

86-589-15182

SEP 13 1986

173 1003 B.C.

Operator: LEMMING RESOURCES LTD.

ASSESSMENT REPORT

SOIL GEOCHEMISTRY

BAP 10, 14, 18 MINERAL CLAIMS

OMINECA MINING DIVISION

94D/8E

56029N, 126003W

29.7' 06'

FILMED

Owner: BP Minerals Limited

**GEOLOGICAL BRANCH  
ASSESSMENT REPORT**

**15,182**

C.M. Rebagliati, P.Eng.

September 23, 1986

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## INTRODUCTION

In 1975 and 1976 BP Minerals Limited conducted a soil geochemical grid over the BAP 10, 14 and 18 mineral claims to assess the copper-zinc potential of a large conspicuous gossan. In 1982 the sample pulps were reanalyzed and many were found to be geochemically enhanced in gold.

This report describes the geochemical survey undertaken by Lemming Resources Ltd. to relocate and to define the areas of anomalous gold concentrations.

## LOCATION AND ACCESS

The claims are located at 56° 29'N latitude and 126° 05'W longitude in the Omineca Mining Division approximately 200 km north-northeast of Smithers and 10 km south-southeast of Johanson Lake (NTS 94D/08, Fig. 1). Access to the property is by helicopter from Johanson Lake, a distance of 15 km, which in turn reached by wheel or float equipped aircraft, or by the Omineca Highway. The Omineca Highway is reached from Fort St. James (400 km) or via Highway 97 from Prince George (500 km). The Dease Lake extension of the British Columbia Railway is operational between Prince George and Driftwood, 65 km southwest of Johanson Lake.

The claims are situated east of Kliyul Creek above timber-line on a 30° southwest facing slope on which elevations range from 1800 to 2000 meters. Ubiquitous talus obscures approximately 65% of the bed rock.

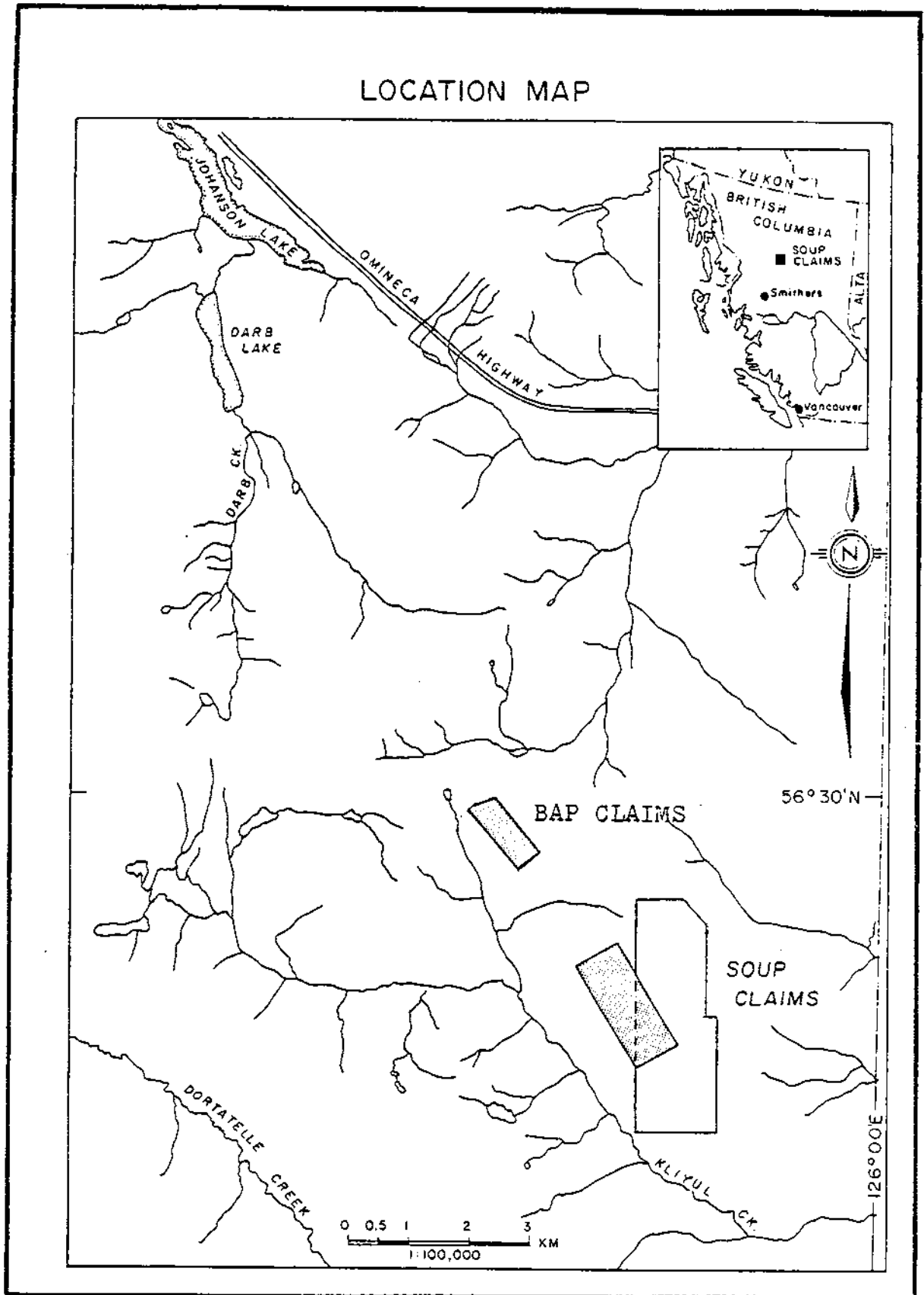
## CLAIMS

The BAP claims are owned by BP Resources Canada Limited and are held under option by Lemming Resources Ltd. (Figure 2).

<u>Claim Name</u>	<u>Record #</u>	<u>Units</u>	<u>Recording Date</u>	<u>Expiry Date*</u>
BAP 10	128000	1	August 13, 1973	August 13, 1994
BAP 14	128004	1	August 13, 1973	August 13, 1994
BAP 18	128008	1	August 13, 1973	August 13, 1994

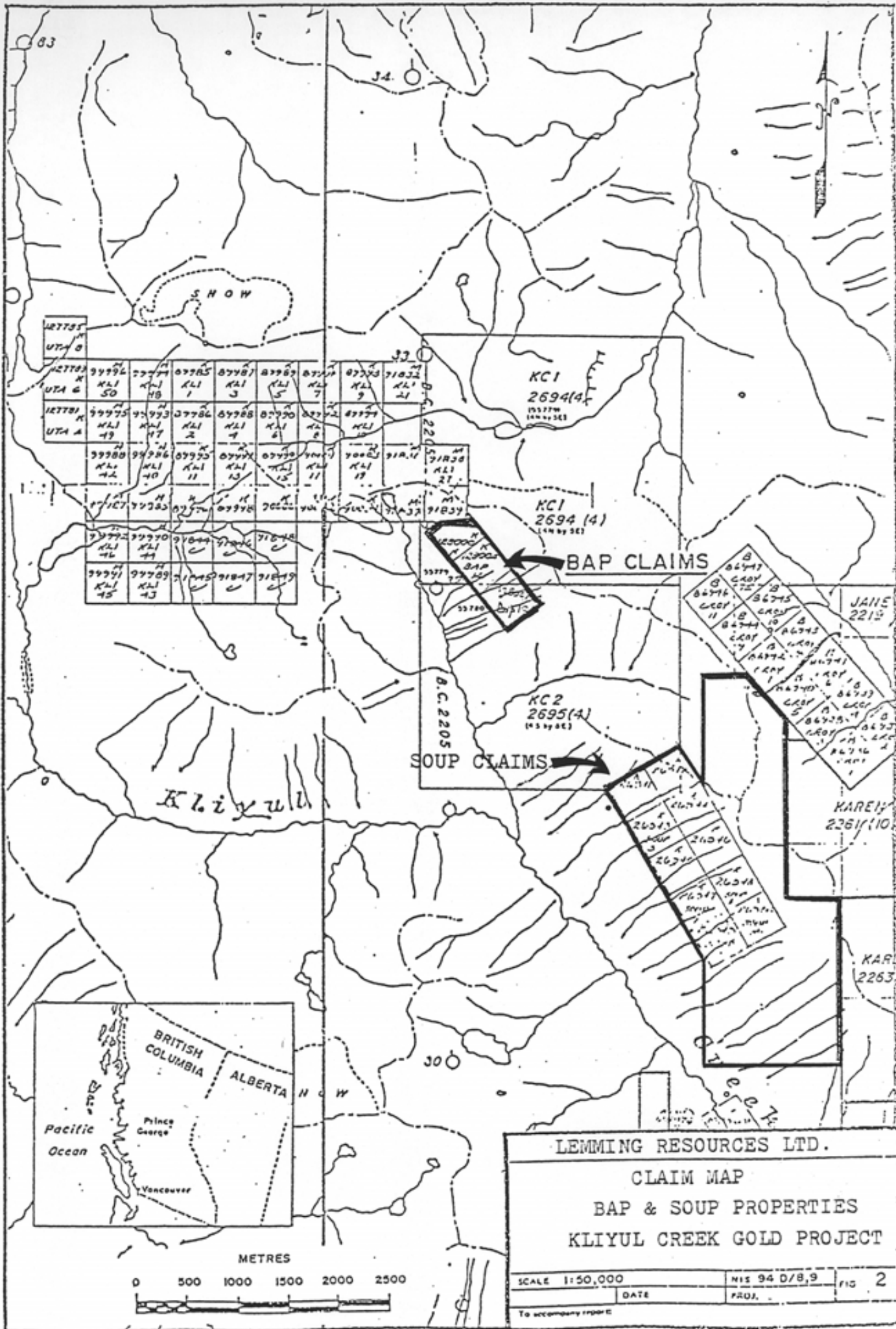
\* Upon acceptance of this assessment report.

# LOCATION MAP

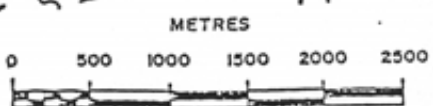


LEMMING RESOURCES LTD.  
KLIYUL CREEK GOLD PROJECT

FIG. 1



127781 K UTA G	99996 KLI 50	99997 KLI 49	99998 KLI 48	99999 KLI 47	99999 KLI 46	99999 KLI 45	99999 KLI 44	99999 KLI 43	99999 KLI 42	99999 KLI 41	99999 KLI 40	99999 KLI 39	99999 KLI 38	99999 KLI 37	99999 KLI 36	99999 KLI 35	99999 KLI 34	99999 KLI 33	99999 KLI 32	99999 KLI 31	99999 KLI 30	99999 KLI 29	99999 KLI 28	99999 KLI 27	99999 KLI 26	99999 KLI 25	99999 KLI 24	99999 KLI 23	99999 KLI 22	99999 KLI 21	99999 KLI 20	99999 KLI 19	99999 KLI 18	99999 KLI 17	99999 KLI 16	99999 KLI 15	99999 KLI 14	99999 KLI 13	99999 KLI 12	99999 KLI 11	99999 KLI 10	99999 KLI 9	99999 KLI 8	99999 KLI 7	99999 KLI 6	99999 KLI 5	99999 KLI 4	99999 KLI 3	99999 KLI 2	99999 KLI 1	99999 KLI 0
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LEMING RESOURCES LTD.

CLAIM MAP

BAP & SOUP PROPERTIES

KLIYUL CREEK GOLD PROJECT

SCALE 1:50,000

DATE

PROJ.

NIS 94 D/8,9

FIG 2

To accompany report

## GEOLOGY

The claims are underlain by northerly striking, gently easterly dipping volcanic rocks of the Upper Triassic - Lower Jurassic Takla Group. Andesite tuffs are intruded by a zoned monzonite - hornblendite stock and by numerous monzonite, diorite and felsite dykes. A large hydrothermal aureole, marked by a regionally prominent gossan, formed adjacent to the eastern side of the stock where dykes abound. Disseminated pyrite and minor chalcopyrite are widely distributed and are the source of the gossan. Post intrusion ductile shearing along the trend of the regionally extensive Kliyul Creek Fault has lead to the development of well defined zones of chlorite and sericite schists within the aureole.

## GEOCHEMISTRY

A total of 8 rock and 90 soil samples were collected. All of the rock and soil samples were geochemically analyzed for gold by atomic absorption methods. Nineteen selected soil samples were tested for platinum, palladium and rhodium by fire assay preconcentration with an atomic absorption finish. Analytical results and techniques are appended.

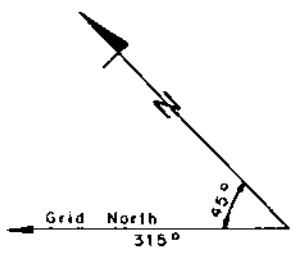
Because no soil profiles have developed over the rapidly eroding gossan, all soil samples comprised oxidized talus fines. Sampling depths averaged 10 cm but were progressively deeper as the size of the talus fragments increased.

Two picketed base lines were established for grid control. Samples were collected at 50 m intervals. Lines were not slope corrected.

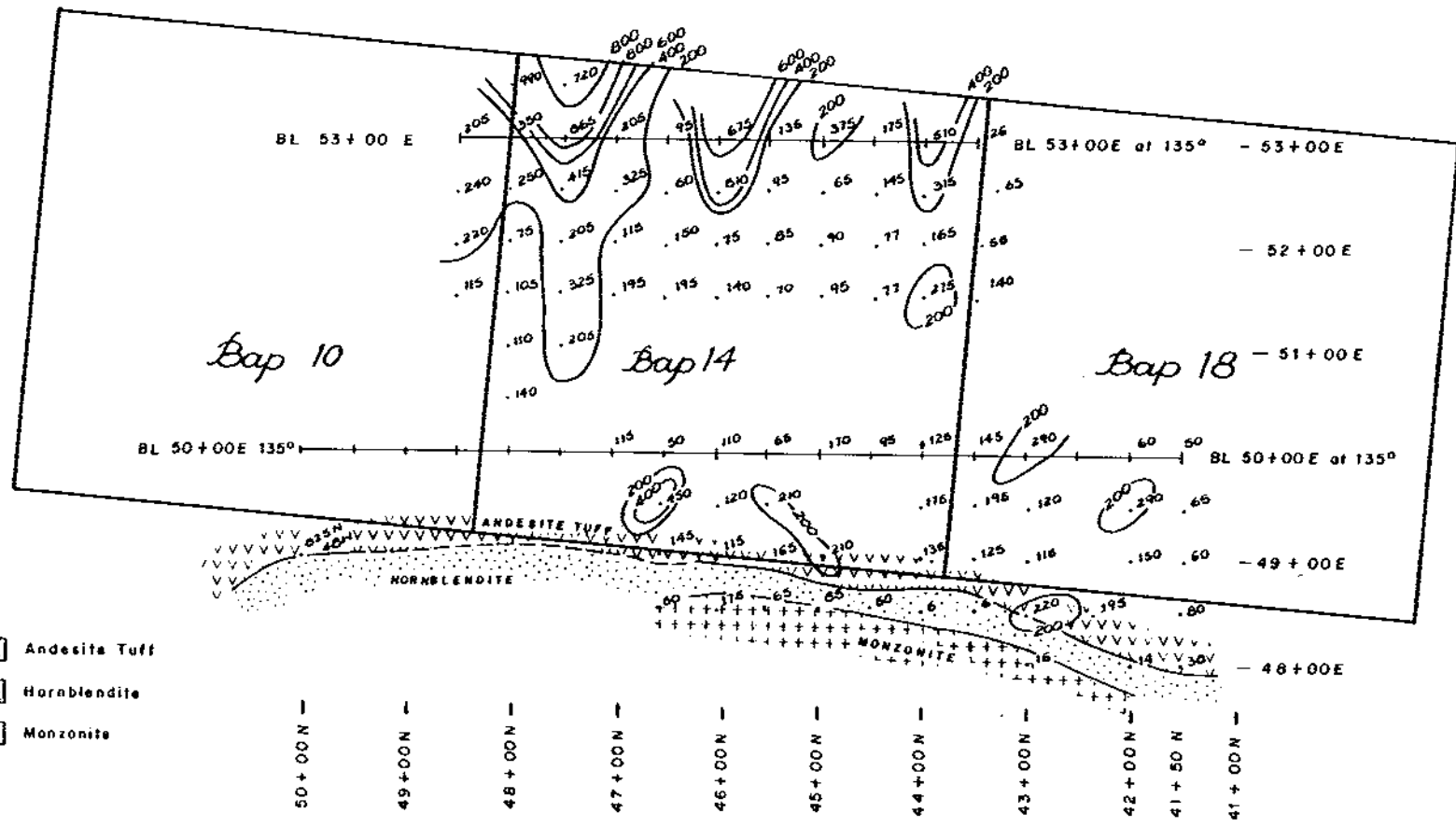
## DISCUSSION OF RESULTS

All soil samples derived from material originating from the hydrothermal alteration aureole are geochemically enhanced in gold. Values range from 50 to 990 ppb. Only the few samples of material derived from the hornblendite returned background concentrations in the 5 to 16 ppb range.

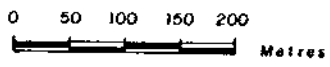
The contoured data displays dispersion patterns consistent with that of downhill migration from a northwesterly trending source located immediately upslope from and parallel to the 53+00E baseline (Figure 3).



50 + 00 N  
48 + 00 N  
46 + 00 N  
44 + 00 N  
42 + 00 N  
40 + 00 N



- Andesite Tuff
- Hornblendite
- Monzonite



CONTOURS	INTERVALS	Au (ppb)
		200
		400
		600
		800

**LEMING RESOURCES LTD.**  
**KLIYUL CREEK GOLD PROJECT**  
**GOLD**  
**SOIL GEOCHEMISTRY**  
**BAP CLAIMS**

NTS 94D/8

**FIGURE 3**

## RECOMMENDATIONS

Extend the soil grid to the northwest and systematically prospect the potential source area upslope from the 53+00E baseline. Quartz veins and all sulphide impregnated outcrops above the baseline require thorough sampling. Altered and mineralized talus blocks also require sampling to identify the source of the gold enhancement.

## STATEMENT OF EXPENDITURES

C.M. Rebagliati	July 16, 17, 18, 1986	3 days @ \$400	\$ 1,200.00
L. Lindinger	July 16, 17, 18, 1986	3 days @ \$200	600.00
Analyses	Soil 90 @ \$ 4.75	\$427.50	
	Soil 19 @ \$ 9.97	\$189.52	
	Rock 8 @\$ 7.00	\$ 56.00	
	Freight	<u>\$ 64.70</u>	
			737.72
Camp rental 1 week @ \$281.61			281.61
Truck rental 1 week @ \$350.00			350.00
Truck operating costs, mileage, insurance			107.00
Helicopter 1.3 hrs. @ \$581.85/hr. including fuel			756.40
Food, camp supplies and other consumables			159.50
Report preparation and drafting July 30 and 31, 1986			
C.M. Rebagliati 2 days @ \$400.00			800.00
Reproductions			<u>46.00</u>
			<u>\$ 5,038.23</u>



## CERTIFICATE OF QUALIFICATIONS

I, Clarence Mark Rebagliati, of 3536 West 15th Avenue, Vancouver, B.C., hereby certify that:

1. I am a consulting geological engineer with offices at 3536 West 15th Avenue, Vancouver, B.C.
2. I am a graduate of the Provincial Institute of Mining, Haileybury, Ontario (Mining Technology, 1966).
3. I am a graduate of the Michigan Technological University, Houghton, Michigan U.S.A. (B.Sc., Geological Engineering, 1969).
4. I have practiced my profession continuously since graduation.
5. I am a member in good standing of the Association of Professional Engineers of British Columbia.

**APPENDIX 1**

### GEOCHEMICAL ASSAY CERTIFICATE

SAMPLE TYPE : P1-3 SOILS -80 MESH P4-ROCKS  
Au\* - 10 GM. IGNITED, HOT AQUA REGIA LEACHED, NIBK EXTRACTION, AA ANALYSIS.

ASSAYER D. Toye DEAN TOYE . CERTIFIED B.C. ASSAYER

REBAGLIATI GEOLOGICAL PROJECT BAF FILE# 86-1730 PAGE# 1

SAMPLE	Au*
	ppb
48+50N 51+50E	115
48+50N 52+00E	220
48+50N 52+50E	240
48+50N 53+00E	205
48+00N 50+50E	140
48+00N 51+00E	110
48+00N 51+50E	105
48+00N 52+00E	75
48+00N 52+50E	250
48+00N 53+00E	350
48+00N 53+50E	990
47+50N 51+00E	205
47+50N 51+50E	325
47+50N 52+00E	205
47+50N 52+50E	415
47+50N 53+00E	865
47+50N 53+50E	720
47+00N 50+00E	115
47+00N 51+50E	195
47+00N 52+00E	115
47+00N 52+50E	325
47+00N 53+00E	205
46+50N 48+50E	50
46+50N 49+00E	145
46+50N 49+50E	450
46+50N 50+00E	50
46+50N 51+50E	195
46+50N 52+00E	150
46+50N 52+50E	60
46+50N 53+00E	75
46+00N 48+50E	175
46+00N 49+00E	115
46+00N 49+50E	120
46+00N 50+00E	110
46+00N 51+50E	140
46+00N 52+00E	75

SAMPLE	Aur ppb
46+00N 52+50E	510
46+00N 53+00E	675
45+50N 48+50E	65
45+50N 49+00E	165
45+50N 49+50E	210
45+50N 50+00E	65
45+50N 51+50E	70
45+50N 52+00E	85
45+50N 52+50E	95
45+50N 53+00E	135
45+00N 48+50E	85
45+00N 49+00E	210
45+00N 50+00E	170
45+00N 51+50E	95
45+00N 52+00E	90
45+00N 52+50E	65
45+00N 53+00E	375
44+50N 48+50E	50
44+50N 50+00E	95
44+50N 51+50E	77
44+50N 52+00E	77
44+50N 52+50E	145
44+50N 53+00E	175
44+00N 48+50E	5
44+00N 50+00E	125
44+00N 51+50E	275
44+00N 52+00E	165
44+00N 52+50E	315
44+00N 53+00E	510
43+90N 49+00E	135
43+90N 49+50E	175
43+50N 48+50E	6
43+50N 49+00E	125
43+50N 49+50E	195
43+50N 50+00E	145
43+50N 51+50E	140

SAMPLE	Au*
	ppb
43+50N 53+00E	26
43+40N 52+00E	55
43+35N 52+50E	65
43+00N 49+50E	120
43+00N 48+00E	16
43+00N 48+50E	220
43+00N 49+00E	115
43+00N 50+00E	290
42+05N 48+50E	195
42+00N 48+00E	14
42+00N 49+00E	150
42+00N 49+50E	290
42+00N 50+00E	60
41+50N 48+00E	38
41+50N 48+50E	80
41+50N 49+00E	60
41+50N 49+50E	65
41+50N 50+00E	55

SAMPLE	AUX	ppb
E-300 50100E, 43120N	60	13 Quartz carbonate breccia strike 190°-40°E
E-301 48+65E, 43150N	2	35cm Quartz vein 10°-75°E
E-302 49+00E, 45150N	1	quartz rubble
E-303 52185E, 45180N	220	quartz rubble
E-304 49+00E, 43190N	14	Ferrocete Bx
E-305 48+80E, 42105N	45	Andesite - 10% pyrite
E-306 49+50E, 44500N	1	sericite schist - shear zone 220° dip 90°
E-307 51+90E, 46100N	47	felsite dyke 10% pyrite

CME ANALYTICAL LABORATORIES LTD.  
852 E. HASTINGS, VANCOUVER B.C.  
PH: (604) 253-3158 COMPUTER LINE: 251-1011

DATE RECEIVED AUG 14 1986

DATE REPORTS MAILED *Aug 18/86*

## GEOCHEMICAL ASSAY CERTIFICATE

SAMPLE TYPE : PULP  
PT\*\* PD\*\* & RH\*\* - 10GM FIRE ASSAY CONCENTRATION. HNO3 LEACHED.  
AQUA REGIA DIGESTION. GRAPHITE FURNACE AA ANALYSIS.

ASSAYER *D. Toye* DEAN TOYE, CERTIFIED B.C. ASSAYER

REBAGLIATI GEOLOGICAL PROJECT BAP FILE# 86-1730 R

PAGE# 1

SAMPLE	Pt** ppb	Pd** ppb	Rh** ppb
47+50N 53+00E	2	4	2
47+50N 53+50E	2	4	2
46+50N 48+50E	2	3	2
46+50N 49+50E	2	7	2
46+00N 48+50E	2	3	2
46+00N 52+50E	2	3	2
46+00N 53+00E	2	5	2
45+50N 48+50E	3	8	2
45+50N 49+50E	2	6	2
45+00N 48+50E	6	8	2
44+50N 48+50E	5	6	2
44+00N 48+50E	9	4	2
43+50N 48+50E	8	5	2
43+00N 48+00E	2	8	2
43+00N 48+50E	2	6	2
42+05N 48+50E	2	5	2
42+00N 48+50E	4	7	2
41+50N 48+00E	2	6	2
41+50N 48+50E	2	4	2

*4750 5350E NS*

## APPENDIX 2



**ACME ANALYTICAL LABORATORIES LTD.**

Assaying & Trace Analysis  
852 E. Hastings St., Vancouver, B.C. V6A 1R6  
Telephone: 253-3158

1986

Acme Analytical continues to update with mass spectrographic analysis which is now operational. In general, mass spec offers detection limits which are at least 100-fold lower than ICP or flame AA. These detection limits are comparable to graphite furnace AA, but the mass spec can analyze up to 60 elements simultaneously.

Acme has pioneered low cost multi-element ICP which has better detection and precision than AA. Mass spec will further expand the range of elements and isotopes available to mineral exploration programs.

SPACE

Total laboratory, sample preparation and sample storage has been expanded to 12,000 square feet.

EQUIPMENT

1. Our ICP system has been expanded, and a fourth unit has been purchased which will allow us to determine up to 45 elements simultaneously.
2. AA spectrophotometers have been increased to 8.
3. Sample preparation, weighing and dissolution facilities have been increased.
4. A LECO Induction Furnace has been installed for determining Carbon and Sulfur simultaneously in geological and metallurgical samples.
5. An UAS Laser Fluorometer from SciNtrex is now used for determination of U in water to .01 ppb.
6. Two ICP mass spectrographs.

TECHNOLOGY

1. Fire Assay for Ag, Au, Pt, Pd, the precious metal bead can be analysed by gravimetric, AA, ICP or Mass spec.
2. ICP multi element packages for water, geochem and assay programs have been developed.
3. Lower detection limits for some elements have been achieved by graphite furnace AA.

TECHNICAL ACHIEVEMENTS

1. Background corrected Atomic Absorption analysis of Ag and Au since 1971.
2. Best proven precision, accuracy and price for MoS<sub>2</sub> assays in North America.
3. Pioneered geochemical analysis by ICP at or to better detection limits than AA, including Ag, As, U, Th and W.
4. First to offer Mass spectrographic scan analysis.

PROVEN PERFORMANCE

Our logistical and technical performance for our clients has been demonstrated on the Gambier, Capoose Lake, Trout Lake, Blackdome, Red Mountain, Carolin, Cirque, Minago River, Quesnel River, Terra Swede, Musto and other major projects.

**ACME ANALYTICAL LABORATORIES LTD.**

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5. Guidelines for Data Interpretation

A. 30 Element ICP - typical value from ICP

Mo - normal soils	1-3 ppm	Th - normal soils	3 ppm
highly decomposed organics	5 ppm	Sr - normal soils	40 ppm
shales	30 ppm	Cd - normal soils	1 ppm
Cu - normal soils	20 ppm	Sb - normal soils	less than 2 ppm
high organics	100 ppm	Bi - normal soils	less than 2 ppm
Pb - normal soils	5 ppm	V - normal soils	40 ppm
Zn - normal soils	30 ppm	Ce - normal soils	0.5 %
high organics	200 ppm	P - normal soils	0.5 %
Ag - normal soils	0.2 ppm	La - normal soils	10 ppm
high organics	0.6 ppm	Cr - normal soils	10 ppm
Ni - normal soils	20 ppm	Mg - normal soils	0.5 %
Co - normal soils	15 ppm	Ba - normal soils	20 ppm
Mn - normal soils	300 ppm	Tl - normal soils	0.1 %
Fe - normal soils	2 %	Bi - normal soils	1 ppm
As - normal soils	5 ppm	Al - normal soils	2 %
U - normal soils	2 ppm	Na - normal soils	0.05 %
Au - normal soils	NO	K - normal soils	0.1 %
(ICP detection limit = 2 ppm)		W - normal soils	2 ppm

B. Geochemical Au

Normal soil 1-3 ppb

6. Geochemical ICP - Notes on Solubilities of Elements

Barites, Chromites .. Insoluble	As .....	soluble up to 20,000 ppm
Magnetite .....	Pb .....	soluble up to 10,000 ppm
Al, Ca, P, Mg .....	Sb, Bi ..	soluble up to 1000 ppm
Na, K, Ti .....	Ag, W ...	soluble up to 100 ppm

7. Conversion Factors

1 Troy oz = 31.10 g  
1 oz/ton = 34.3 ppm = 34.3 g/tonne = 34,300 ppb  
1 % = 10,000 ppm

8. Whole Rock Geochemical Analysis

The lithium metaborate fusion dissolves most types of rock except for very high chromite and very massive sulfides. Whole Rock data and Zr, Ba, Ce, Y and Sr are also available from this fusion by ICP. Other elements are available by mass spectrographic analysis. The proposed 50 element package includes Ag, Al, As, Ba, Be, Bi, Br, Ca, Cd, Ce, Cl, Co, Cr, Cs, Eu, Fe, Ga, Ge, Hg, I, In, K, La, Mg, Mn, Mo, Na, Nb, Ni, P, Pb, Rb, Re, Ru, S, Sb, Se, Sn, Sr, Ta, Te, Th, Ti, Tl, U, V, W, Y, Zn, Zr.

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Suggestions for Effective use of Analytical Services**1. General Sampling**

- A. **Rocks** - In general 1/2 to 2 lb of sample are required. Large boulders should be broken down to chip size with a 20 lb sledge hammer. A representative sample is then taken from these chips. The lab will crush, split and pulverize.
- B. **Cores** - Drill cores should be split into halves for assaying
- C. **Soils** - The organic "A" horizon gives good base metal responses. Supply about one cup of material in a soil or paper envelope. The soil is treated in one of three methods after drying :-  
1) -80 mesh sieving (standard).  
2) -80 mesh sieving + pulverizing.  
3) pulverizing the whole sample.

Samplers must not wear any jewelry.

**2. Shipping**

- A. **Local and Within Canada** - use Greyhound or Pacific Stage Lines. For large drill programs use a truck line.
- B. **U.S. Customers** - for surface transport use UPS and address to :-

Acme Analytical Laboratories Ltd.,  
c/o Pac Ex Services,  
140 - 14th St.,  
Blaine, Wash. 98230

Air freight shipments are addressed to :-

Acme Analytical Laboratories Ltd.  
c/o Cole McCubbin  
Vancouver, B.C.

Shipments from the U.S. should be labelled "Geological Samples for Analysis - No Commercial Value".

**3. Suggested Geochemical Analyses**

- A. **Rocks with No Visible Mineralization** - 30 element ICP + geochemical Au.
- B. **Rocks with High Sulphides** - 16 element ICP Assay.
- C. **Cores** - assays for elements of mineralization and possible 30 element ICP.
- D. **Soils** - 30 element ICP + geochemical Au.
4. **Samples with Possible Native Gold**

For rocks and cores with nugget or native gold, request that the total sample be pulverized and sieved on a 100 mesh screen. Two fire assays are then required for each sample; one on the entire +100 mesh fraction for any possible native gold and one on the -100 mesh. (1 A.T.)

Pan or sluice concentrates are best treated by cyclone concentration and fire assay for total Au.

**ACME ANALYTICAL LABORATORIES LTD.**

Assaying & Trace Analysis  
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Telephone: 253-3158

GEOCHEMICAL LABORATORY METHODOLOGY - 1986Sample Preparation

1. Soil samples are dried at 60°C and sieved to -80 mesh.
2. Rock samples are pulverized to -100 mesh.

Geochemical Analysis

0.5 gram samples are digested in hot dilute aqua regia in a boiling water bath and diluted to 10 ml with demineralized water. Extracted metals are determined by :

**A. Atomic Absorption (AA)**

Ag<sup>+</sup>, Bi<sup>+</sup>, Cd<sup>+</sup>, Co, Cu, Fe, Ga, In, Mn, Mo, Ni, Pb, Sb<sup>+</sup>, Tl, V, Zn  
(\* denotes with background correction.)

**B. Inductively Coupled Argon Plasma (ICP)**

Ag, Al, As, Au, B, Ba, Bi, Ca, Cd, Co, Cu, Cr, Fe, K, La, Mg, Mn, Mo, Na, Ni, P, Pb, Sb, Sr, Th, Tl, U, V, W, Zn.

**C. Mass Spec (lower detect limits)**

Same as above except delete As, and add Li, Ga, Ge, Rh, Pd, Pt, In, Te, Re, Os, Ir, Hg, Tl.

Geochemical Analysis for Au\*

10.0 gram samples that have been ignited 4 hours at 600°C are digested with 30 ml hot dilute aqua regia, and 75 ml of clear solution obtained is extracted with 5 ml Methyl Isobutyl Ketone.

Au is determined in the MIBK extract by Atomic Absorption using background correction (Detection Limit = 1 ppb).

Geochemical Analysis for Au\*\*, Pd, Pt, Rh

10.0 - 30.0 gram samples are subjected to Fire Assay preconcentration techniques to produce silver beads.

The silver beads are dissolved and Au, Pd, Pt, and Rh are determined in the solution by graphite furnace Atomic Absorption. Detections - Au=1 ppb; Pd, Pt, Rh=5 ppb

Geochemical Analysis for As

0.5 gram samples are digested with hot dilute aqua regia and diluted to 10 ml. As is determined in the solution by Graphite Furnace Atomic Absorption (AA) or by Inductively Coupled Argon Plasma (ICP).

Geochemical Analysis for Barium

0.10 gram samples are fused .6 gm LiBO<sub>2</sub> and dissolved in 50 ml 5% HNO<sub>3</sub>. (Same as Whole Rock).

Ba is determined in the solution by ICP or M.S.

Geochemical Analysis for Tungsten

0.50 gram samples are fusion Na<sub>2</sub>O<sub>2</sub> and dissolved in 20 ml H<sub>2</sub>O. W in the solution determined by ICP with a detection of 1 ppm.

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Geochemical Analysis for Selenium

0.5 gram samples are digested with hot 3 ml of 50% HNO<sub>3</sub> and diluted to 10 ml with H<sub>2</sub>O. Se is determined by M.S.

Precious Metal Mass Spec. Analysis (41 elements listed above.)

5.0 gm samples are digested with 30 ml aqua regia and diluted to 100 ml then analysed by M.S.

Geochemical Analysis for Fluorine

0.25 gram samples are fused with sodium hydroxide and leached with 10 ml water. The solution is neutralized, buffered, adjusted to pH 7.8 and diluted to 100 ml.

Fluorine is determined by Specific Ion Electrode using an Orion Model 404 meter.

Geochemical Analysis for Tin

1.0 gram samples are fused with ammonium iodide in a test tube. The sublimed iodine is leached with 5 ml of dilute hydrochloric acid.

The solution is determined by Atomic Absorption.

Geochemical Analysis for Chromium

0.1 gram samples are fused with Na<sub>2</sub>O<sub>2</sub>. The melt is leached with HCl and analysed by AA or ICP. Detection 1 ppm.

Geochemical Analysis for Hg

0.5 gram samples are digested with aqua regia and diluted with 20% HCl.

Hg in the solutions are determined by cold vapour AA using a F & J Scientific Hg assembly. The aliquots of the extract are added to a stannous chloride / hydrochloric acid solution. The reduced Hg is swept out of the solution and passed into the Hg cell where it is measured by AA.

Geochemical Analysis for Ga & Ge

0.5 gram samples are digested with hot aqua regia with HF in pressure bombs.

Ga and Ge in the solutions are determined by graphite furnace AA or M.S. Detection 1 ppm.

Geochemical Analysis for Tl (Thallium)

0.5 gram samples are digested with 1:1 HNO<sub>3</sub>. Tl is determined by graphite AA or by M.S. Detection .1 ppm.

Geochemical Analysis for Te (Tellurium)

0.5 gram samples are digested with hot aqua regia. The Te extracted in MIBK is analysed by graphite furnace AA or analysed by M.S. Detection .1 ppm.

Geochemical Whole Rock

0.1 gram is fused with .6 gm LiBO<sub>2</sub> and dissolved in 50 ml 5% HNO<sub>3</sub>. Analysis by ICP gives excellent precision for major components. The M.S. can analyze for up to 50 elements with lower detection limit but lower precision.

**ACME ANALYTICAL LABORATORIES LTD.**

Assaying & Trace Analysis  
852 E. Hastings St., Vancouver, B.C. V6A 1R6  
Telephone: 253-3158

1986

GEOCHEMICAL ANALYSES  
Rocks and Soils

Group I Digestion - 0.50 gm sample is digested by 3 ml Aqua Regia and diluted to 10 ml with H<sub>2</sub>O.

Group IA - Analysis by Atomic Absorption.

Element	Detection	Element	Detection	Element	Detection
Antimony *	2 ppm	Copper	1 ppm	Molybdenum	1 ppm
Bismuth *	2 ppm	Iron	0.01%	Nickel	1 ppm
Cadmium *	0.1 ppm	Lead	2 ppm	Silver	0.1 ppm
Chromium	1 ppm	Lithium	2 ppm	Vanadium	2 ppm
Cobalt	1 ppm	Manganese	5 ppm	Zinc	2 ppm

First Element \$2.00

Subsequent Element \$.75

Group IB - Same digestion; hydride generation of volatile elements and analysis by ICP.

Element	Detection	Price
Arsenic	0.1 ppm	First Element \$3.00 All Elements \$4.00 (This technique is unsuitable for samples grading over 1% Cu or Ni and is only partial for Ge.)
Antimony	0.1 ppm	
Bismuth	0.1 ppm	
Germanium	0.2 ppm	
Selenium	0.2 ppm	
Tellurium	0.3 ppm	

Group IC - Same digestion.

Element	Detection	Method	Price
Mercury	5 ppb	Flameless AA	\$2.00

Group ID - Same digestion - 30 elements ICP.

Element	Detection
Ag	0.1 ppm
Cd, Co, Cr, Cu, Mn, Mo, Ni, Sr, Zn	1 ppm
As, Au, B, Ba, Bi, La, Pb, Sb, Th, V, W	2 ppm
U	5 ppm
Al, Ca, Fe, K, Mg, Na, P, Ti	0.01%
Any 2 elements	\$ 3.00
5 elements	\$ 4.00
10 elements	\$ 5.00
All 30 elements	\$ 6.00

Group IE - Same digestion as above analysis by ICP MS.

Element	Detection
Li, Be, Ga, Ge	1 ppm
Rh, Pd, Ag, Cd, In, Sn, Sb, Te, I, Ir, Pt, Au, Hg, Tl, Th, U	0.1 ppm
First Element	\$5.00
Additional Element	\$1.00
All Elements	\$15.00

\* Minimum 20 samples or \$5.00 surcharge.



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**Group 2 - Base Metals by Specific Extraction and Instrumental Techniques.**

Element	Method	Detection	Price
Barium	LiBO <sub>2</sub> fusion, ICP analysis	10 ppm	\$3.50
Carbon	LECO (Total as C or CO <sub>2</sub> )	0.01%	5.00
Carbon & Sulfur	LECO	0.01%	6.00
Carbon (graphite)	LECO	0.01%	7.00
Chromium	LiBO <sub>2</sub> fusion, ICP analysis	5 ppm	3.50
Fluorine	NaOH fusion, Specific Ion Electrode	10 ppm	4.00
Gallium	HF, Aqua Regia, AA determination	1 ppm	4.00
Germanium	HF, Aqua Regia, AA determination	1 ppm	4.00
Sulphur	LECO (Total as S)	0.01%	5.00
Sulphur	LECO (Insoluble SO <sub>4</sub> )	0.01%	7.00
Tin	NH <sub>4</sub> I fusion, AA determination	1 ppm	3.00
Tungsten	Na <sub>2</sub> O <sub>2</sub> fusion, ICP determination	2 ppm	3.00
Uranium	Aqua Regia digestion, Fluorometric	0.1 ppm	4.00
Thallium	Nitric acid - AA	0.1 ppm	3.00

**Group 3 - Noble Metals.**

Element	Method	Detection	Price
Au	AA (10 gm, ignited at 600°C, Aqua Regia digestion, MIBK extraction, graphite furnace AA determination.)	1 ppb	\$4.00
Au	FA+AA (10 gm, Fire Assay Conc. to Ag bead, Aqua Regia digestion of bead, graphite furnace AA determination.)	1 ppb	\$5.50 for first element
Palladium	Same	2 ppb	\$2.50 for each
Platinum	Same	2 ppb	additional
Rhodium	Same	2 ppb	element

**Group 4A - Geochem Whole Rock Assay.**

0.1 gram is fused with .6 gm LiBO<sub>2</sub> and is dissolved in 50 ml 5% HNO<sub>3</sub>.

SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, CaO, MgO, Na<sub>2</sub>O, K<sub>2</sub>O, MnO, TiO<sub>2</sub>, P<sub>2</sub>O<sub>5</sub>, Cr<sub>2</sub>O<sub>3</sub>, LOI + Ba by ICP

Price : \$3.50 first metal \$1.00 each additional \$9.00 for all 13 metals

**Group 4B - Same fusion + ICP optical analysis**

Element	Detection	Price
Ba, Co, Cu, Ni, Sr, Zn	10 ppm	\$3.50 first element or
Rb, Ce	20 ppm	\$1.00 each additional to
Nb, Ta, Y, Zr	30 ppm	Whole Rock analysis
Cs	10 ppm by AA	\$5.00 for all 12
		\$2.00

**Group 4C - Same fusion, analysis by Mass Spec. (MS)**

Be, Cu, Rb, Y, Zr, Nb, Sn, Cs, La, HF, Ta, W, Ce, Pr, Nd, Sm, Eu, Gd, Tb, Dy, Ho, Er, Tm, Yb, Lu, Th, U

Detection : 1 to 5 ppm Price : \$7.00 for first element  
\$20.00 for all 27 elements

\* Minimum 20 samples or \$5.00 surcharge.



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**Regular Assay**

Aluminum (Al)	\$7.50	Moisture (H <sub>2</sub> O)	\$5.00
Antimony (Sb)	7.50	Molybdenum (Mo)	6.75
Arsenic (As)	7.50	Molybdenum Sulfide (MoS <sub>2</sub> )	7.50
Barium (Ba)	7.50	Niobium (Nb)	10.00
Bismuth (Bi)	7.50	Nickel (Ni)	6.75
Boron (B)	7.50	Nickel (Non-sulfide)	7.50
Cadmium (Cd)	6.75	Palladium (Pd)	12.50
Calcium (Ca)	7.50	Phosphorus (P)	7.50
Carbon (Total) (C)	7.50	Platinum (Pt)	12.50
Carbon (Graphitic)*	9.50	Potassium (K)	7.50
Carbon plus Sulfur (Total)*	11.00	Rhodium (Rh)	12.50
Cerium (Ce)	10.00	Rubidium (Rb)	7.50
Chromium (Cr)	7.50	Selenium (Se)	10.00
Cesium (Cs)	10.00	Silica (SiO <sub>2</sub> )	7.50
Cobalt (Co)	6.75	Silver (Ag)	6.75
Copper (Cu)	6.75	Silver (Fire Assay)	9.00
Copper (non-sulfide)*	8.00	Sodium (Na)	7.50
Europium (Eu)	10.00	Specific Gravity* (SG)	6.00
Fluorine (F)	7.50	Strontium (Sr)	7.50
Gallium (Ga)	7.50	Sulfur (Total)* (S)	7.50
Germanium (Ge)	7.50	Sulfur (Sulfate) (S)	8.50
Gold (Au)	6.75	Tantalum (Ta)	7.50
Gold (Fire Assay)	8.25	Tellurium (Te)	10.00
Gold plus Silver (Fire Assay)	11.25	Thallium (Tl)	10.00
Indium (In)	8.50	Thorium*	7.50
Iron (Total) (Fe)	7.50	Tin (Sn)	8.00
Iron (Ferrous)*	9.00	Titanium (Ti)	7.50
Lanthanum (La)	7.50	Tungsten (W)	7.50
Lithium (Li)	7.50	Uranium (U)	7.50
Lead (Pb)	6.75	Vanadium (V)	7.50
Loss on Ignition (LOI)	2.00	Yttrium (Y)	10.00
Magnesium (Mg)	7.50	Zinc (Zn)	6.75
Manganese (Mn)	7.50	Zirconium* (Zr)	10.00
Mercury*	7.50	Pb Isotope Ratio	20.00

\* Minimum 5 samples per batch

Other elements by Mass Spec. on request.

**Multi-Element Assay Price**

Arsenic, Antimony, Bismuth, Cadmium, Cobalt, Copper, Gold, Iron, Lead, Manganese, Molybdenum, Nickel, Silver, Thorium, Uranium, Zinc.

Price : First element \$6.75 Each Additional \$3.00 All 16 elements \$20.00

**Whole Rock Assay Prices**

SiO<sub>2</sub>, Al<sub>2</sub>O<sub>3</sub>, Fe<sub>2</sub>O<sub>3</sub>, CaO, MgO, Na<sub>2</sub>O, K<sub>2</sub>O, MnO, TiO<sub>2</sub>, P<sub>2</sub>O<sub>5</sub>, Cr<sub>2</sub>O<sub>3</sub>, LOI.

Price : First oxide \$7.50 Each Additional \$3.50 All 12 \$20.00

Volume Discounts Available.

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Supplies

Soil Envelopes	4" x 6"	\$100.00/thousand
Soil Envelopes	4" x 6" with gusset	\$120.00/thousand
Plastic Bags	7" x 13" 6 ml	\$ 10.00/hundred
Plastic Bags	12" x 20" 6 ml	\$ 20.00/hundred
Ties		\$ 4.00/hundred
Assay Tags		N/C
10% HCl		\$ 5.00/liter
Dropping bottles		\$ 1.00/each
Zn Test	A & B	\$ 10.00/each liter

Hydrogeochemical analysis  
Natural water for mineral exploration.

26 elements ICP	\$6.00
50 elements MS	\$6.00 first element \$1.00 additional element \$25.00 all

Au	detection	.001 ppb	\$6.00
F	detection	20 ppb	\$3.00
U	detection	.01 ppb UA3	\$4.00

Special Geochemical Packages

Exp 1	30 elements ICP + Au by AA	\$10.00
Exp 2	30 elements ICP + Au + Hg	\$12.00
Exp 3	Ag, As, Se, Te, Bi, Sb + Au + Hg	\$11.00
Exp 4	30 elements + Se, Te, + Au + Hg	\$14.00
Exp 5	Same as Exp 4 + Geochem Whole Rock	\$20.00
Exp 6	Geochem Group I (ICP + MS) Whole Rock + Fire Assay Geochem Au, Pt, Pd, Rh + Total C & S + F	\$60.00

\* Minimum 20 samples or \$5.00 surcharge.

Regular Fire Assay for Noble Metals.

Gold & Silver	\$ 11.00
Gold, Silver, Palladium, Platinum, Rhodium	\$ 25.00
Placer Concentrate for total Gold - up to 1/2 lbs	\$ 11.75
- up to 5 lbs.	\$ 13.25

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Sample Preparation

S1	Soils and silts - drying at 60°C and sieve to -80 mesh	\$ .75
S2	Same as above include saving part of reject	\$1.00
S3	Soils and silts drying at 60°C and pulverize up to 100 gms to -100 mesh	\$1.50
S4	Soils and silts sieve to -20 mesh first, pulverize to -100 mesh	\$1.75
R1	Rock or core - crush to -3/16" approx., split off 200 gms, pulverize to 98% -100 mesh	\$3.00
R2	Same as R1 but sieve to -100 mesh and save +100 mesh for possible native Au	\$3.50
R3	Same as R1 but sieve to -140 mesh and save +140 mesh for possible native Au	\$4.00
R4	Same as R2 except pulverize half of total reject	additional pulverizing \$1.50/lb
R5	Same as R2 except pulverize whole sample	additional pulverizing \$2.00/lb
	Composites - each sample added, then mixed	\$1.00
	Crushing surcharge for samples over 10 lbs.	\$ .25/lb
	Drying extra wet rock samples	\$1.50
V1	Drying vegetation plants or leaves and pulverize 50 gms to -80 mesh	\$3.00
C1	Cyclone (water) of -30 mesh for native Au	\$3.50/lb
C2	Pan Conc. (water) and cyclone overflow fines for native Au	\$5.00/5 lbs.
D1	Core splitting and sampling	\$ .75/ft
H1	Special Handling	\$16.00/hour

Sample Storage

Crushed rocks or rejects are retained for 3 months and discarded unless claimed.

Pulps are retained for one year and discarded unless claimed.