1978 Geological & Geochemical

Assessment Report

TITLE	MOUNT COOK PROPERTY
CLAIMS	Grew 1-25 inclusive
COMMODITY	Pb-Zn, Cu-Mo
LOCATED	25.6 km west-southwest of Ross River, Y.T. Latitude 61°56'N Longitude 132°55'W Whitehorse Mining District 105 F/15
BY	D.G. Allen, P.Eng. (B.C.) & P.N. McCarter
FOR	AMAX Potash Limited
WORK PERIOD	August 28 - 30, 1978

090484

AMAX Vancouver Office

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

$ 2,500.00

J a Morin

A/ Resident Geologist or
Resident Mining Engineer

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

B. R. BAXTER
Supervising Mining Recorder

per Commissioner of Yukon Territory

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ILLUSTRATIONS

SUMMARY

The Mt. Cook Property consists of 25 contiguous Grew claims (Grew #1-25; YA18310-18334 inclusive) located in the St. Cyr Range of the Pelly Mountains, 25.6 km southwest of Ross River, Yukon. The claims were staked by AMAX Potash Limited in the summer of 1977.

The property is underlain by Upper Devonian to Mississippian argillaceous sedimentary rocks and acidic volcanic rocks. Two small Cretaceous biotite quartz monzonite plugs intrude the volcanic and sedimentary strata.

High concentrations of Zn (500-2800 ppm) and Pb (54-234 ppm) are present in the argillites and slates within and north of Grew #19 to 25. Anomalous Zn and Pb values are rare in the volcanic rocks.

Pyrrhotite is present in the volcanic rocks in amounts ranging from 2-10% whereas argillites commonly contain up to 5% pyrrhotite.

The highest Cu and Mo concentrations occur in the volcanic rocks and in one sample from the smaller biotite quartz monzonite plug.

CONCLUSIONS

The Zn and Pb mineralization appears to be directly related to the more argillaceous sedimentary rocks, and may be syngenetic in origin. The Cu and Mo mineralization is related to the Cretaceous quartz monzonites and associated quartz vein stockworks in the sedimentary strata.

RECOMMENDATIONS

The present geochemical survey outlines a Pb-Zn anomaly within and north of the northeast claims of the Grew Property. Magnetic and electromagnetic surveys are recommended to test for unexposed massive sulphide horizons near the shale-felsic volcanic contact.

INTRODUCTION

The Grew claims are located 25.6 km west-southwest of Ross River in the St. Cyr Range of the Pelly Mountains, Yukon Territory (Figure 1).

The property consists of a block of 25 claims extending east-southeast along a ridge and includes Mt. Cook (2004 m). Overall relief in the area is 600 metres (2000 ft). The area is above treeline with the exception of some of the lower valleys. Access to the property is best obtained by helicopter from Ross River.

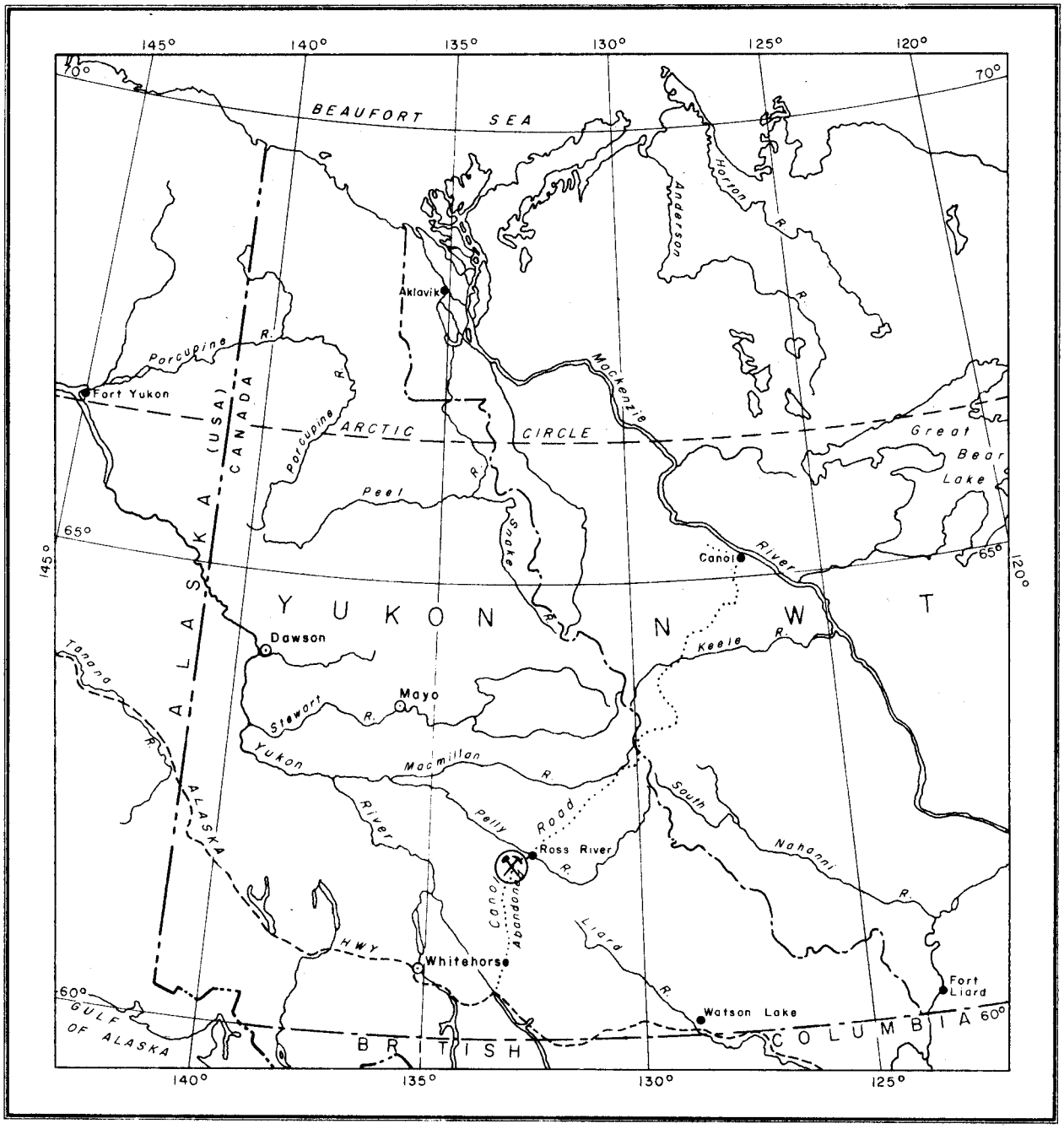
A two-man field party completed mapping and geochemical sampling in the claim area from August 28 - 30, 1978. Field and geochemical results were plotted on an enlargement of NTS Map 105F/15 at a scale of 1:10,000 (Figures 2 and 3).

Claim Data

Thirty-eight claims were staked by AMAX Potash Limited in 1977, however 13 claims were subsequently dropped. Grant numbers for the active claims are YA18310-YA18334 inclusive.

Previous Work

Bulldozer trenches are present in the volcanic unit in the southeast part of the property. Pb-Zn-Ag veins have been reported as occurring within the sedimentary rocks, however they have not been located by AMAX. During the summer of 1977 the property was mapped and selectively sampled geochemically by AMAX.



AMAX POTASH LIMITED

MOUNT COOK PROPERTY
GREW CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

LOCATION MAP

Donald S. Allen

SCALE 1" = 120 MILES

N.T.S. Ref. 105 F 15

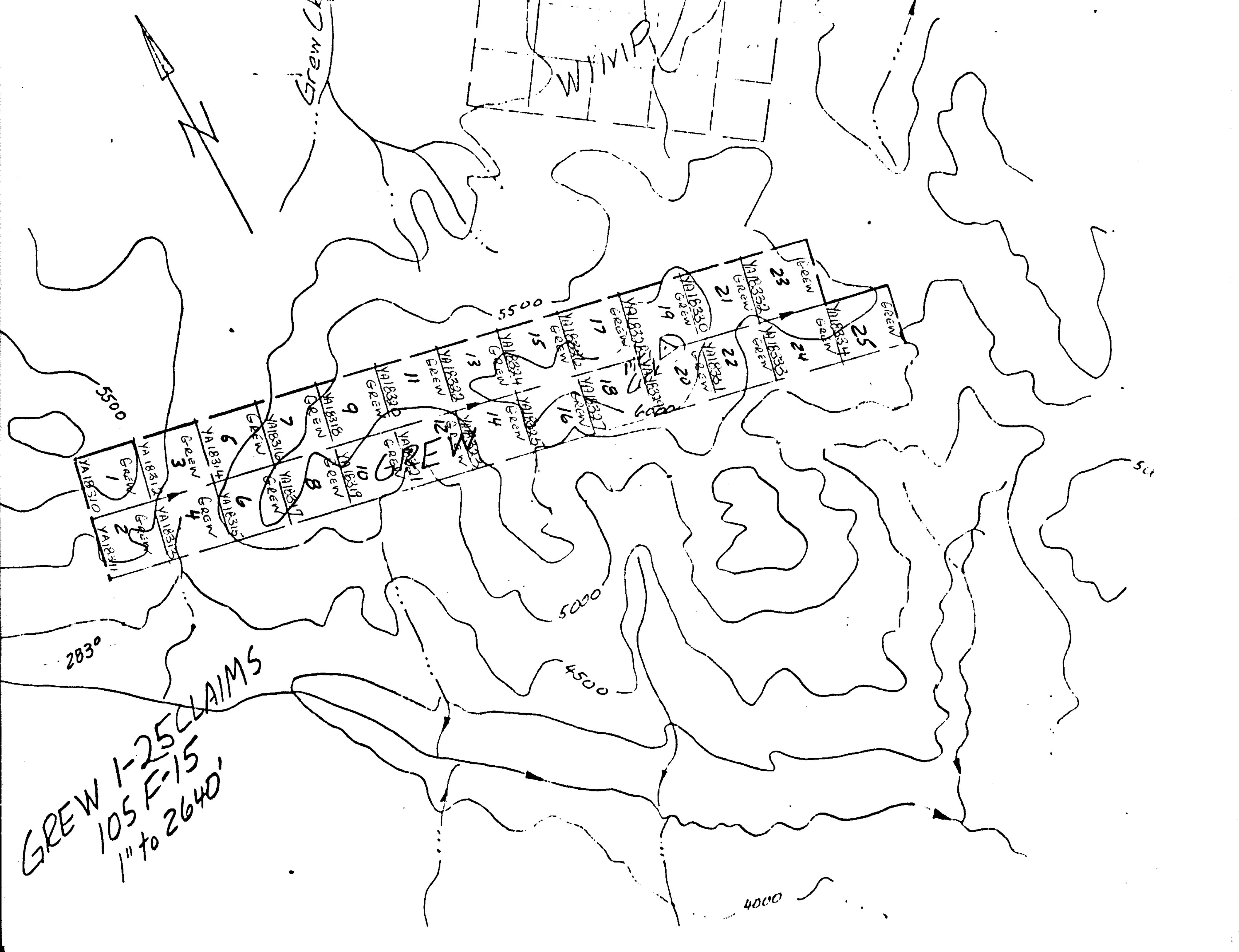
FIG. 1

Vancouver - H.P.

MT. COOK PROPERTY - WHITEHORSE M.D.

LIST OF CLAIMS ON WHICH WORK WAS PERFORMED BETWEEN AUGUST 28-30, 1978

CLAIM NAME	TAG NUMBER
GREW 5	YA 18314
GREW 6	YA 18315
GREW 7	YA 18316
GREW 8	YA 18317
GREW 9	YA 18318
GREW 10	YA 18319
GREW 11	YA 18320
GREW 12	YA 18321
GREW 13	YA 18322
GREW 14	YA 18323
GREW 15	YA 18324
GREW 16	YA 18325
GREW 17	YA 18326
GREW 18	YA 18327
GREW 19	YA 18328
GREW 20	YA 18329
GREW 21	YA 18330
GREW 22	YA 18331
GREW 23	YA 18332
GREW 24	YA 18333
GREW 25	YA 18334


GREW 1-25 CLAIMS
105 F-15
1" to 2640'
GREW
5500
5500
5000
4500
4000
283°
N

REGIONAL GEOLOGY

The property is located 9.6 km southwest of the Tintina Fault. The area is underlain by a succession of Upper Devonian to Mississippian argillaceous sedimentary and acidic volcanic rocks. The strata strike northwest and dip steeply to the southwest. A northwest-trending anticlinal structure is present north of the property. The St. Cyr Fault is present south of the property and strikes parallel to the bedding in the strata. Later northeast trending faults displace the sedimentary and volcanic rocks, as well as earlier structural trends.

G.S.C. Open File 486 by Templeman Kluit depicts the geology of the Quiet Lake and Finlayson Map Sheets.

PROPERTY GEOLOGY

The property is underlain by a series of Upper Devonian to Mississippian argillaceous sedimentary and acidic volcanic rocks (Figure 2). The sedimentary rocks consist of beds of fine grained dark grey to black argillite, slate, phyllite, siltstone, chert and greywacke alternating with fine grained grey to dark grey argillaceous limestone and calcarenite. Banding is best developed in the argillaceous sedimentary strata, whereas the limy beds tend to be more massive. The argillites and slates commonly contain up to 5% fine grained pyrrhotite as disseminations and fine bands. Massive barite beds are present in the sedimentary strata, particularly in the western part of the property where they are most abundantly interbedded with the limestone units. Minor volcanic interbeds are also present in the sedimentary rocks.

A band of dacitic to rhyolitic flows, tuffs and breccias in the central part of the property, which are conformable with the sedimentary strata, generally contain 2-10% fine grained pyrrhotite as disseminations, and in clots and bands. The presence of the pyrrhotite imparts a strong rust-coloured gossan to the volcanic unit.

Two small plugs of biotite quartz monzonite are present near the central part of the property. The larger intrusion, which underlies Mt. Cook contains quartz-sericite±molybdenite veins ranging in abundance up to three veins per metre. A smaller inequigranular to porphyritic plug with 2-4% quartz phenocrysts contains quartz±molybdenite veins averaging about one vein per five metres. Local quartz-vein stockworks (20 to 30 veins per metre) are associated with this intrusion.

A north-northwest-trending fault and a northeast-trending fault displace the strata in the central part of the property. Minor anticlinal folds are present along the northern boundary of the property and may represent parasitic folds on the southern limb of a larger anticline to the north.

PROPERTY GEOCHEMISTRY

Soil and rock chip samples were taken throughout the property for geochemical analyses. The results are shown in Figure 3. Pb values $\geq$50 ppm and Zn values $\geq$500 ppm were considered to be anomalous. The strong gossan in the eastern part of the claim block was systematically sampled. The highest values for Zn and Pb are present on the north slope of the ridge north of claims 21 and 23. Anomalous values for Zn and Pb in this area range from 500 - 2800 ppm Zn and 54 - 234 ppm Pb. These soils are colluvial in origin, however rock chip samples from the top of the ridge are not

anomalous. The highest Pb and Zn values correlate well with the argillites and slates. Pb and Zn anomalies in the sedimentary rocks of the western part of the property are not as high or as common as those in the east.

Pb and Zn values are lower in the volcanic rocks. There appears to be no correlation of high Pb-Zn values with high pyrrhotite concentrations.

High values for Mo and Cu correlate well with each other. They are generally found in the volcanic rocks although high Mo values are also present in the sedimentary rocks. A weak Cu anomaly associated with a high concentration of Mo in the sedimentary sequence north of claim number 23 is located near an outcrop of silicified sedimentary rocks containing a barren quartz vein stockwork system with a vein density of ten per metre. The highest Mo value was found in the small quartz monzonite plug.

It appears that the Cu and Mo concentrations are related to the quartz monzonite bodies and quartz vein stockwork systems. In contrast, the Pb and Zn concentrations may be related to the deposition of the sedimentary sequence.

D.G. Allen, P.Eng. (B.C.)

APPENDIX I - STATEMENT OF WORK

Summary of Work - Geological and Geochemical Sampling
Mt. Cook Property - Grew Claims

Period of Work - August 28 - 30, 1978

Personnel

D.G. Allen, P.Eng. 601-535 Thurlow Street, Vancouver 3 days @ $127.97/day	$ 383.91
P.N. McCarter, Sr. Assistant, c/o Geology Department, Oregon State University, Corvallis, Ore. 3 days @ $ 53.25/day	159.75

Accommodation

6 man days @ $ 30.00/day	180.00

Transportation

Trans North Turbo Air Ltd., - Whitehorse, Y.T. Inv. #34811, 34812, 34813	813.20
Terr-Air Rotary Ltd., - Ross River, Y.T. Inv. #5105	177.00

Geochemistry

Geochemical Analysis - Rossbacher Laboratories, Burnaby Inv. #9009 - Mo, Cu, Ni, Mn, Fe, Ag, Zn, Pb, Bi 54 soil and silt samples 69 rock samples	510.30
Report Preparation and Draughting	300.00
TOTAL	$2,524.16

Work to be applied: Grew 1-25 inclusive - 1 year

APPENDIX II

STATEMENT OF QUALIFICATIONS

NAME	P.N. McCarter
ADDRESS	c/o Geology Department Oregon State University Corvallis, Oregon 97331
EDUCATION	BSc. Major in Geology - University of Western Ontario 1974 Presently working on MS degree in Geology at Oregon State University (expected 1979)
EXPERIENCE	1977-1975 Ontario Div. of Mines - Senior Assistant 1974 Utah Mines Ltd. - Junior Assistant 1973 Cand. Occidental - Stream Sampler 1973 Cand. Occidental - Soil Sampler

Statement of Qualifications

Donald G. Allen

B.A.Sc	University of British Columbia	1964
M.A.Sc	University of British Columbia	1966
PhD	Queen's University	1970

Since 1970 Professional Engineer in the Province of British Columbia

Staff Geologist for Amax Potash Limited since October 1969

APPENDIX III

CONTRACTOR'S INVOICES

TRANS NORTH TURBO AIR LTD.
BOX 4338, WHITEHORSE, YUKON Y1A 3T6
TELEPHONE (403)668-2177 · TELEX 036-8-290

ACCOUNT NUMBER 6 0
34811

INVOICE DATE 16 | 9 | 78

AREA: B.C. / YUKON / NWT / ALTA.

CHARTERER: Amax

BILLING ADDRESS

AMAX
SEP 11 1978
VANCOUVER OFFICE

A/C TYPE: 206B
AIRCRAFT REGISTRATION: CFTWG

FLIGHT DATE: DAY 28 MONTH 08 YEAR 78

PURCHASE ORDER NO.

FUEL & OIL-X: TNTA ✓ / CUST.
TNTA FUEL USED: JP-4
HRS-GALS.: 0.8
FROM: RR-Bouk

FROM: RR
TO: Setouts & Pickups
Mt. Cook Area

MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
			Don. Allen.
	0.8	B	
			Mt Cook Property

ADD'S & EXT. CORRECT: Laura B. Menne
APPROVED DATE 9/13/78

Project Number	Group Code	Activity Code	Account Class	Sub Class	Amount
880	—	—	8684	—	297.28

CK. 17326 SEP 14 1978

SUB	G.L.		AMOUNT
61116	5T420		280.00
61116	5T110		17.28

0.8	@ 350.00		280.00
	@		
	@		
	@		
WAITING TIME	@	/HR.	
FUEL:	@	/GAL.	
FUEL: JP 18	@ .96	/GAL.	17.28
MEALS & LODGING			
OTHER			
OTHER			

TERMS: EIGHTEEN PERCENT INTEREST PER ANNUM WILL BE CHARGED ON ALL INVOICES NOT PAID WITHIN 30 DAYS OF DATE ISSUED.

D. Allen.
CHARTERER'S SIGNATURE

[signature]
PILOT'S SIGNATURE

Linseman.
ENGINEER'S NAME

TOTAL $ 297.28

FLIGHT REPORT INVOICE

...TH TURBO AIR LTD.
BOX 4038, WHITEHORSE, YUKON Y1A 3T6
TELEPHONE (403)668-2177 • TELEX 036-8-290

ACCOUNT NUMBER	6 0
	34812
INVOICE DATE	16 19 78
AREA	B.C. / YUKON / NWT / ALTA.

CHARTERER: Amax Northwest mining

BILLING ADDRESS: 601 - 535 Thurlow St
Van BC V6E 3L6

A/C TYPE	AIRCRAFT REGISTRATION
206 B	C-GTNG

FLIGHT DATE	DAY	MONTH	YEAR
	29	08	78

PURCHASE ORDER NO.

FUEL: TNTA / CUST.	TNTA FUEL USED	HRS.-GALS.	FROM
✓	SPA	0.8	RR Buck

FROM: RR
TO: Setouts & Pickups Mt Cook Area

MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
			Don Allen
	0.8	B	Mt Cook Property

AUD & EXT. CORRECT: Laura B. M...
APPROVED — DATE 9/13/78

Project Number	Group Code	Activity Code	Account Class	Sub Class	Amount
880	–	–	8684	–	297.28

CK. 17326 SEP 14 1978

				AMOUNT	
6116	std2	0		280	00
6116	st11	0		17	28

	0.8 @ 350.00		280	—
	@			
	@			
	@			
WAITING TIME	@	/HR.		
FUEL: RR 18	@ .96	/GAL.	17	28
FUEL:	@	/GAL.		
MEALS & LODGING				
OTHER				
OTHER				

TERMS: EIGHTEEN PERCENT INTEREST PER ANNUM WILL BE CHARGED ON ALL INVOICES NOT PAID WITHIN 30 DAYS OF DATE ISSUED.

D. Allen
CHARTERER'S SIGNATURE

[signature]
PILOT'S SIGNATURE

Linseman
ENGINEER'S NAME

TOTAL $ 297.28

FLIGHT REPORT INVOICE

TRANS NORTH TURBO AIR LTD.
BOX 4338, WHITEHORSE, YUKON Y1A 3T6
TELEPHONE (403)668-2177 • TELEX 036-8-290

ACCOUNT NUMBER: 6 0
34813

INVOICE DATE: 16 9 78
AREA: B.C. / YUKON / NWT / ALTA.

A/C TYPE: 206B
AIRCRAFT REGISTRATION: C-GTNG

FLIGHT DATE: DAY 30 MONTH 08 YEAR 78

PURCHASE ORDER NO.

CHARTERER: Amax

BILLING ADDRESS:

AMAX SEP 11 1978

FUEL & OIL-X: TNTA ✓ CUST.
TOTAL FUEL USED (HRS./GALS.): 1.2
FROM: RR

FROM: RR
TO: For MtN Dropoffs & Pickups, 2 Stops & Mt Cook Setout

MILES	HOURS	ZONE	REMARKS - NO. OF PASS - FREIGHT LBS.
	1.2	B	Don Allen

APPROVED (stamp) — DATE 9/13/78

Project Number	Group Code	Activity Code	Account Class	Sub Class	Amount
880	—	—	8684	—	444.96

CK. 173?6 SEP 14 1978

1.2 @ 350.00 420 —

SUB	G.L.		AMOUNT	
6116	5022		420	00
6116	5110		24	96

0.6 HRS. = 210.00
FUEL 9 GALS = 8.64
218.64

TERMS: EIGHTEEN PERCENT INTEREST PER ANNUM WILL BE CHARGED ON ALL INVOICES NOT PAID WITHIN 30 DAYS OF DATE ISSUED.

WAITING TIME	@	/HR.		
FUEL: 26	@ .96	/GAL.	24	96
FUEL:	@	/GAL.		
MEALS & LODGING				
OTHER				
OTHER				

TOTAL $444.96

CHARTERER'S SIGNATURE: D. Allen
PILOT'S SIGNATURE: J. Smith
ENGINEER'S NAME: Linseman

FLIGHT REPORT INVOICE

HELICOPTER CHARTER

ROSS RIVER
YUKON
CANADA

terr-air
ROTARY LTD.

PHONE: 403-969-2240

AMAX
SEP 5 1978

CHARTER TICKET NO. 5105

PROJECT: _____

AIRCRAFT H500D

DATE Aug 30/78

NAME AMAX

ADDRESS _____

FLIGHT/PASSENGER DETAILS	HOURS	MINS.	FUEL
Pick up Twb Crew Mont Coor 1 East 1 West			

ADD & EXT CORRECT Joan B McCann
APPROVED DATE 9/6/78

Project Number	Group Code	Activity Code	Account Class.	Sub Class	Amount
880	—	—	8684	—	177.00
Ck. 17285			SEP 6 - 1978		
100			177.	00	

TOTAL HRS .5 @ 354.00 PER HR. 177. 00

EXTRA CHARGES fuel 13 @ 1.50 19. 50

TOTAL CHARGES 177.00

STAR PRINTING, WHITEHORSE

D. Allen. 880
Charterer's Authorization

Pilot's Signature

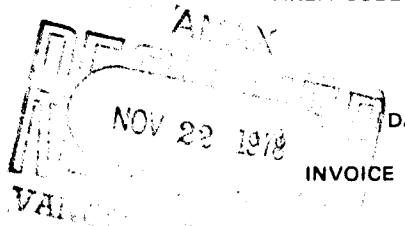
Lossbacher Laboratory

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.

Project 880, order # 2580

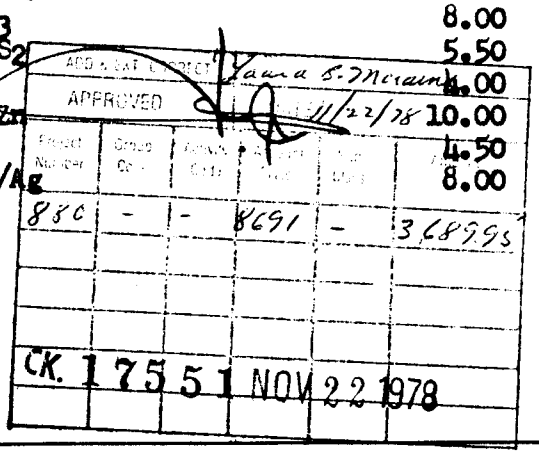


DATE Oct 29,1978

INVOICE NO. 9009

CERTIFICATE NO. Various

ITEM	DESCRIPTION		SUB-TOTAL	TOTAL
580	Geochem analysis, 9 elements	@ $ 3.50	$ 2,030.00	
60	Geochem analysis for W	2.00	120.00	
59	Geochem analysis for F	2.75	162.25	
4	Geochem analysis for Sb	2.00	8.00	
1	Geochem analysis for Au	2.50	2.50	
266	Soil prep	0.20	53.20	
314	Rock prep	1.00	314.00	
61	Whole rock analysis	11.15	680.15	
20	Assays for WO_3	8.00	160.00	
9	Assays for MoS_2	5.50	49.50	
7	Assays for Cu	4.00	28.00	
1	Assay for Pb/Zn	10.00	10.00	
1	Assay for Ag	4.50	4.50	
5	Assays for Au/Ag	8.00	40.00	
	Freight		27.85	
				$ 3,689.95



TERMS – NET 30 DAYS

APPENDIX IV

GEOCHEMICAL RESULTS AND PROCEDURES FOR COLLECTION AND PROCESSING OF GEOCHEMICAL SAMPLES

Kossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

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

SEP 22 1978

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 8135

TO: Amax Minerals Exploration
535 Thurlow St. Van. B.C.

INVOICE NO.

PROJECT Mt. Cook

DATE ANALYSED SEPT/78

No.	Sample	pH	Mo	Cu	Ni		Mn	Fe	Ag	Zn	Pb		Bi	No.
01	78COT821		1	2	32		620	.2	1.8	44	62		48	01
02	822		18	16	76		140	1.8	.6	176	104		12	02
03	823		32	34	106		100	1.8	3.0	146	330		6	03
04	824		32	24	96		60	1.1	.4	80	46		10	04
05	825		23	8	72		60	0.8	.2	116	54		2	05
06	826		20	22	60		60	1.6	1.2	1440	540		8	06
07	827		1	6	26		100	0.3	1.6	38	170		42	07
08	828		1	6	24		80	0.1	1.8	24	98		44	08
09	829		1	4	26		100	0.2	1.4	12	56		44	09
10	830		1	4	26		300	02	1.0	52	42		38	10
11	831		1	4	36		420	0.3	1.2	76	66		40	11
12	832		24	8	88		160	1.4	.6	92	34		8	12
13	833		17	14	60		100	1.2	.2	164	60		4	13
14	834		7	8	24		40	0.7	.8	24	22		8	14
15	835		1	6	32		420	0.3	1.0	36	46		32	15
6	836		22	6	88		140	0.8	.4	80	18		4	16
17	837		25	12	78		100	0.8	.4	10	18		2	17
18	838		1	4	60		140	0.3	1.0	14	36		32	18
19	839		6	10	76		340	2.3	1.2	58	46		20	19
20	840		9	20	66		260	2.8	1.0	82	40		20	20
21	841		30	18	130		400	2.6	.8	52	22		18	21
22	842		6	8	40		100	1.0	.8	16	18		16	22
23	843		10	58	76		140	2.6	1.2	36	22		22	23
24	844		15	10	88		360	30	1.2	80	30		28	24
25	845		11	10	72		320	2.6	1.0	72	36		80	25
26	846		30	8	112		100	1.2	.2	24	6		2	26
27	847		1	4	26		180	.3	1.8	14	26		44	27
28	L848		17	80	78		220	3.6	2.0	x1050	140		16	28
29	S849		30	78	100		400	4.3	1.8	[redacted]	202		24	29
30	850		20	72	82		220	3.7	1.4	x 900	56		12	30
31	851		15	52	76		220	3.0	1.2	x 780	90		20	31
32	852		17	52	92		180	4.0	1.2	x 700	82		24	32
33	853		8	38	72		40	2.3	5.4	270	34		20	33
34	T854		24	6	92		160	1.0	.2	116	2		10	34
35	S 855		10	48	62		220	2.6	1.2	x460	66		16	35
36	856		43	122	176		180	3.7	3.6	x1160	64		20	36
37	L857		60	110	212		180	4.8	4.2	x1460	42		14	37
38	858		32	128	216		160	4.6	3.8	x1140	22		24	38
39	T859		1	6	32		160	.5	1.4	110	24		24	39
40	G 27		22	280	32		420	1.1	1.2	x 800			10	40

* 8 COS 849 = 2800 Zn

Certified by [signature]

Rossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

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

NOV 22 1978

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 8135

TO: Amax Minerals Exploration
535 Thurlow St. Van., B.C.

INVOICE NO.

PROJECT Mt Cook.

DATE ANALYSED Sept 1/78

No.	Sample	pH	Mo	Cu	Ni		Mn	Fe	Ag	Zn	Pb	Zn	Bi	No.
01	78COS860		10	60	84		460	4.4	2.6	850	234		24	01
02	T861		15	34	74		300	2.3	2.0	16	16		26	02
03	S862		9	214	24		180	>10.0	1.8	28	20		42	03
04	T863		16	18	66		940	9.0	1.0	80	22		30	04
05	864		9	80	48		620	>10.0	1.2	38	22		34	05
06	865		12	6	46		340	7.0	.6	20	10		26	06
07	866		11	160	40		540	3.3	.6	32	10		28	07
08	867		11	32	28		180	2.8	.4	16	10		18	08
09	868		18	56	76		500	5.0	1.0	52	18		24	09
10	869		18	330	76		420	6.2	.6	30	14		24	10
11	870		18	380	66		420	6.6	.8	36	16		22	11
12	871		12	22	66		400	7.2	.8	24	20		32	12
13	872		12	116	52		360	3.1	.4	26	14		20	13
14	873		4	78	176		220	1.9	.8	28	14		20	14
15	874		1	10	60		320	1.0	.8	44	30		22	15
16	875		22	34	52		220	1.1	1.0	60	20		26	16
17	876		17	18	76		220	1.8	.6	18	18		16	17
18	877		8	124	88		420	3.8	.8	18	18		24	18
19	S878		10	214	48		540	9.0	1.4	134	30		36	19
20	879		9	268	52		540	>10.0	1.2	90	30		36	20
21	T880		18	100	80		280	3.2	1.0	20	14		20	21
22	S881		10	206	42		460	10.0	1.2	96	26		34	22
23	T882		11	290	118		340	4.7	1.2	16	18		26	23
24	S883		9	110	30		700	7.5	1.2	234	86		26	24
25	884		7	90	36		1440	1.4	.8	228	40		26	25
26	885		8	110	48		2120	9.5	1.0	368	66		24	26
27	T886		7	32	86		620	3.0	1.0	30	18		24	27
28	S887		14	114	40		2260	>10.0	1.8	184	36		32	28
29	888		3	30	28		1240	3.2	.4	80	22		14	29
30	889		4	48	56		460	4.7	.6	140	22		18	30
31	T890		3	2	110		500	4.0	.8	80	16		18	31
32	S891		4	34	48		500	3.8	.6	180	34		20	32
33	892		10	56	48		1100	4.0	.8	116	34		20	33
34	893		21	76	62		840	>10.0	2.4	76	30		36	34
35	894		12	106	126		4000	9.0	1.0	180	58		24	35
36	895		5	68	110		3020	6.2	1.0	1160	42		20	36
37	896		5	124	88		2840	7.0	1.2	400	40		20	37
38	T902		4	14	46		420	2.3	1.0	42	30		24	38
39	903		7	10	56		540	3.0	1.0	60	22		28	39
40	G 1		7	38	14		280	2.7	.4	92	22		14	40

Certified by C. Rossbacher

Rossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

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

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 8135

TO: Amax Minerals Exploration
535 Thurlow St Van B.C.

INVOICE NO.

PROJECT Mt. Cook

DATE ANALYSED SEPT/78

No.	Sample	pH	Mo	Cu	Ni		Mn	Fe	Ag	Zn	Pb		Bi	No.
01	78COT904		6	44	148		300	2.7	.8	32	14		20	01
02	5905		4	26	42		460	2.7	.8	<660	166		16	02
03	906		7	38	60		420	3.2	.8	<660	102		12	03
04	907		7	68	12		500	3.1	.8	210	46		20	04
05	908		14	94	80		380	3.2	1.2	400	50		16	05
06	909		11	48	130		600	3.9	1.0	340	30		12	06
07	910		7	72	104		600	4.4	1.0	280	32		20	07
08	911		7	70	76		720	5.2	.8	<410	50		20	08
09	T912		18	14	96		260	1.4	.8	20	18		18	09
10	5913		8	140	82		500	7.5	1.0	126	26		22	10
11	T914		12	20	84		500	2.2	.8	70	18		14	11
12	5915		6	90	130		1260	6.7	1.0	165	34		20	12
13	916		6	104	88		1300	8.0	1.2	<1160	98		20	13
14	T917		20	16	104		260	1.4	.8	24	18		16	14
15	5918		4	214	180		220	10.0	1.6	<600	70		24	15
16	T919		11	32	64		2020	5.2	1.8	220	26		28	16
17	5920		7	82	94		780	4.8	1.0	230	36		16	17
18	921		7	200	126		680	6.5	1.6	<420	38		20	18
19	T922		14	168	172		500	6.2	.8	28	18		18	19
20	5923		5	64	80		660	4.0	1.0	190	28		14	20
21	924		8	66	104		640	4.2	1.4	<460	86		14	21
22	925		9	62	88		500	3.6	1.2	270	32		20	22
23	926		55	56	116		620	4.0	1.6	<730	48		20	23
24														24
25														25
26														26
27														27
28														28
29														29
30														30
31														31
32														32
33														33
34														34
35														35
36														36
37														37
38														38
39														39
40	G6		45	374	270		340	1.8	2.8	340	7400			40

Certified by R. Rossbacher

Kossbacher Laboratory

GEOCHEMICAL ANALYSTS & ASSAYERS

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

CERTIFICATE OF ANALYSIS

CERTIFICATE NO. 8135

TO: AMAX MINERALS EXPLORATION
601 - 535 THURLOW ST. VANC.

INVOICE NO.

PROJECT MT. COOK

DATE ANALYSED NOV. 1978

No.	Sample	pH	Mo	Cu	Ni	Fe %	Mn	~~Fe~~	Ag	Zn	Pb	Bi	Bi	No.
01	8 CAT 643		20	20	44	1.4	100	~~3.9~~	.6	16	46	10	86	01
02	S 644		10	88	48	>10.0	360	2/4	1.0	110	44	40	20	02
03	T 645		12	12	16	2.4	1740	6.6	.8	34	78	18	6	03
04	646		12	8	24	1.0	60	1.8	.4	8	20	14	14	04
05	S 647		6	80	128	4.3	640	7.6	1.6	108	38	20	32	05
06	T 648		8	12	26	.5	60	8.9	.2	32	6	4	4	06
07	649		4	38	36	1.3	60	1.6	.6	60	96	6	64	07
08	T 650		10	16	26	1.4	520	2.6	.4	196	60	10	20	08
09	S 651		12	60	60	7.8	1800	1.7	1.2	>620	160	24	12	09
10	651		60	104	40	6.8	880	2/0	1.0	88	54	38	14	10
11	T 652		6	80	66	2.1	240	8.9	2.8	36	44	36	32	11
12	653		6	26	26	1.7	120	2/0	.8	32	68	24	14	12
13	654		14	38	40	6.4	420	6.4	1.0	36	70	40	16	13
14	655		18	52	58	6.5	300	1.8	1.6	40	118	44	20	14
15	S 656		6	400	32	8.2	300	2/2	.8	116	46	34	14	15
16	657		10	180	48	8.8	760		1.0	272	40	54		16
17	658		12	196	30	5.8	300		.4	140	40	36		17
18	659		9	72	48	7.2	820		.8	>400	98	30		18
19	661		12	40	36	4.6	700		.4	330	110	26		19
20	662		10	34	20	1.4	60		.8	126	140	20		20
21	T 668		10	32	120	1.1	120		.4	32	28	16		21
22	8 CAT 669		12	56	48	1.0	60		.4	24	14	12		22
23														23
24														24
25														25
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38														38
39														39
40														40

Certified by F. Kossbacher

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

SAMPLE COLLECTION

Soil

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.

Rossbacher Laboratory
GEOCHEMICAL ANALYSTS & ASSAYERS

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

April 30, 1974

SUMMARY OF SOME ANALYTICAL TECHNIQUES CURRENTLY IN USE AT ROSSBACHER LABORATORY

A ANALYTICAL TECHNIQUES FOR GEOCHEMICAL SAMPLES

SAMPLE PREPARATION

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

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

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

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 $Hx10_3$ and dilute to 500 mls

2. 100 gamma/ml Ag - 10 mls of above + 20 mls $HClO_4$, dilute to 100 mls

3. Recovery spiked standard

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

Working AA Standards

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

Recovery Standard

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

Follow the general geochemical procedure for sample preparation and digestion.

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

1 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 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, 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 us 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 M

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% HC

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

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

2, 5, 8, 10 mls 10,000 gamma/ml - dilute to 100 mls in 20% HClO4. This gives

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

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

Cu Geochemical AA Setting

Lamp Single Cu or

5 multi element

Current 10 for multi element #4 Slit 7A

4 for single #3 Slit 7A

Wavelength 3247 Dial 280

Burner Techtron AB 51 (For Cu in natural waters)

P.E. Short Path (For geochem)

Fuel Acetylene Flow 14

Oxidant Air Flow 14

Range

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

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

Burner 90°

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

Wavelength 2492 Dial 147

Burner in line

Range

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

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

Higher range than 40,000 ppm requires 10x dilution

Standards

10,000 gamma/ml

1.000 gm metal powder, 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, 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 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

MOUNT COOK

LEGEND

CRETACEOUS

3 Quartz monzonite.

UPPER DEVONIAN ? TO MISSISSIPPIAN

2 Sedimentary rocks. 2a Slate, argillite, phyllite, minor chert, tuff, limy argillite. 2b Siltstone, greywacke. 2c Limestone, chert, with ▬ massive barite beds. 2d Chert, argillite, tuff, ▬ minor barite. 2e Limestone, argillaceous limestone, calcarenite.

1 Volcanic rocks. Dacite to rhyolite flows, breccia, locally cherty.

SYMBOLS

- Outcrop, suboutcrop and / or boulder.
- Geological contact.
- Fault.
- Plunge of slickensides.
- Foliation (vertical, inclined).
- Bedding (vertical, inclined).
- Quartz vein (inclined).
- Major fold axis (anticline).
- Quartz vein (inclined).
- Quartz vein stockwork.
- Claim post, claim location line.
- Claim boundary.

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MOUNT COOK PROPERTY
GREW CLAIMS
WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOLOGICAL MAP

SCALE 200 0 200 METRES
800 0 800 FEET
1 : 10,000

Donald G. Allen

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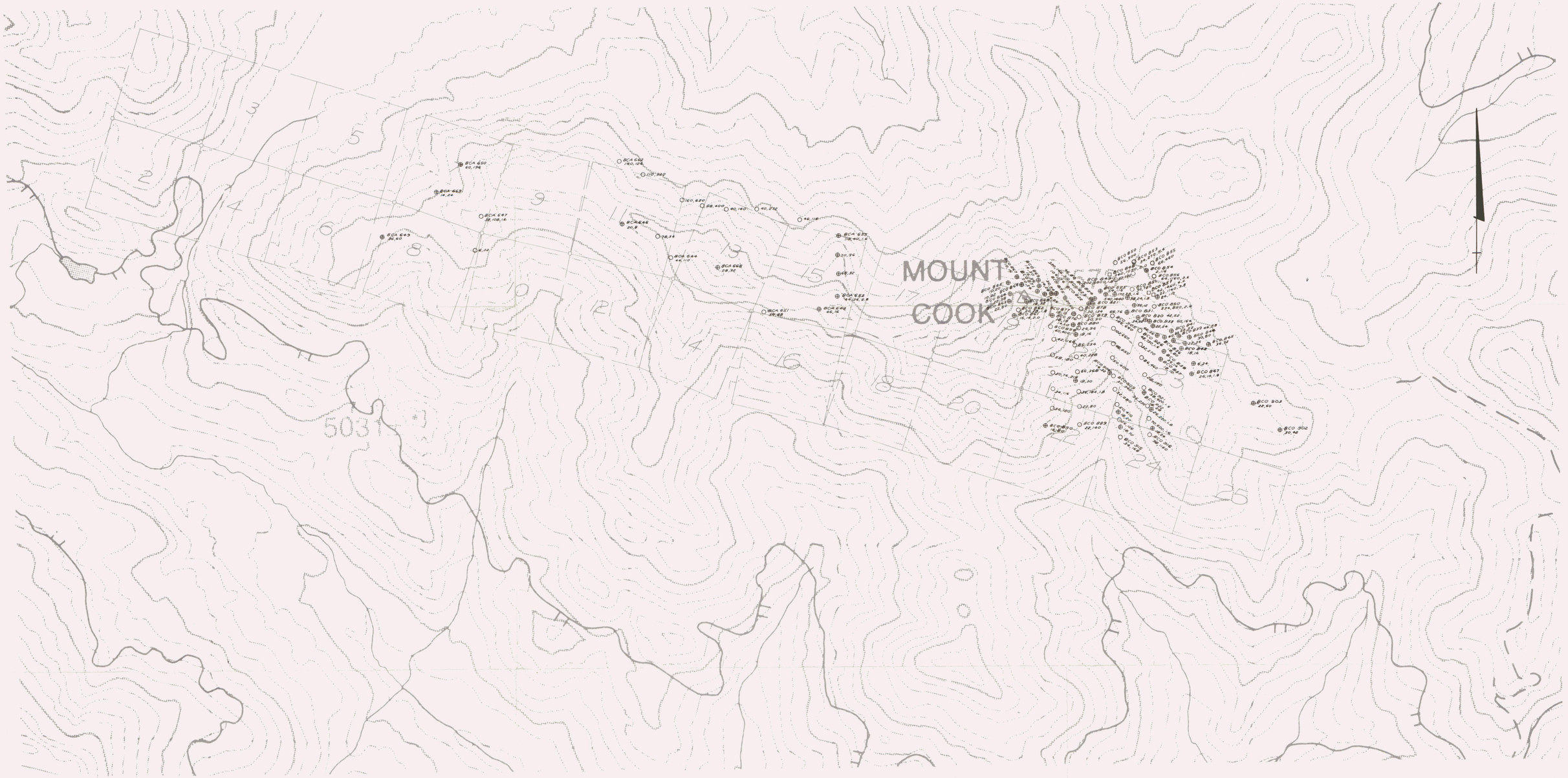
N.T.S. Ref. 105 F 15

FIG. 2



SYMBOLS

- ○ BCO 315 / 34, 168 — Soil sample site; sample number; p.p.m. Pb, Zn.
- □ BCO 887 / 42, 1460, 42 — Silt sample site; sample number; p.p.m. Pb, Zn.
- ⊕ BCA 649 / 94, 60 — Rock chip sample site; sample number; p.p.m. Pb, Zn.
- Claim post, claim location line.
- Claim boundary.

NOTE: Significant p.p.m. Ag values (> 1.5) also shown.

AMAX POTASH LIMITED

MOUNT COOK PROPERTY
GREW CLAIMS

WHITEHORSE MINING DISTRICT — YUKON TERRITORY

GEOCHEMICAL MAP

SCALE 200 0 200 METRES / 800 0 800 FEET
1 : 10,000

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FIG. 3