APPENDIX III

GEOPHYSICAL PLANS AND PSEUDOSECTIONS

2.17105

ASSESSMENT REPORT

(1995-1996)

PIPESTONE NARROWS OPTION - PROJECT 461

EASTERN CANADA

BATTLE MOUNTAIN CANADA LTD.

David R. Truscott
Exploration Geologist

January, 1997
Timmins, Ontario

TABLE OF CONTENTS

List of Figures

List of Maps

List of Appendices

1.0 SUMMARY

The Pipestone Narrows Option is situated in the Pipestone Narrows/Middle Bay area of Red Lake. Past work has generated several anomalous gold occurrences related to quartz and quartz-ankerite veining in mafic volcanic flows. Recent Hemlo Gold Mines Inc./Battle Mountain Canada Ltd. mapping, prospecting and geophysical surveying has delineated a moderately strong linear magnetic anomaly trend characterized by moderate to high resistivity signatures and discrete, strong, linear chargeability trends on the southwestern portion of the property. Host lithologies appear to consist of mafic to ultramafic flows characterized by a moderate to strong ankerite-biotite-silica-fuchsite suite of alteration, anomalous gold and variable arsenopyrite mineralization.

2.0 INTRODUCTION

The Pipestone Narrows property comprises nine unpatented mining claims and is held under option from Mr. A. Maciejewski of Red Lake, Ontario. According to the terms of the agreement dated June 15, 1995, Battle Mountain Canada Ltd. (formerly Hemlo Gold Mines Inc.) can earn an undivided 100% interest in the property for an amount of $60,000 in option payments, scheduled over a four year period.

3.0 PROPERTY, LOCATION AND ACCESS

The property is located in central Ball Township, district of Kenora, NTS 52-M-1 (Figure 1). Access is achieved via water from Red Lake Townsite, some 30 kilometers to the east.

The claim group consists of nine unpatented mining claims in Middle Bay and Pipestone Narrows, west Red Lake, as follows (Figure 2):

KRL1143622-1143624 (inclusive)
KRL1143645-1143647 (inclusive)
KRL 1184230
KRL 1184316-1184317

4.0 HISTORY

1929-1930: Bernard Phillips (KRL 1143645), trenching; 1.87 opt/1.8m, 0.38 opt/7.3m.

1962: Wm. Stupack, 62 meters diamond drilling in two holes.

1963: Cochenour Willians Gold Mines Ltd. (KRL 1184317), self potential, magnetometer, geology, trenching, diamond drilling.
- grab 3.55 opt Au/1.8% Cu (trench #3).
- grab 0.16 opt Au/0.7% Cu (trench #2)-collected "at random".

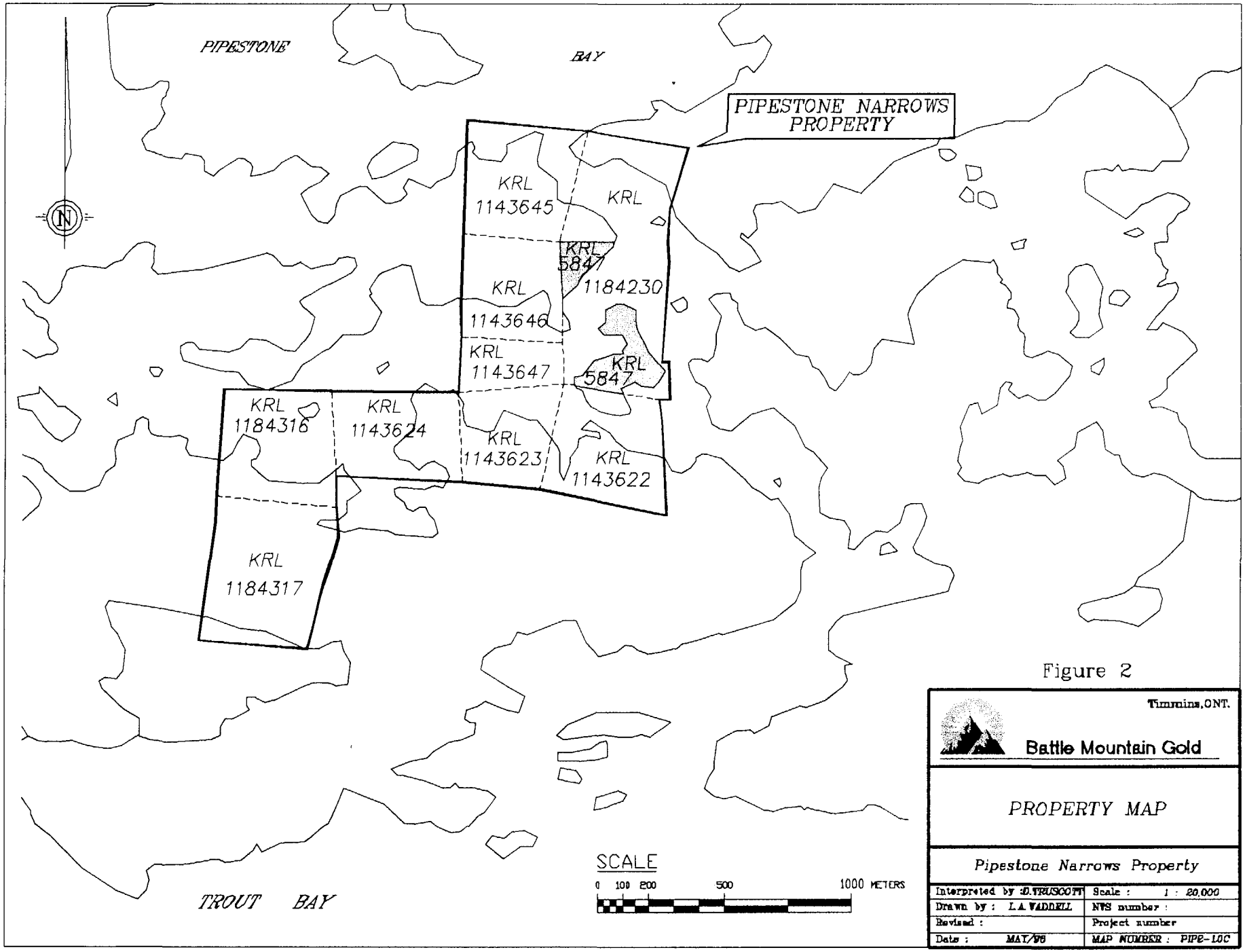


Figure 2

Timmins, ONT.

Battle Mountain Gold

PROPERTY MAP

Pipestone Narrows Property

Interpreted by : D.TRUSCOTT	Scale : 1 : 20,000
Drawn by : L.A.VARDELL	NTS number :
Revised :	Project number
Date : MAY/96	MAP NUMBER : PIPE-LOC

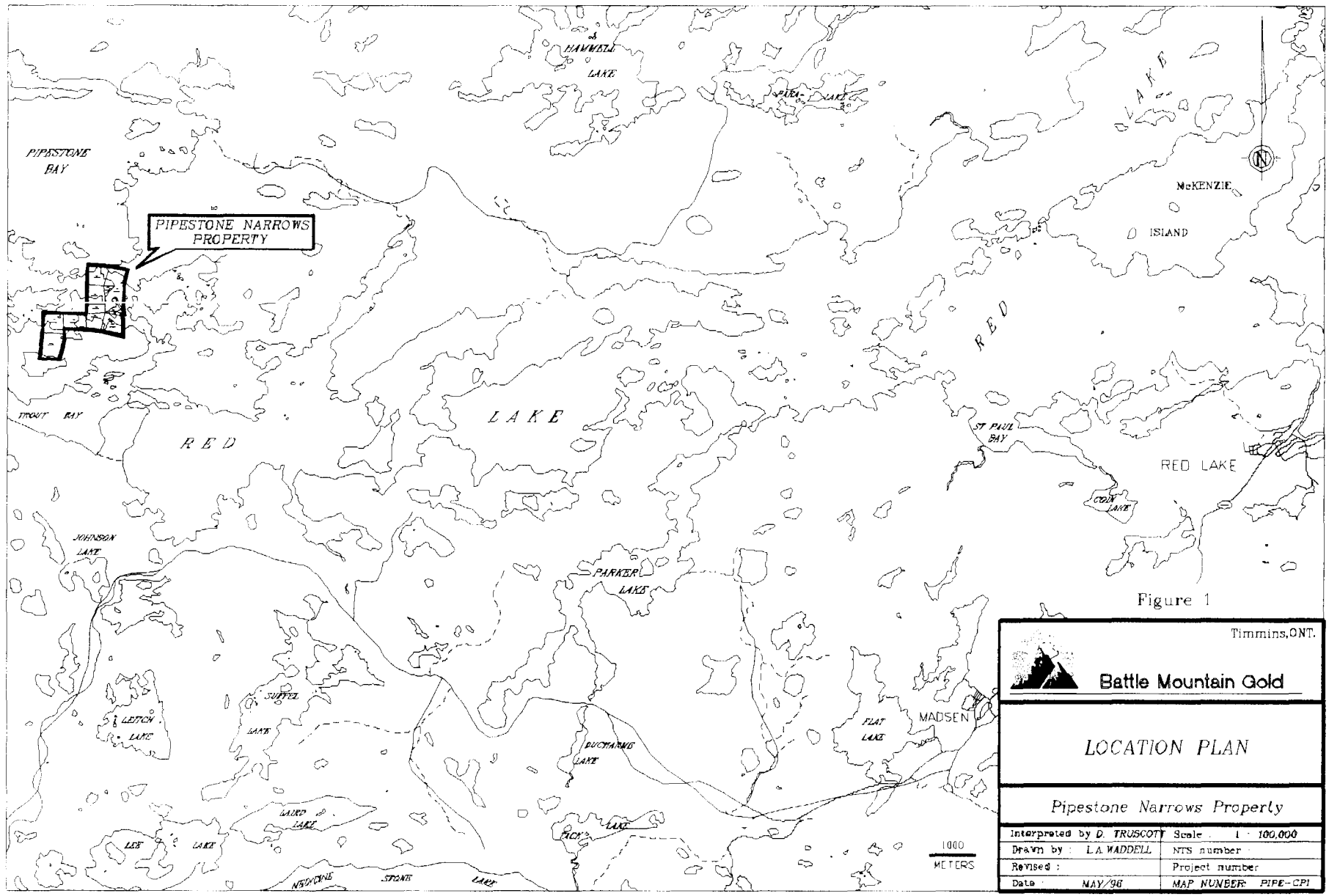


Figure 1

Timmins,ONT.

Battle Mountain Gold

LOCATION PLAN

Pipestone Narrows Property

Interpreted by D. TRUSCOTT	Scale : 1 : 100,000
Drawn by : L.A. WADDELL	NTS number :
Revised :	Project number :
Date : MAY/96	MAP NUMBER : PIPE-CP1

- 2 holes in mafic flows hosting carbonate veins; 7.24 opt Au/0.58m, 2.94 opt Au/0.30m, 2.28 opt Au/0.30m.

1965-1969: Cochenour Explorations Ltd. (KRL 1143646), 8 DDH's totalling 277 meters; 0.24 opt Au 10.61m (65-1), 0.27 opt Au/0.46m (65-2A).

1981: Gold Fields Resources, geophysics over a portion of the property.

1988: Shane Resources Ltd., humus geochem, 4 DDH's totalling 475 meters.

1993: A. Maciejewski, stripping, blasting, magnetometer, HLEM.

5.0 WORK PERFORMED

Subsequent to several property visits with Mr. Maciejewski, a portion of the claim group was mapped at a scale of 1:5,000 in the summer of 1995.

During January and February 1996, a 100 meter spaced grid was cut across the property and used as control for magnetometer and induced polarization surveys.

Mapping and prospecting in July, 1996 tied earlier (1995) mapping into the new grid. A total of one hundred and two (102) samples were collected and analyzed for gold, with one of these being submitted for XRF whole rock analysis.

6.0 REGIONAL GEOLOGY

The property is located in the extreme western end of the Red Lake Greenstone Belt of the Uchi Sub-province. Mafic (komatiitic and tholeiitic) and felsic (calc-alkaline) flows are enveloped to the south, west and north by felsic batholithic intrusions.

Archean-aged greenstone lithologies have been subjected to at least two periods of deformation: east-west and northwest-southeast. The resultant domal structure is the locus of a large ultramafic intrusive body underlying Pipestone Bay and environs. An amphibolite-greenschist facies isograd transverses the region north of and parallel to the east-west fold axis.

Deformation zones cross the region in the northern and central portions: the Pipestone Bay-St. Paul Bay Deformation Zone and the Middle Bay Deformation Zone, respectively. Shearing, axial planar thrust faulting, Ankeritization and gold mineralization are associated with these zones.

7.0 PROPERTY GEOLOGY

The property is underlain by an east-west trending (90^0-130^0) tholeiitic-komatiitic and calc-alkaline volcanic sequences, and associated interflow sediments. Chert-dolomite chemical metasediments are draped across the southernmost flows along the north shore of Bridget Lake. The Pipestone Bay mafic-ultramafic body locally intrudes volcanics at the northeast end of the property. Late felsic porphyry plugs and dykes occur throughout. The entire volcanic assemblage has been overturned and subjected to upper-greenschist to mid-amphibolite facies metamorphism.

A table of formations is presented below followed by a generalized description of each lithology. A geology plan is located in the back pocket (Figure 3).

6G Gabbro
6P Peridotite/Pyroxenite
5St Siltstone
5A Argillite
3D Dacite
3Dxt Dacitic Quartz Crystal Tuff
3Dbxt Black Dacitic Quartz Crystal Tuff
2 Tholeiitic to Komatiitic Basalt

(i) Tholeiitic to Komatiitic Basalts

Flows and tuffs are generally fine-grained, dark green to dark grey, moderately to well-foliated, variably magnetic and often host narrow interflow magnetite iron formation (± garnet). Plagioclase-phyric varieties occur locally. Trace levels of fine-grained pyrite are typical.

(ii) Black Dacitic Quartz Crystal Tuff

Massive to moderately well-foliated, 1mm euhedral quartz crystals to 3 to 5%, hard, siliceous, locally weakly carbonatized, moderately to strongly sericitized.

(iii) Dacitic Quartz Crystal Tuff

Light green to light grey, massive to moderately well-foliated, locally sheared and sericitic. Glassy sub-to euhedral quartz phenocrysts range from 1mm to 1.5cm and 1 to 5% of the rock. Feldspar-phyric varieties are rare. Phenocrysts are aligned parallel to bedding/foliation. These units are typically moderately ankeritized, chloritic and barren of sulphides.

(iv) Dacite

Similar in appearance to (iii) though more massive

(v) Siltstone

Light to dark grey, poorly laminated, occasionally fissile. 3-5% pyrite is typically smeared along bedding planes.

(vi) Peridotite/Pyroxenite/Serpentinite; Ultramafic Intrusive

Massive to well-foliated, light greenish grey to dark grey to black. Polysuturing is distinctive in some varieties and may be partly extrusive. These rocks are distinctive in that they are often strongly talc-altered to talc, in which case their typically strong magnetic signature is dramatically reduced. Coarse crystalline carbonate (magnesite) is a major component of the less strongly talc-altered portions.

(vii) Gabbro

Massive, dark grey to dark greenish-grey, diabasic to gabbroic textured rocks are strongly magnetic and host 3-5% medium-grained pyrite. These rocks may be, in part, massive flows.

7.1 Alteration

Ankeritization is pervasive, weak to moderate, with local high concentrations as veins in mafic-ultramafic flows, ultramafic intrusive contacts and, rarely, in felsic-intermediate flows.

Felsic flows are generally weakly to moderately well sericitized.

An alteration suite of ankerite-silica/albite-biotite-fuchsite was traced 450+ meters along strike on claims KRL 1184317. The maximum width of this well foliated/sheared package is in the order of 190 meters. Folding/faulting may have offset an originally continuous horizon on claims KRL 1143622-1143624.

One silicified ultramafic flow (sample 1004-I) shows modest sodium depletion and potassium enrichment in association with moderate to strong ankeritization. Barium enrichment, high arsenic (1200ppm) and weakly anomalous gold values (28 ppb) were also detected during whole rock analysis (Table 1).

7.2 Mineralization

Significant assays from 1995/1996 sampling are hosted by altered mafic volcanic stratigraphy. Gold mineralization is related to quartz and quartz-ankerite veining. Pyrite mineralization and occasional arsenopyrite and chalcopyrite were noted.

A complete list of assays and descriptions and accompanying certificates are located in Appendix I.

8.0 GEOPHYSICS

The geophysical program at the Pipestone Narrows property was carried out between January 30, 1996 and February 15, 1996. The program consisted of 20.3 km of linecutting, 18.625 km of total field magnetic surveying and 7.15 km of induced polarization and resistivity surveying.

The line-cutting was carried out by Stares Contracting of Thunder Bay, Ontario and the induced polarization survey was completed by Belanger Geophysics Ltd. of Rouyn, P.Q. The total field magnetic survey was completed by B. MacLachlan of Hemlo Gold Mines Inc. All of the data has been plotted at a scale of 1:5000.

8.1 Induced Polarization Survey

A number of strong IP and resistivity anomalies were detected over the Pipestone property. These responses are illustrated on the both the stacked pseudo-sections of phase and resistivity, and will be summarized below.

LINE	STATION	COMMENTS
139E	9900N	strong near surface response coincident with high resistivity
141E	9900N	strong near surface response;
	10060N	strong phase anomaly
147E	10875N	strong phase anomaly coincident with high resistive anomaly
149E	10850N	strong well defined phase with coincident resistivity high
	11175N	strong phase response with coincident resistivity high; shallow depth to top.
	11325	moderate phase anomaly incompletely defined

LINE	STATION	COMMENTS
151E	10775N	weak phase anomaly; N flanking resistivity high
	11175N	high phase anomaly with coincident resistivity high
	11475N	strong phase anomaly with S flanking resistivity high
153E	10575N	moderate phase anomaly with coincident resistivity high
	11575N	very strong, wide shallow phase anomaly with coincident resistivity high; good target for follow-up investigation
155E	10575N	weak phase response coincident with high resistivity anomaly
	10825N	weak phase response
	11220N	moderate phase anomaly
	11525N	very strong, wide phase anomaly with coincident high resistivity anomaly; good follow-up target

Induced polarization anomalies on lines 139 E and 141E/9900N correlate with ankerite-silica-biotite-fuchsite altered, sulphide and gold mineralized stratigraphy identified during mapping. Much of this area is swamp and overburden-covered. The remaining anomalies to the east and north are in terrain underlain by the Pipestone Bay intrusive and are attributed in part to that ultramafic body, and graphitic and sericitic horizons within felsic flows.

8.2 Total Field Magnetics

Total field magnetic amplitudes in the survey area vary between 56430 and 658865.5 nT with the majority of readings between 58500 and 59800 nT. The isomagnetic contour pattern over the Pipestone grid indicates that the underlying lithology is striking in an east-west direction between 075° and 090°. Two distinct magnetic domains are evident within the magnetic data. These consist of linear east-west striking magnetic highs ranging up to 4000 nT above background interspersed within a generally quiescent magnetic background of approximately 59000 nT. These magnetic highs may reflect mafic to ultramafic stratigraphy within the felsic stratigraphy.

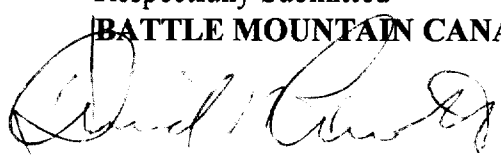
9.0 CONCLUSIONS AND RECOMMENDATIONS

The northern portion of the property west of Pipestone Narrows features favorable stratigraphy, alteration and anomalous gold values. Previous diamond drilling and current field examination suggest this area to be a roof pendant underlain by the Pipestone Bay intrusive body. As such, this area holds little economic importance.

Claim KRL 1184317 and the central east-west trending block of four claims (KRL 1143622-1143624 and KRL 1184316) hold the best economic potential. All claims host favourable mafic-ultramafic lithologies, have been subjected to moderate to strong deformation and a hydrothermal alteration suite consisting of ankerite-silica/albite-biotite ± fuchsite reminiscent of areas of the Campbell Mine. The extent of alteration and accompanying geophysical anomaly is in the order of 190 meters by 450+m. It is recommended that the claims be maintained under option until such time as funds are made available to drill a stratigraphic fence across claim KRL 1184317 as follows:

Hole #	Location	Azimuth	Dip	Depth
1	L141E/10000N	180	-45	265m
2	L141E/9810N	180	-45	265m
				530m

Respectfully Submitted
BATTLE MOUNTAIN CANADA LTD.



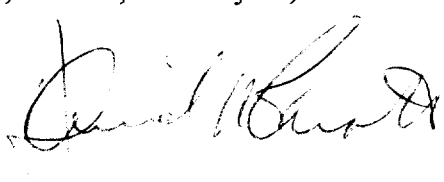
David R. Truscott
Exploration Geologist

STATEMENT OF QUALIFICATIONS

This is to certify that I, David Truscott:

- am a resident of the city of Timmins, in the province of Ontario, since July 1, 1996.
- am employed as an Exploration Geologist by Battle Mountain Gold (formerly Hemlo Gold Mines Inc.).
- have received a Bachelor of Science (Geology) degree from the University of Western Ontario, London, Ontario, having graduated in 1988.
- have been employed as a geologist since 1988.
- do not hold or expect to receive any interest in these claims, held under option, by Battle Mountain Gold (formerly Hemlo Gold Mines Inc.).

Signed in Timmins, Ontario, February 14, 1997.



APPENDIX I

SAMPLE DESCRIPTIONS AND ASSAY CERTIFICATES

N- 1004

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Narrows Number: 401 ?? District: Superior

Date: June 95 Sampler: BM/DT N.T.S.:

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP	Rep	NORTHING	EASTING	SAMPLE DESCRIPTION
A	✓ 556					NE corner of 6954 OLD Trenches	Tony Took	from TR#1 Qtz veining ank alt. rusty
B	✓ 35					"		Rusty volcanic? Qtz veining Te#3
C	✓ 330					"		rusty sheared volcanic 3-5% dis py silicified V.G?
D	✓ 725					"		rusty mafic 2-3% py
E	✓ 3947				✓			mafic flow Qtz str 1% cpy 1% py
F	✓ 1808				✓			Rusty mafic vol 5% py cpy Qtz str.
G	✓ 67							Bull white Qtz veins
H	✓ 273							rusty sheared mafic 1% py
I	✓ 9				✓			Qtz eye silicified mafic
J	✓ <5							rusty felsic vol? Porphyry?
K	✓ <5							Qtz vein Bull white.
L								
M								VOID
N								
O								

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№ 1014

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Advance / Pipestone Number: 452 / 461 District: Superior

Date: July 01 / 96 Sampler: Dave Truscott N.T.S.: 52m-1

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP	REP	NORTHING	EASTING	SAMPLE DESCRIPTION
A								
B								
C								
D								
E								
F								
G								
H								
I								
J								
K								
L	<5					Pipestone 95N	L140	2; ank, aqv, qav 80% vein material,
M	<5				/	11		2; ank vn + glassy qsv + tourm
N	<5					11		2, sa, tr py
O	<5					98+50	L140	Bull quartz, minor ank

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№ 1015

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone North Number: 461 District: Superior

Date: June 6/96 Sampler: T. Maciejewski N.T.S.: 52M1

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP	REP	NORTHING	EASTING	SAMPLE DESCRIPTION
A	552					same location		mV; 1-2% py Ank Vng, massive Agy unfrac's
B	426					as DT's	2444K	mV; semimassive Agy unfracs; ank Vng 5-8% mass fracs py ± brassy py
C	230							mV; wk strong ank; 2-3% frac py 1-2% fg frac Agy;
D	818							mV + qt-/q-Ank Vng; shrd
E	<5				✓	98+50	L140	2; ank-glassy qSW
F	<5				✓	98+65	L140	2; sank; cherty sil = ADVANCE "N" aqsw, tr py; ± stks
G	<5					"		shrd 2; mod ank, 5 fm
H	<5				✓	"		as 1015F
I	7					101+02	142+05	2m sil/dacite; wk ank s mag 1-2% fg py; wk shr
J	<5					"	"	3DXT; m sr, m chl
K	<5					100+95	141+15	smoky grey/bull white qV in 3DXT
L	<5					100+10	139+60	Dacite; well foliated; poss arkose bands s ank, chl, ser
M	6					101	137	3D black QE (3DBXT); sil, wsr tr py
N	6					"	"	glassy white qV

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N° 1016

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Number: 461 District: Superior

Date: July 3/4 1996 Sampler: Dave Truscott N.T.S.: 52 m-1

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP	PEP	NORTHING	EASTING	SAMPLE DESCRIPTION
F	36					109+25	148+90	2; massive; 2-3% fg diss py locally appears pillowed
G	29					109+15	149+15	2 pill w-m cal; minor q-av 3-5% py
H	453					"	"	"
I	<5					111+40	150+05	Dacite; ✓ siliceous; q av's
J	<5					111+35	150+00	30% t; fold nose in q av + UM core; Mineralization + to QAV in parasitic fold nose
K	40/35					112+00	150+20	
L	<5					112+00	150+10	QV; smoky grey to white @ dacite/UM ct 5% ribbon tv

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Nº 2258

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Narrows Number: 461 District: Superior

Date: July 1996 Sampler: BM N.T.S.: 52M/

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP	Rep	NORTHING	EASTING	SAMPLE DESCRIPTION
A	✓ 5					98+15	B9+95	arg Qtz-carb Float tr py
B	✓ 5					98+15	B9+90	15cm Qtz-carb vein
C	✓ 638					98+05	138+80	weakly sheared sed? rusty tr py
D	✓ 5					98+02	138+80	5cm Qtz vein
E	✓ 10					98+00	138+80	Qtz stk in int vol
F	✓ 5					98+25	138+40	Qtz v/stk in int - mafic minor carb
G	✓ 5					98+25	138+39	Qtz stk in int vol
H	✓ 15				✓	98+25	138+38	weakly sheared / deformed int vol rusty.
I	✓ 5					98+25	138+36	Qtz stk in deformed int, rusty, carb st
J	✓ 38					98+25	138+32	rusty sed? nsp
K	✓ 5				✓	98+25	138+31	Qtz stk/vein in mafic
L	✓ 40					98+25	138+16	rusty sed nsp
M	✓ 5					98+25	138+15	silicified int vol numerous Qtz stk
N	✓ 5					98+80	138+35	mafic minor Qtz-carb stk tr py
O	✓ 5					97+45	138+35	glassy white Qtz, frost heave, minor carb tr cpy

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№ 2259

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Firestone Narrows Number: 461 District: Superior

Date: July 96 Sampler: BM N.T.S.: 52M1

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP		NORTHING	EASTING	SAMPLE DESCRIPTION
A	✓ 8					97+45	138+38	int. mafic, weakly silicified, Qtz-carb stringers, tr. 1% cpy
B	✓ 7					97+45	138+38	Qtz, 20% carb, rusty sugary
C	✓ 5					97+70	138+55	int vol, Qtz-carb str, tr cpy
D	✓ 13					97+70	138+55	glassy Qtz str/veins in int vol
E	✓ 5					97+00	139+60	carb pod + glassy Qtz
F	✓ 5					97+05	139+80	int vol, silicified, Qtz veins, tr py
G	✓ 11					96+90	140+20	Qtz-carb veins in mafic rusty
H	✓ 5					96+95	140+35	carb pod, Qtz str
I	✓ 132					98+85	140+80	rusty sed, mag, 1% py
J	✓ 10					98+60	140+45	int vol, Qtz str, rusty.
K	✓ 53					99+05	141+82	rusty sed, mag, 5% Qtz veining
L	✓ 221					99+05	141+80	" " " 5% py
M	14					109+00	148+46	carb pod/int vol Qtz str tr py
N	5					109+70	148+40	5cm QtzV in felsic
O	9					108+90	147+25	silicified int vol Qtz str tr py tr fuch.

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№ 2260

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Narrows Number: 461 District: Superior

Date: July 96 Sampler: BM N.T.S.: 52M1

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP		NORTHING	EASTING	SAMPLE DESCRIPTION
A	✓ 32					108+90	147+25	silicified vol, Qtz str 1% Py.
B	✓ 3517					108+85	147+25	int med vol? sed? Qtz str 1% Py tr cpy minor carb
C	✓ 24					108+70	147+25	weakly silicified vol Qtz str 1% dis Py in Qtz
D								
E								
F								
G								
H								
I								
J								
K								
L								
M								
N								
O								

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NORANDA EXPLORATION COMPANY, LIMITED **SAMPLE REPORT** **№ 2263**

WHITE - OFFICE
YELLOW - FIELD

LAB _____ PROJECT NO./PROPERTY T. Maciejewski 503 N.T.S. 52 M 1

GEOLOGIST/PROSPECTOR Harper, MacIsaac, Stares GRID REFERENCE _____ DATE Nov 1/94

SAMPLE	FIELD #	DESCRIPTION	TYPE	WIDTH	ASSAYS							CO-ORDINATES	
					WRA	Au	Ag	Cu	Pb	Zn		GRID	UTM
A		rusty zone, lake shore 10m from B.	grab			8.0 gpt							
B	.28 grab	strongly sheared mafic with gtz-cb flooding	grab	8"		10.0							
C		strongly sheared mafic with sulphide coatings on shear planes.	grab			21 ppb							
D		sheared mafic, finely diss py.	grab			67 "							
E		mafic with 2-3% diss py, asp, po	grab			99 "					Co		
F		cb zone in mafics with rust	grab			26 "							
G		sheared mafic, rusty	grab.			97 "							
H		gtz-cb vn in mafics	grab			<5 ppb							
I		sheared Q.E. felsic diss py	grab.			23 ppb							

samp
show

№ 2444

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Narrows Number: 461 District: Superior

Date: Aug 20 / 95 Sampler: D.T N.T.S.:

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP		NORTHING	EASTING	SAMPLE DESCRIPTION
A	<5							Mafic flow / poss tuff; frtd & per v fecb'd fecb vns to .5cm
B	<5							Mafic flow; sltd; @ fecb flooded; poss wk bt & loc hbl alt'n; py / po stg; tr diss apy, asp
C	<5							Int-flsc flow / @ Eye; wk ser'n?
D	<5							UM intrusive? mg, equigranular; @ fecb vn'd; mod'y to stry mtx
E	<5					Trench		blk, @ l-eye rhy / tuff; sltd, mod'y to stry ser'd
F	<5					Trench		blk @ eye rhy; shrd, stry ser'd
G	<5							Vm / UM; shrd, ftcs, wk fecb; anastom. blk ch(in shr - resembles 2444 "K"
H	16						rep	Vm / interflow mat IF(?) stry mtc, sltd, mod'y cb'd; fg py to 5%; 1-2% garnet
I	36							Vm / IF(?) as above, no gt.
J	<5							Lyt @ eye ash tuff; lt grn-gry; fg diss py to 3%; wk l/y cr'bd
K	43					Trench		mafic flow; fecb vn to 4cm x-cut by smoky @ stgs; fg cpy to 5% in @
L	12						rep	Int @ - fp vtl tuff / poss @ FP(?); chlc, ser'd fg diss tr py; wk l/y cb'd; ≈ Mag Spiers 's
M	82							Int / flsc tuff; shrd; mod'y ser'd, mod'y chlc ≈ Mag Spiers 's.
N	-							No Sample
O	-							No Sample

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№ 2447

HEMLO GOLD MINES INC. - SAMPLE RECORD SHEET

Project Name: Pipestone Number: 1461 District: Superior

Date: Aug 14/95 Sampler: DT, RG N.T.S.:

SAMPLE #	AU P.P.B.	AU O.P.T.	W.R.	ICP		NORTHING	EASTING	SAMPLE DESCRIPTION
Proj A	~							
Proj B	~							
Proj 1461 C	/<5							mafic tuff; 15-20% plag, 3-5% blue Q-eye 3-5% fg diss py, cpy; fe cb'd
D	/25							asc; intensely sltd; chl, Qtz - fe cb & stkwk tr-1% py; ser'd
E	/583							sltd UM? (?); V. stry mtc & shrd.
F	/52							felsic tuff; sltd; poss shrd FP; wkly ser'd & fe cb'd; wk Ab'n (?)
G	/13							felsic flow; shrd, sltd, fe cb'd; 3-5% fg diss py, po, mt
H	/<5							felsic flow? Q-Vn'd, shrd, chl c, stry fe cb'd; 3-5% diss py ± po ± mt; stry mtc
I	/<5							fg blk Q-eye rhyolite; wkly crb'd; poss. potassic, alt'n; may be lithic tuff.
J	/8							mass cherty black rhyolite
K	/42							trench & pit: rhy. tuff, ctc w UM; wk, pervv. fuchsite, mntns fe cb, chl c, tlcs
L	/7							UM intr. (?) (mass Vn (?); wkly to mod. mtc; chl c, fuchs, talc; stry sltd
M	/157							UM int? / shrd, fe cb'd; tlcs, fuchsitic; poss highly altered Vc-Q Eye
N	5404							felsic Q-eye volc; ser'd, fe cb'd; shrd 1-3% py; closely Qv.
O	/11							Qtz Fld Xtl tuff; med-lt grey; Q-eyes to 1mm @ 5% & fg apatitic to 1.5 mm to 25%; wkly ser'd in shr, wkly fe cb'd tr py
P	/<5			- mafic tuff - blue quartz eyes & 3-5% euhedral plag laths; wk chl, stry fe cb'd				

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A DIVISION OF ASSAY LABORATORY SERVICES INC.

1070 LITHIUM DRIVE, UNIT 2
THUNDER BAY, ONTARIO P7B 6G3
PHONE (807) 623-6448
FAX (807) 623-6820

HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

June 5, 1995

Job #954675

PROJECT #401-PIPE

ATTENTION: STEVE CONQUER

Sample # Accurassay		Customer	Gold ppb	Gold Oz/t
2		1004-A	556	0.016
3		1004-B	35	0.001
4		1004-C	317	0.009
5	CHECK	1004-C	330	0.010

Certified By: Bob Beier

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FAX (807) 623-6820

HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

June 8, 1995

Job #954698

REF: RED LAKE

ATTENTION: WAYNE REID

Sample # Accurassay	Customer	Gold ppb	Gold Oz/t
1	1004-D	725	0.021
2	1004-E	3947	0.115
3	1004-F	1808	0.053
4	1004-G	67	0.002
5	1004-H	273	0.008
6	1004-I	9	<0.001
7	1004-J	<5	<0.001
8	1004-K	<5	<0.001

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HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

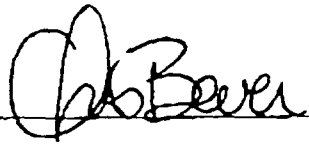
July 5, 1996

Job# 964876

Project #452/461

ATTENTION: WAYNE REID

SAMPLE #		Gold	Gold
Accurassay	Customer	ppb	Oz/t
13	~~1014-L~~	<5	<0.001
14	~~1014-M~~	<5	<0.001
15	~~1014-N~~	<5	<0.001
16	~~1014-O~~	<5	<0.001

Certified By: 

ACCURASSAY LABORATORIES
A DIVISION OF ASSAY LABORATORY SERVICES INC.

1070 LITHIUM DRIVE, UNIT 2
THUNDER BAY, ONTARIO P7B 6G3
PHONE (807) 623-6448
FAX (807) 623-6820

HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

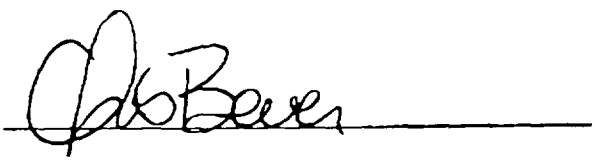
June 11, 1996

Job# 964749

Project #453/456

ATTENTION: WAYNE REID

SAMPLE # Accurassay	Customer	Gold ppb	Gold Oz/t
1	1015-A	752	0.022
2	1015-B	426	0.012
3	1015-C	230	0.007
4	1015-D	818	0.024

Certified By: 

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HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

July 8, 2996

Job# 964881

Project #461

ATTENTION: WAYNE REID

SAMPLE # Accurassay	Customer	Gold ppb	Gold Oz/t
35	1016-F	36	0.001
36	1016-G	29	<0.001
37	1016-H	453	0.013
38	1016-I	<5	<0.001
39	1016-J	<5	<0.001
40	1016-K	40	0.001
41 Check	1016-K	35	0.001
42	1016-L	<5	<0.001

Certified By: 

ACCURASSAY LABORATORIES
A DIVISION OF ASSAY LABORATORY SERVICES INC.

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THUNDER BAY, ONTARIO P7B 6G3
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FAX (807) 623-6820

HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

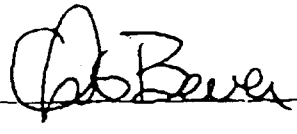
JULY 5, 1996

Job# 964874

Project #461

ATTENTION: WAYNE REID

SAMPLE # Accurassay	Customer	Gold ppb	Gold Oz/t
1	2258-A	<5	<0.001
2	2258-B	<5	<0.001
3	2258-C	638	0.019
4	2258-D	<5	<0.001
5	2258-E	10	<0.001
6	2258-F	<5	<0.001
7	2258-G	<5	<0.001
8	2258-H	15	<0.001
9	2258-I	<5	<0.001
10	2258-J	38	0.001
11	Check 2258-J	53	0.002
12	2258-K	<5	<0.001
13	2258-L	40	0.001
14	2258-M	<5	<0.001
15	2258-N	<5	<0.001
16	1015-E	<5	<0.001
17	1015-F	<5	<0.001
18	1015-G	<5	<0.001
19	1015-H	<5	<0.001

Certified By: 

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FAX (807) 623-6820

HEMLO GOLD MINES INC. EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

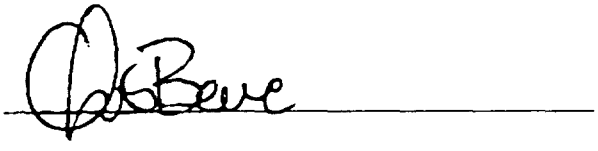
July 8, 1996

Job# 964881

Project #461

ATTENTION: WAYNE REID

SAMPLE # Accurassay	Customer	Gold ppb	Gold Oz/t
1	2258-O	<5	<0.001
2	2259-A	8	<0.001
3	2259-B	7	<0.001
4	2259-C	<5	<0.001
5	2259-D	13	<0.001
6	2259-E	<5	<0.001
7	2259-F	<5	<0.001
8	2259-G	11	<0.001
9	2259-H	<5	<0.001
10	2259-I	251	0.007
11	Check 2259-I	132	0.004
12	2259-J	10	<0.001
13	2259-K	53	0.002
14	2259-L	221	0.006
15	2259-M	14	<0.001
16	2259-N	<5	<0.001
17	2259-O	9	<0.001
18	2260-A	32	<0.001
19	2260-B	3517	0.103
20	2260-C	24	<0.001
21	Check 2260-C	21	<0.001
22	1015-I	7	<0.001
23	1015-J	<5	<0.001
24	1015-K	<5	<0.001
25	1015-L	<5	<0.001
26	1015-M	6	<0.001
27	1015-N	6	<0.001

Certified By: 

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HEMLO GOLD MINES INC.-EXPLORATION OFFICE
P.O. BOX 1205, 60 SHIRLEY ST. S.
TIMMINS, ONTARIO
P4N 7J5

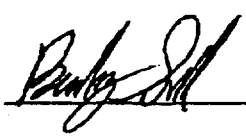
August 30, 1995

Job #9541201

PROJECT #: 461

ATTENTION: WAYNE REID

Sample # Accurassay		Customer	Gold ppb	Gold Oz/t
1		2444- A	<5	<0.001
2		2444- B	<5	<0.001
3		2444- C	<5	<0.001
4		2444- D	<5	<0.001
5		2444- E	<5	<0.001
6		2444- F	<5	<0.001
7		2444- G	<5	<0.001
8		2444- H	16	<0.001
9		2444- I	36	0.001
10		2444- J	<5	<0.001
11	Check	2444- J	<5	<0.001
12		2444- K	43	0.001
13		2444- L	12	<0.001
14		2444- M	82	0.002
15		2447- C	<5	<0.001
16		2447- D	25	<0.001
17		2447- E	583	0.017
18		2447- F	52	0.002
19		2447- G	13	<0.001
20		2447- H	<5	<0.001
21	Check	2447- H	<5	<0.001
22		2447- I	<5	<0.001
23		2447- J	8	<0.001
24		2447- K	42	0.001
25		2447- L	7	<0.001
26		2447- M	157	0.005
27		2447- N	2404	0.070
28		2447- O	11	<0.001
29		2447- P	<5	<0.001

Certified By: 

APPENDIX II

FIGURE 3: GEOLOGY

SCALE 1:5000

APPENDIX IV

TECHNICAL DATA FOR GEOPHYSICAL SURVEYS

2.17105

Induced Polarization Surveys

This is currently the most powerful and commonly used galvanic method in mineral exploration. Originally designed in the post-war period for use in porphyry copper exploration, it has evolved into a tool of much wider application.

The method depends on the fact that if the voltage near a pair of current electrodes is observed as the current is turned off, it often decreases gradually to zero rather than dropping instantly. This behavior is what is know as the induced polarization (IP) effect. other equivalent manifestations of IP are a drop in resistance to an AC current with increasing frequency and **a phase shift of measured voltage relative to signal current**. The effect is caused by current-induced ionic disequilibrium at conductor surfaces and in certain clays such as montmorillonite. The return to chemical equilibrium when the current is shut off is diffusion-controlled, producing the observed slow decay. The electrical analogy often furnished is that of a capacitor discharging current following a charge period.

IP measurements are used to located disseminated conductors such as typical porphyry copper deposits. IP can distinguish zones of electrolytic conductivity from conductive minerals. IP surveys are often useful as a geological mapping tool in areas of thick overburden, and can sometimes provide information on clay alteration. They are invariably combined with resistivity surveys, both measurements being made with the same electrode setup. The technique has found a place in **gold exploration** due to its increasing ability to sense very minor sulphides (1-2%) associated with vein types of gold occurrences.

The measured primary voltage, which increases with time, can be regarded as being shifted in time with respect to the transmitted current. That is, there is a phase shift. This shift, expressed in milliradians, is the parameter measured in phase IP. The received square wave is digitized and filtered, and the phase shift of the desired frequency (fundamental or harmonic) is measured relative to the transmitted signal or a synchronous digital clock. The voltage is recorded for use in calculating the resistivity. Many cycles of signal can be averaged, thus increasing the signal to noise ratio and thereby simulating the effect of higher current.

The most advanced instruments measure amplitude and phase shift of the voltage at a wide range of frequencies. This is the so-called spectral IP, multifrequency IP, or complex resistivity technique. These systems are all microprocessor-controlled, and the large amounts of data they produce require digital storage systems. The same information is available from time-domain systems with multiple time gates.

All these systems require some way of synchronizing transmitter and receiver. The easiest method, applicable to time and frequency domain systems, is to synchronize on the received signal. This is feasible if the signal is much stronger than ambient noise. Otherwise, crystal clocks or a cable link must be employed.

IPT-1 TRANSMITTER

Induced Polarization (Time Domain or Frequency Domain), CSAMT, Time Domain EM, Resistivity

Lightweight: 12 kg

Low cost

Wide range of power sources: 50Hz, 60Hz or 400Hz motor generators or mains power; or 12V batteries

DC-8192Hz, Time Domain or Frequency Domain

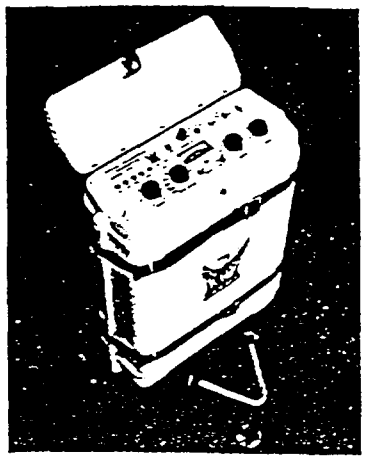
The most versatile geophysical transmitter ever made

PHOENIX

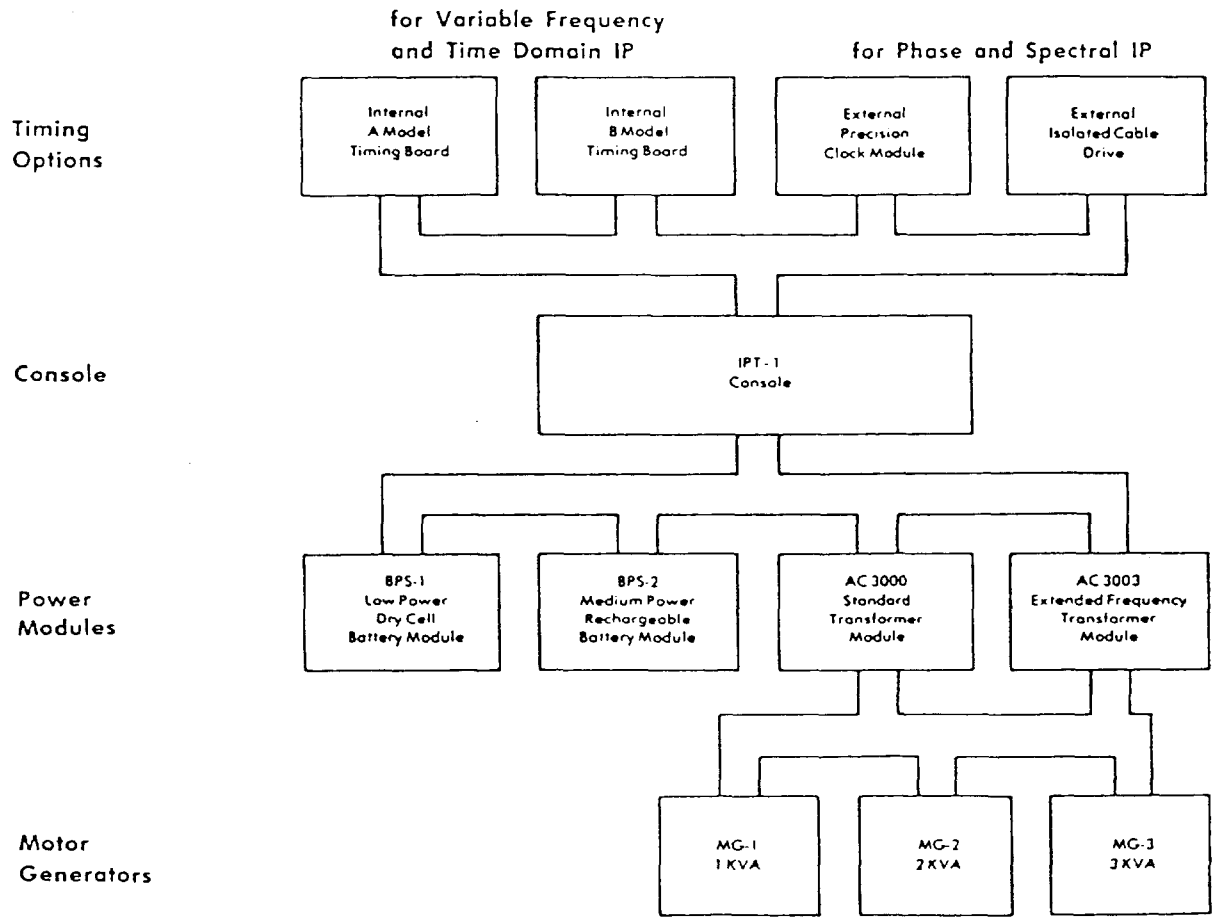
IPT-1

Variable Frequency, Time Domain and Phase IP Transmitter

- Reliable: Backed by twenty years experience in the design and worldwide operation of induced polarization and resistivity equipment
- Versatile: Can be used for resistivity, variable frequency IP, time domain IP or phase angle IP measurements
- Stable: Excellent current regulation
- Lightweight, portable
- Wide selection of power sources
- Low cost



Transmitter Configurations



PHOENIX

PHOENIX GEOPHYSICS LIMITED

Geophysical Consulting and Contracting, Instrument Manufacture, Sale and Lease.

Head Office: 200 Yorkland Blvd. Willowdale, Ont., Canada M2J 1R5. Tel: (416) 493-6350
310 - 885 Dunsmuir St. Vancouver, B.C., Canada V6C 1N5. Tel: (604) 684-2285
4690 Ironton St. Denver, Colorado, U.S.A. 80239. Tel: (303) 373-0332

Timing Options

INTERNAL TIMING BOARD

There are two available internal timing boards. Both have the same internally mounted crystal oscillator with a stability of 50 PPM over the temperature range -40°C to +60°C.

Model A :

STANDARD FREQUENCY SERIES
Frequency domain mode
±DC, .062, .125, .25, 1, 2 and 4 Hz.
Time domain mode
2 sec +, 2 sec off, 2 sec -, 2 sec off.
Simultaneous transmission mode
.25 and 4.0 Hz standard, other pairs available.

OPTIONAL FREQUENCY SERIES (change link on board)
Frequency domain mode
±DC, .078, .156, .313, 1.25, 2.5, and 5.0 Hz.
Time domain mode
1.6 sec +, 1.6 sec off, 1.6 sec -, 1.6 sec off.
Simultaneous transmission mode
.313 and 5.0 Hz standard, other pairs available.

Model B :

The main difference between this timing board and the model A board is that the duty cycle is variable. Frequency domain operation is obtained by setting the duty cycle to 100% and selecting any of nine binary frequencies from 1/64 Hz to 4 Hz. Various time domain waveforms may be obtained by choosing any of the nine frequencies and a duty cycle of 25%, 50% or 75%. The standard 2 sec +, 2 sec off, 2 sec -, 2 sec off time domain waveform is chosen by selecting a duty cycle of 50% and a frequency of .125 Hz.

EXTERNAL HIGH PRECISION CRYSTAL CLOCKS

The IPT-1 may be driven by external high precision crystal clock modules such as the CL-1 and transmitter driver or CL-2 and transmitter driver. These clock modules were designed for use as a time reference between the IPT-1 or IPT-2 transmitters and the Phoenix IPV-2 phase IP receiver. The aging rate of the CL-1 clock module is 5×10^{-10}/day (0.11 mrad/hr at 1 Hz) and the stability of the CL-2 clock module is 10^{-7}/day (2.26 mrad/hr at 1 Hz). These clock modules weigh 7.5 kg., however space is provided for as much as 5 kg of additional internal batteries for operating the CL-1 oven heated clocks all day at -40°C. Clock modules produced by other manufacturers of induced polarization receivers are also compatible with the IPT-1.

EXTERNAL ISOLATED CABLE DRIVE

The isolated cable drive option allows the IPT-1 to be driven by the timing circuitry of the IPV-3 spectral IP receiver. The maximum distance allowed between transmitter and receiver is 500m. For efficient spectral IP field surveying, the distance between the transmitter and receiver is always maintained at one electrode interval. Thus the maximum convenient electrode interval, using the isolated cable drive option, is 500m. The IPV-3 measures the current plus six voltage dipoles (n = 1,6) simultaneously.

Console

Ammeter Ranges : 30 mA, 100 mA, 300 mA, 1A, 3A and 10A full scale.

Meter Display : A meter function switch selects the display of current level, regulation status, input frequency, output voltage, control voltage and line voltage.

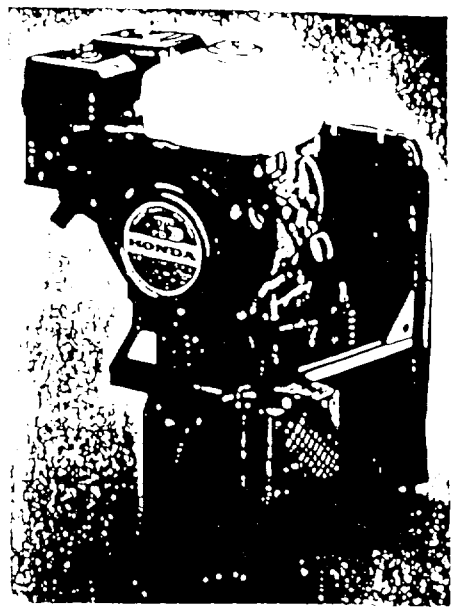
Current Regulation : The change in output current is less than 0.2% for a 10% change in input voltage or electrode impedance.

Protection : The current is turned off automatically if it exceeds 150% full scale or if it is less than 5% full scale.

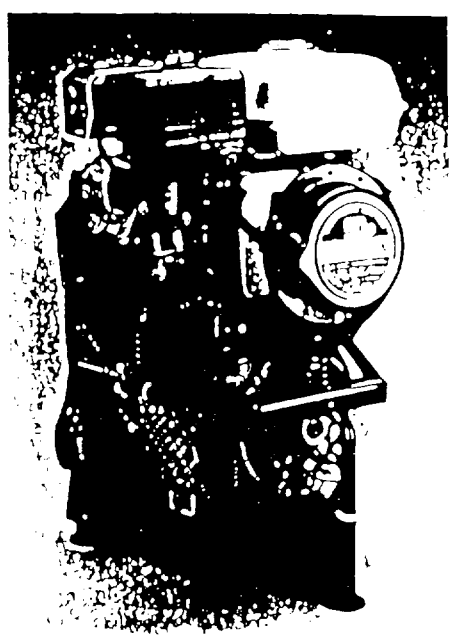
Motor Generators

There are three motor generators, differing in weight and power, which can be used with the transformer power modules. All three supply three phase 400 Hz (350 to 600 Hz) 60V (45V to 80V). The voltage is regulated by feedback from the transmitter.

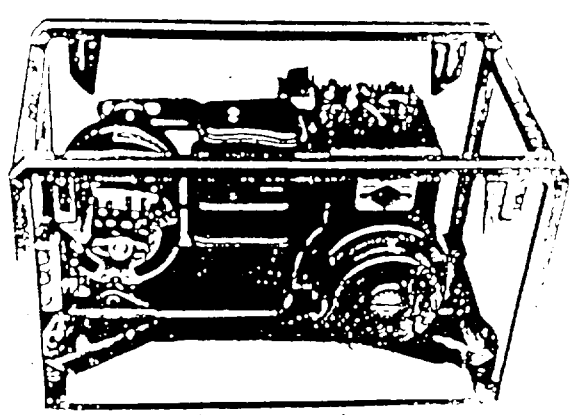
MG - 1 : This lightweight unit is designed for easy portability in areas of moderately high resistivity. It is well suited for massive sulfide exploration in Northern Canada, Europe and Asia, as well as general IP and resistivity surveys in rugged, mountainous areas around the world. The motor is a 4 cycle Honda which produces 3 HP at 3600 rpm. The dimensions of the unit, including packframe, are 40 x 45 x 60 (16 x 18 x 24 in). Total weight is 25 kg (55 lb.).

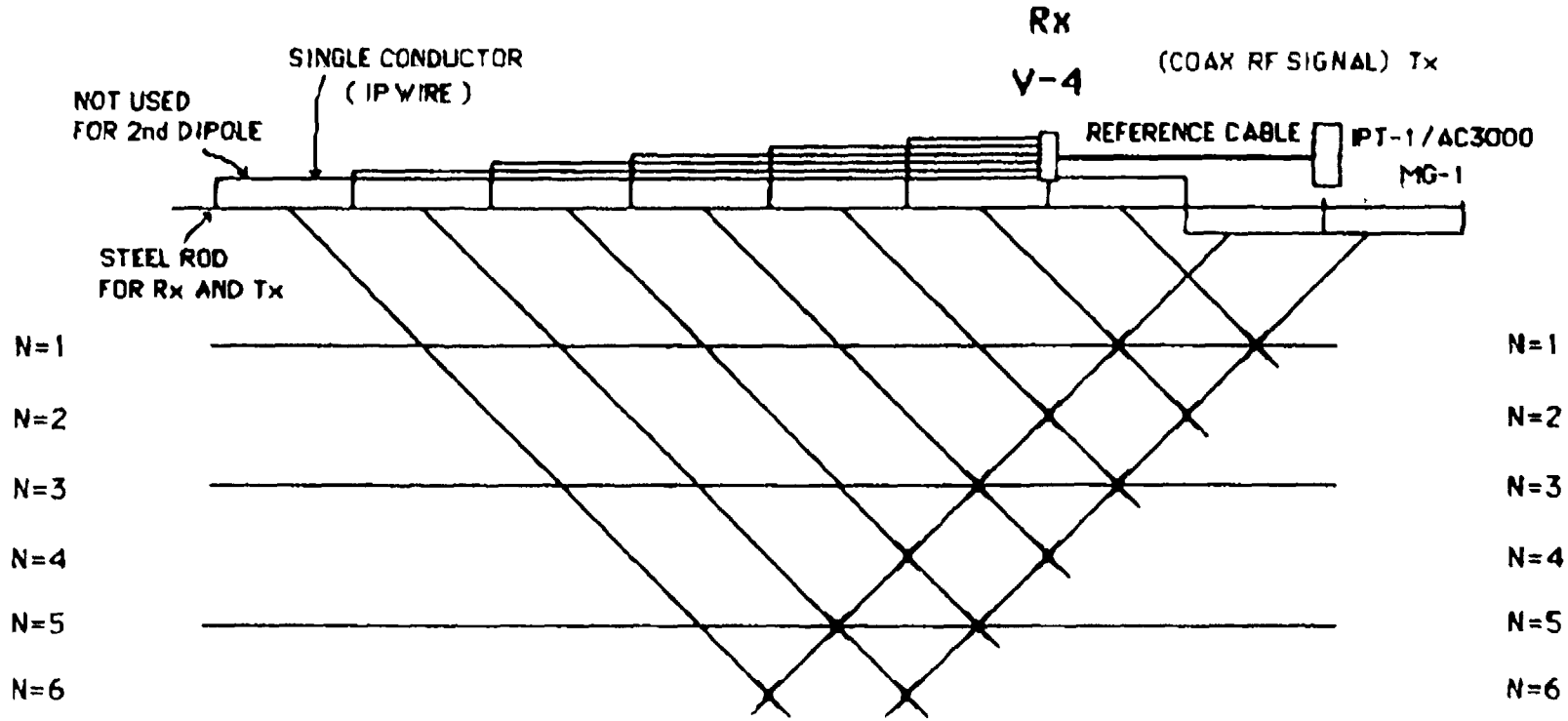


MG - 2 : 2KVA motor generator. This versatile unit is adequate for the vast majority of IP and resistivity surveys conducted worldwide. It is light enough to be carried by one man, yet powerful enough for most survey requirements. The motor is a 4 cycle Honda which produces 5 HP at 3600 rpm. The dimensions of the unit, including packframe, are 40 x 45 x 60 cm (16 x 18 x 24 in). Total weight is 34 kg (75 lb.).



MG - 3 : 3KVA motor generator. This two-man portable unit is designed for surveys in areas which require additional power. The motor is a 3 cycle Briggs and Stratton which produces 8 HP at 3600 rpm. The unit is mounted on a square frame with dimensions 48 x 48 x 75 cm (18 x 19 x 29 in). Total weight is 55 kg (121 lb.).





NOTE: V-4 CAN READ N-1 to N-6 SIMULTANEOUSLY FROM Tx DIPOLE
WHEN 2nd Tx DIPOLE IS READ EVERYTHING MOVES AHEAD 2 SEPARATIONS
THIS METHOD CAN BE USED FOR DIPOLE-DIPOLE OR POLE-DIPOLE CONFIGURATIONS

ADVANTAGES :

- ONLY 2 HIGH VOLTAGE WIRES (REDUCES COUPLING)
- REDUCED SETUP TIME (WIRES CAN BE PULLED LINE TO LINE)
- NO OVERLAP OF SETUPS TO FILL IN DEEPER (N) VALUES
- REFERENCE CABLE ELIMINATES CALIBRATION ERRORS AND DATA CORRECTION

TURBO V-4

A NEW DIMENSION IN INSTRUMENTATION

PHOENIX

Cost-effectiveness through multiple functions: five controlled-source geophysical techniques plus generalized data acquisition/processing/control in a rugged, battery powered, portable package.

The Turbo V4 is an upgraded version of the V4 receiver, with a new, high-performance CPU board.

The Turbo V4 processor is 50 times faster than the original V4 processor, and features 12 times as much ROM/RAM memory for stored programs and data.

Programs for the Turbo V4 are written in high-level languages; the data processing is therefore much more efficient and intelligent than on the old CPU, which used assembler language only.

Also, the new CPU is programmable*. Users can develop their own programs in FORTRAN or C language using the IBM PC (or compatible), then download them into the V4. This capability means the V4 will remain up-to-date for years, and can be matched precisely to the user's applications.

*** Optional.**

SPECIFICATIONS

Analog Section

Number of channels	2, 4, 6 or 8 (in pairs)
Dynamic range	± 10 volts
Frequency range	1024 sec to 4 kHz (SIP); 4 sec to 4 kHz (CSAMT) in binary or 2/3 binary steps.
Input impedance	More than 100 megohms at low frequencies.
Powerline filtering	Triple notch 40 db powerline filter for 1/3/5 harmonics of 50/60 Hz. Switchable in/out.
Other filtering	Bad sample rejection; offset adjustment; programmable anti-alias filters; slope correction (TDIP) all under processor and/or manual control.
Gain	Automatic or manual control, range of 1 to 640.
DC offset	Processor controlled DC offset control, range: ± 2.5 volts.
Calibration	Manual external calibration; processor-controlled, internal calibration with built-in calibration/test signals: 1/128 Hz to 4 kHz ±5 v, 200 ohm impedance; 50% or 100% duty cycle.
Sensitivity	Sufficient for stand alone controlled source applications.

Digital Section

Processor/CPU board	32/16 bit NS32C016 with NS32081 maths coprocessor. Clock rate 6-10 MHz. Programmable interrupt controller with 16 request lines. MULTIBUS interface. DIN connectors. On-board real time clock.
Monitor firmware	Monitor firmware interfaces to National 32000 series software development tools. Also provides run time environment, terminal handler, debugger execute module, floating point support module and interrupt handler.
Applications firmware	Initially offered with geophysical applications firmware, for IP in time, frequency, or phase domain; spectral IP; resistivity; and CSAMT. Other offerings (such as FDEM) may become available from time to time. The user may develop proprietary applications in FORTRAN 77, PASCAL or C on VAX, IBM PC or compatibles and download into the V4.
CPU board memory	Up to 576 Kbyte RAM + 320 Kbyte ROM.
Serial I/O	Optional RS-232 port with selectable baud rate. Can drive RS-232 printer.
Parallel I/O	8 bit port with max 1/2 MHz transfer rate. For vest-pocket printer or external computer.
Timing	Internal crystal clock; processor-controlled resetting for synchronized operation with transmitters. Optional external precision clock.
A-D conversion	16-bit resolution, 12.5 kHz conversion rate.

Mechanical

Weight	approx. 13 kg
Dimensions	32 × 36 × 27 cm high
Case	resilient, tough PVC alloy
Connectors	3 multipin connectors for analog inputs, 2 of which have power for external sensors.

Environmental

Operating temperature	−10°C to +50°C (−20°C with LCD heater)
Storage temperature	−50°C to +60°C
Humidity	Splashproof, may be operated in light rain
Shock and vibration	Suitable for transport in bush vehicles.

Battery

12 v / 6 Ah rechargeable battery. Nominal 10 h continuous operation at +20°C. Provision for external 12V battery supply.

Inputs

Signal channel	Three multipin connectors for 8 analog inputs. (6 + 1 + 1)
Battery	Multipin connector for external battery or for charging of the internal battery @ 12 V, approx 1.2 A.
Remote clock signal	Optional input.
Current Monitor	Twin plugs for RF modulated signal from transmitter (for real-time deconvolution)

Outputs

Analog meters	Eight analog meters
Display	16 char × 4 lines LCD
Analog outputs	8 outputs for analog recorders, etc. ±5V range. (Optional)
External isolated transmitter drive	Via special purpose isolated RF link.
Calibration signal	Twin connectors

Switches and Controls

Keyboard	20-key alphanumeric/command keypad (waterproof).
On/off	2 position rotary.
Meter Mode	2 position toggle, AC or DC
Battery test	2 position toggle.
Input Select	2 position rotary

Note : Specifications subject to change. Customized configurations are available.

Magnetic Surveying

Theory:

The magnetic method is based on measuring alteration in the shape and magnitude of the earth's naturally occurring magnetic field caused by changes in the magnetization of the rocks in the earth. These changes in magnetization are due mainly to the presence of the magnetic minerals, of which the most common is magnetite, and to a lesser extent ilmenite, pyrrhotite, and some less common minerals. Magnetic anomalies in the earth's field are caused by changes in two types of magnetization: (1) Induced, caused by the magnetic field being altered and enhanced by increases in the magnetic susceptibility of the rocks, which is a function of the concentration of the magnetic minerals. (2) Remnant magnetism is independent of the earth's magnetic field, and is the permanent magnetization of the magnetic particles (magnetite, etc.) in the rocks. This is created when these particles orient themselves parallel to the ambient field when cooling. This magnetization may not be in the same direction as the present earth's field, due to changes in the orientation of the rock or the field. The **unit** of measurement (variations in intensity) is commonly known as the Gamma which is equivalent to the nanotesla (nT).

Method:

The magnetometer, **OMNI IV** with an proton precession sensor measures the **Total Magnetic Field** (TFM) perpendicular to the earth's field (horizontal position in the polar region). The unit has no moving parts, produces an absolute and relatively high resolution measurement of the field and displays the measurement on a digital lighted display and is recorded (to memory). Initially, the tuning of the instrument should agree with the nominal value of the magnetic field for each particular area. The proton procession magnetometer collected the data with a **0.5 nanoTesla accuracy.** The operator read each and every line at a **12.5m** interval with the sensor attached to the top of three (56cm), aluminum tubing sections. The readings were corrected for changes in the earth's magnetic field (diurnal drift) with a similar OMNI IV magnetometer, >>base station<< which automatically read and stored the readings at every 30 seconds. The data from both units was then downloaded to PC and base corrected values were computed.

OMNI-IV MAGNETOMETER SYSTEM
Technical Specifications

(from OMNI-IV MAGNETOMETER Operating Manual)

Physical Dimensions	**Wt(kg):**	**w x h x d(mm)**
Instrument console only	3.8:	122 x 246 x 210
Battery belt	1.8:	540 x 100 x 40
Battery cartridge	1.8:	138 x 95 x 75

Sensors

Magnetometer remote sensor	1.2:	56 dia x 220
Magnetometer gradient sensor	2.1:	56 dia x 220

Environment

Magnetometer Sensors

Temperature range	-45°C to +55°C
Relative humidity	0 to 100 % (weather proof)

Standard Memory Capacity

Field unit	1300 sets of readings
Tie-line points	100 sets of readings
Base station	5500 sets of readings

Electronics

RS-232C serial I/O	300 to 9600 baud (programmable); 8 data bits, 2 stop bits; no parity
Electronics console	Enclosure contains electronics and battery pack (if not contained in separate belt). Front panel includes liquid crystal display (LCD), and keypad.
Power Supply	Internal battery pack or external battery belt; or 12V car battery (base station).

SCINTREX OMNI IV MAGNETOMETER

Specifications

Dynamic Range	18,000 to 110,000 gammas. Roll-over display feature suppresses first significant digit upon exceeding 100,000 gammas.
Tuning Method	tuning value is calculated accurately utilizing a specially developed tuning algorithm
Automatic Fine Tuning	± 15% relative to ambient field strength of last stored value
Display Resolution	0.1 gamma
Processing Sensitivity	± 0.02 gamma
Statistical Error Resolution	0.01 gamma
Absolute Accuracy	± 1 gamma at 50,000 gammas at 23°C ± 2 gamma over total temperature range
Standard Memory Capacity	
Total Field or Gradient	1,200 data blocks or sets of readings
Tie-Line Points	100 data blocks or sets of readings
Base Station	5,000 data blocks or sets of readings
Display	Custom-designed, ruggedized liquid crystal display with an operating temperature range from -40°C to +55°C. The display contains six numeric digits, decimal point, battery status monitor, signal decay rate and signal amplitude monitor and function descriptors.
RS 232 Serial I/O	2400 baud, 8 data bits, 2 stop bits, no parity
Gradient Tolerance	6,000 gammas per meter (field proven)

Test Mode	A. Diagnostic testing (data and programmable memory. B. Self Test (hardware)
Sensor	Optimized miniature design. Magnetic cleanliness is consistent with the specified absolute accuracy.
Gradient Sensors	0.5 meter sensor separation (standard), normalized to gammas/meter. Optional 1.0 meter sensor separation available. Horizontal sensors optional.
Sensor Cable	Remains flexible in temperature range specified, includes strain-relief connector
Cycling Time (Base Station Mode)	Programmable from 5 seconds up to 60 minutes in 1 second increments
Operating Environment Range	-40°C to +55C; 0-100% relative humidity; weatherproof
Power Supply	Non-magnetic rechargeable sealed lead-acid battery cartridge or belt; rechargeable NiCad or Disposable battery cartridge or belt; or 12V DC power source option for base station operation
Battery Cartridge/ Belt Life	2,000 to 5,000 readings, for sealed lead acid power supply, depending upon ambient temperature and rate of readings

Weights and Dimensions

Instrument Console Only	2.8 kg, 238 X 150 X 250mm
NiCad or Alkaline Battery Cartridge	1.2 kg, 235 X 105 X 90 mm
NiCad or Alkaline Battery Belt	1.2 kg, 540 X 100 X 40 mm
Lead Acid Battery Cartridge	1.8 kg, 235 X 105 X 90mm
Lead Acid Battery Belt	1.8 kg, 540 X 100 X 40mm
Sensor	1.2 kg, 56 mm diameter X 200mm
Gradient Sensor (0.5m separation - standard)	2.1 kg, 56mm diameter X 790mm
Gradient Sensor (1.0m separation - optional)	2.2 kg, 56mm diameter X 1300mm
Standard System complement	Instrument console; sensor; 3-meter cable, aluminum sectional sensor staff, power supply, harness assembly, operations manual

Ontario

Ministry of Northern Development and Mines

Lands

Declaration of Assessment Work Performed on Mining Land

Mining Act, Subsection 65(2) and 66(3), R.S.O. 1990

Transaction Number (office use)
W9720.00019
Assessment Files Research Imaging

Personal information c
Mining Act, the inform
Questions about this
933 Ramsey Lake Ro

52M01SE0078 2.17105 BALL

66(3) of the Mining Act. Under section 8 of the
ork and correspond with the mining land holder.
North Dev lopment and Mines, 5 Floor,

2.17105

900

Instructions: - F ., use form 0240.
- Please type or print in ink.

1. Recorded holder(s) (Attach a list if necessary)

Name	Client Number
Battle Mountain Canada Ltd.	143550
Address	Telephone Number
PO Box 1205, 60 Shirley St. South	(705) 268-9600
Timmins, Ont. P4N 7J5	Fax Number (705) 268-9572
Name	Client Number
Address	Telephone Number
	Fax Number

2. Type of work performed: Check (✓) and report on only ONE of the following groups for this declaration.

☑ Geotechnical: prospecting, surveys, assays and work under section 18 (regs) ☐ Physical: drilling, stripping, trenching and associated assays ☐ Rehabilitation

Work Type	Office Use
LC, Mag, IP, Geology, Assaying	Commodity
	Total $ Value of Work Claimed $28,134.00
Dates Work Performed From 08 (Day) Aug (Month) 1995 (Year) To 31 (Day) Jan (Month) 1997 (Year)	NTS Reference 52m/01SW - 52m/01SE
Global Positioning System Data (if available) Township/Area: Ball	Mining Division: Red Lake
M or G-Plan Number: G 3740	Resident Geologist District: Red Lake

Please remember to: - obtain a work permit from the Ministry of Natural Resources as required;
- provide proper notice to surface rights holders before starting work;
- complete and attach a Statement of Costs, form 0212;
- provide a map showing contiguous mining lands that are linked for assigning work;
- include two copies of your technical report.

3. Person or companies who prepared the technical report (Attach a list if necessary)

Name	Telephone Number
David Truscott	(705) 268-9600
Address	Fax Number
PO Box 1205, 60 Shirley St. South, Timmins, Ont. P4N 7J5	(705) 268-9572
Name	Telephone Number
Address	Fax Number
Name	Telephone Number
Address	Fax Number

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MAR 10 1997
MINING LANDS BRANCH

4. Certification by Recorded Holder or Agent

I, George J. Kolesar (Print Name), do hereby certify that I have personal knowledge of the facts set forth in this Declaration of Assessment Work having caused the work to be performed or witnessed the same during or after its completion and, to the best of my knowledge, the annexed report is true.

Signature of Recorded Holder or Agent	Date
	Feb 21, 1997
Agent's Address	Telephone Number / Fax Number
PO Box 1205, 60 Shirley St South, Timmins Ont P4N 7J5	(705) 268-9600 / (705) 268-9572

Received Mail

2.17105

5. Work to be recorded and distributed. Work can only be assigned to claims that are contiguous (adjoining) to the mining land where work was performed, at the time work was performed. A map showing the contiguous link must accompany this form.

LW9720. ONO 19

Mining Claim Number. Or if work was done on other eligible mining land, show in this column the location number indicated on the claim map.		Number of Claim Units. For other mining land, list hectares.	Value of work performed on this claim or other mining land.	Value of work applied to this claim.	Value of work assigned to other mining claims.	Bank. Value of work to be distributed at a future date.
eg	TB 7827	15 ha	$26, 825	N/A	$24,000	$2,825
eg	1234567	12	0	$24,000	0	0
eg	1234568	2	$ 8, 692	$ 4,000	0	$4,692
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
		Column Totals				

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I, George J. Kolesar (Print Full Name), do hereby certify that the above work credits are eligible under subsection 7 (1) of the Assessment Work Regulation 6/96 for assignment to contiguous claims or for application to the claim where the work was done.

Signature of Recorded Holder or Agent Authorized in Writing | Date Feb 21, 1997

6. Instructions for cutting back credits that are not approved.

Some of the credits claimed in this declaration may be cut back. Please check (✓) in the boxes below to show how you wish to prioritize the deletion of credits:

- ☐ 1. Credits are to be cut back from the Bank first, followed by option 2 or 3 or 4 as indicated.
- ☐ 2. Credits are to be cut back starting with the claims listed last, working backwards; or
- ☐ 3. Credits are to be cut back equally over all claims listed in this declaration; or
- ☐ 4. Credits are to be cut back as prioritized on the attached appendix or as follows (describe):

Note: If you have not indicated how your credits are to be deleted, credits will be cut back from the Bank first, followed by option number 2 if necessary.

For Office Use Only

Received Stamp: MINING DIV. FEB 25 1997 PM

Deemed Approved Date: May 25/97 | Date Notification Sent

Date Approved | Total Value of Credit Approved

Approved for Recording by Mining Recorder (Signature)

0241 (03/96)

SCHEDULE FOR DECLARATION OF
ASSESSMENT WORK ON MINING LAND

Work Transaction #
EASTCAN97.010

W9720.00019

	MINING CLAIM NUMBER. Or if work was done on other eligible mining land. show in this column the location number indicated on the claim map.	NUMBER OF CLAIM UNITS. For other mining land. list hectares.	VALUE OF WORK PERFORMED on this claim or other mining land	VALUE OF WORK APPLIED to this claim	VALUE OF WORK ASSIGNED to other mining claims	BANK. Value of work to be distributed at a future date
1	KRL 1143622 ✓	1	3.996.00	956.00	236.00	2.804.00
2	KRL 1143623 ✓	1	2.076.00	956.00		1.120.00
3	KRL 1143624 ✓	1	1.443.00	956.00		487.00
4	KRL 1143645 ✓	1	2.364.00	956.00		1.408.00
5	KRL 1143646 ✓	1	2.928.00	956.00		1.972.00
6	KRL 1143647 ✓	1	720.00	956.00		
7	KRL 1184230 ✓	2	4.295.00	3.200.00		1.095.00
8	KRL 1184316 ✓	1	3.099.00	1.600.00		1.499.00
9	KRL 1184317 ✓	2	7.213.00	3.200.00		4.013.00
	Column Totals		28.134.00	13.736.00	236.00	14.398.00

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FEB 25 1997
AM PM
7,8,9,10,11,12,1,2,3,4,5,6

Ontario

Ministry of Northern Development and Mines

Ministère du Développement du Nord et des mines

Statement of Costs for Assessment Credit

État des coûts aux fins du crédit d'évaluation

Mining Act/Loi sur les mines

Transaction No./N° de transaction: W9720.00019

2.17105

Personal information collected on this form is obtained under the authority of the **Mining Act**. This information will be used to maintain a record and ongoing status of the mining claim(s). Questions about this collection should be directed to the Provincial Manager, Minings Lands, Ministry of Northern Development and Mines, 4th Floor, 159 Cedar Street, Sudbury, Ontario P3E 6A5, telephone (705) 670-7264.

Les renseignements personnels contenus dans la présente formule recueillis en vertu de la **Loi sur les mines** et serviront à tenir à jour un reg des concessions minières. Adresser toute quesiton sur la collece de renseignements au chef provincial des terrains miniers, ministère Développement du Nord et des Mines, 159, rue Cedar, 4e étage, Sud (Ontario) P3E 6A5, téléphone (705) 670-7264.

1. Direct Costs/Coûts directs

Type	Description	Amount Montant	Totals Total global
Wages Salaires	Labour (Geologu) Main-d'oeuvre	2832.00	
	Field Supervision Supervision sur le terrain		2832.00
Contractor's and Consultant's Fees Droits de l'entrepreneur et de l'expert-conseil	Type		
Supplies Used Fournitures utilisées	Type		
	RECEIVED FEB 25 1997 MINING LANDS BRANCH		
Equipment Rental Location de matériel	Type		

Total Direct Costs / Total des coûts directs 2832.00

2. Indirect Costs/Coûts indirects

** **Note:** When claiming Rehabilitation work Indirect costs are not allowable as assessment work.
Pour le remboursement des travaux de réhabilitation, les coûts indirects ne sont pas admissibles en tant que travaux d'évaluation.

Type	Description	Amount Montant	Totals Total glo
Transportation Transport	Type Rental truck + gas	629.00	
			629.0
Food and Lodging Nourriture et hébergement	Camp Costs		502.0
Mobilization and Demobilization Mobilisation et démobilisation			

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Sub Total of Indirect Costs / Total partiel des coûts indirects 1131.0

Amount Allowable (not greater than 20% of Direct Costs) / Montant admissible (n'excédant pas 20 % des coûts directs) 566.0

Total Value of Assessment Credit (Total of Direct and Allowable Indirect costs) / **Valeur totale du crédit d'évaluation (Total des coûts directs et indirects admissibles)** 3398.0

Note: The recorded holder will be required to verify expenditures claimed in this statement of costs within 30 days of a request for verification. If verification is not made, the Minister may reject for assessment work all or part of the assessment work submitted.

Note : Le titulaire enregistré sera tenu de vérifier les dépenses demandées d le présent état des coûts dans les 30 jours suivant une demande à effet. Si la vérification n'est pas effectuée, le ministre peut rejeter t ou une partie des travaux d'évaluation présentés.

Filing Discounts

1. Work filed within two years of completion is claimed at 100% of the above Total Value of Assessment Credit.

2. Work filed three, four or five years after completion is claimed at 50% of the above Total Value of Assessment Credit. See calculations below:

Total Value of Assessment Credit	Total Assessment Claimed
x 0.50 =	

Remises pour dépôt

1. Les travaux déposés dans les deux ans suivant leur achèvement so remboursés à 100 % de la valeur totale susmentionnée du crédit d'évaluat

2. Les travaux déposés trois, quatre ou cinq ans après leur achèvem sont remboursés à 50 % de la valeur totale du crédit d'évaluat susmentionné. Voir les calculs ci-dessous.

Valeur totale du crédit d'évaluation	Évaluation totale demandé
x 0,50 =	

Certification Verifying Statement of Costs

I hereby certify:
that the amounts shown are as accurate as possible and these costs were incurred while conducting assessment work on the lands shown on the accompanying Report of Work form.

that as Lands Manager (Recorded Holder, Agent, Position in Company) I am authorized

to make this certification

Attestation de l'état des coûts

J'atteste par la présente :
que les montants indiqués sont le plus exact possible et que c dépenses ont été engagées pour effectuer les travaux d'évaluati sur les terrains indiqués dans la formule de rapport de travail ci-joi

Et qu'à titre de _____ (titulaire enregistré, représentant, poste occupé dans la compagnie) je suis autori

à faire cette attestation.

Signature	Date
	Feb 21, 1997

0212 (04/91)

Nota : Dans cette formule, lorsqu'il désigne des personnes, le masculin est utilisé au sens neut

Ontario Ministry of Northern Development and Mines

Statement of Costs for Assessment Credit

Transaction Number (office use): W9720.00019

Personal information collected on this form is obtained under the authority of subsection 6(1) of the Assessment Work Regulation 6/96. Under section 8 of the Mining Act, the information is a public record. This information will be used to review the assessment work and correspond with the mining land holder. Questions about this collection should be directed to the Chief Mining Recorder, Ministry of Northern Development and Mines, 6th Floor, 933 Ramsey Lake Road, Sudbury, Ontario, P3E 6B5.

Work Type	Units of Work Depending on the type of work, list the number of hours/days worked, metres of drilling, kilometres of grid line, number of samples, etc.	Cost Per Unit of work	Total Cost
Linecutting (contractor)	20.125 km	300/km	6037.00
Mag Survey (BMC Personnel)	20.125 km	134.70/km	2711.00
IP Survey (contractor)	8.365 km	1280/km	10708.00
Geology	16 man days	192/man day	3071.00
Assays (Au)	102 samples	10.40/sample	1060.00
Associated Costs (e.g. supplies, mobilization and demobilization).			
Transportation Costs			
Rental truck & gas		RECEIVED MAR 10 1997 MINING LANDS BRANCH	342.00
Food and Lodging Costs			
Camp, groceries			867.00
		Total Value of Assessment Work	24,736.00

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Calculations of Filing Discounts:

1. Work filed within two years of performance is claimed at 100% of the above Total Value of Assessment Work.
2. If work is filed after two years and up to five years after performance, it can only be claimed at 50% of the Total Value of Assessment Work. If this situation applies to your claims, use the calculation below:

TOTAL VALUE OF ASSESSMENT WORK × 0.50 = Total $ value of worked claimed.

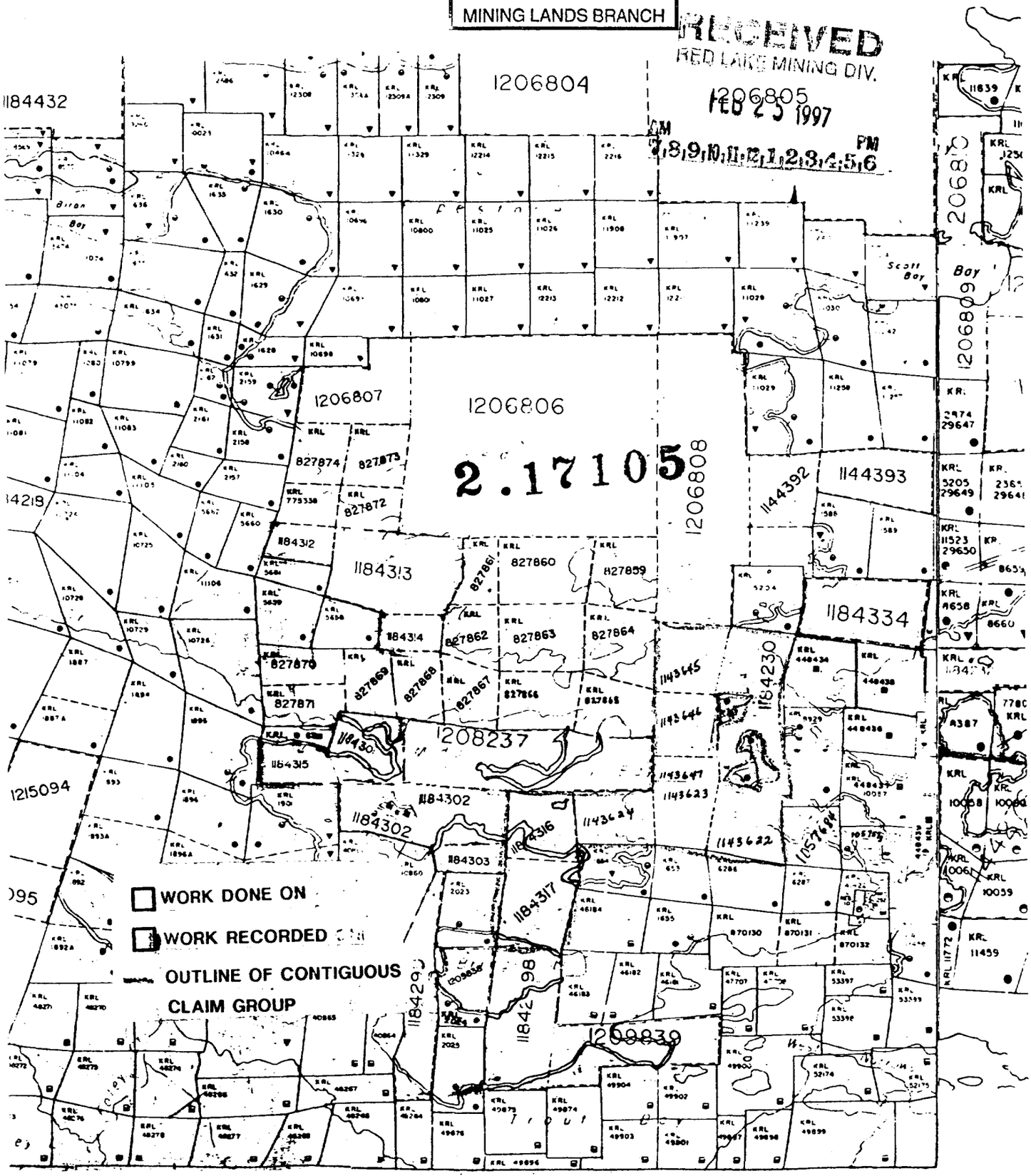
Note:
- Work older than 5 years is not eligible for credit.
- A recorded holder may be required to verify expenditures claimed in this statement of costs within 45 days of a request for verification and/or correction/clarification. If verification and/or correction/clarification is not made, the Minister may reject all or part of the assessment work submitted.

Certification verifying costs:

I, George J. Kolesza (please print full name), do hereby certify, that the amounts shown are as accurate as may reasonably be determined and the costs were incurred while conducting assessment work on the lands indicated on the accompanying Declaration of Work form as Lands Manager (recorded holder, agent, or state company position with signing authority) I am authorized to make this certification.

Signature	Date
	Feb 21, 1997

0212 (02/96)



Ministry of
Northern Development
and Mines

Ministère du
Développement du Nord
et des Mines

Ontario

Geoscience Assessment Office
933 Ramsey Lake Road
6th Floor
Sudbury, Ontario
P3E 6B5

Telephone: (705) 670-5853
Fax: (705) 670-5863

April 3, 1997

Scott A. Rivett
Mining Recorder
Ontario Government Building
227 Howey Street, Box 324
Red Lake, ON
P0V 2M0

Dear Sir or Madam:

Submission Number: 2.17105

Status

Subject: Transaction Number(s): W9720.00019 Deemed Approval

We have reviewed your Assessment Work submission with the above noted Transaction Number(s). The attached summary page(s) indicate the results of the review. WE RECOMMEND YOU READ THIS SUMMARY FOR THE DETAILS PERTAINING TO YOUR ASSESSMENT WORK.

If the status for a transaction is a 45 Day Notice, the summary will outline the reasons for the notice, and any steps you can take to remedy deficiencies. The 90-day deemed approval provision, subsection 6(7) of the Assessment Work Regulation, will no longer be in effect for assessment work which has received a 45 Day Notice.

Please note any revisions must be submitted in DUPLICATE to the Geoscience Assessment Office, by the response date on the summary.

NOTE: This correspondence may affect the status of your mining lands. Please contact the Mining Recorder to determine the available options and the status of your claims.

If you have any questions regarding this correspondence, please contact Bruce Gates by e-mail at gates_b@torv05.ndm.gov.on.ca or by telephone at (705) 670-5856.

Yours sincerely,

ORIGINAL SIGNED BY
Ron C. Gashinski
Senior Manager, Mining Lands Section
Mines and Minerals Division

Correspondence ID: 10692
Copy for: Assessment Library

Work Report Assessment Results

Submission Number: 2.17105

Date Correspondence Sent: April 03, 1997 **Assessor:** Bruce Gates

Transaction Number	First Claim Number	Township(s) / Area(s)	Status	Approval Date
W9720.00019	1143622	BALL	Deemed Approval	April 01, 1997

Section:

12 Geological GEOL
14 Geophysical IP
14 Geophysical MAG

Correspondence to:

Mining Recorder
Red Lake, ON

Resident Geologist
Red Lake, ON

Assessment Files Library
Sudbury, ON

Recorded Holder(s) and/or Agent(s):

George J. Koleszar
BATTLE MOUNTAIN CANADA LTD.
TIMMINS, ONTARIO

Correspondence ID: 10692

TODD G 1789

AREAS WITHDRAWN FROM DISPOSITION

M.R.O. MINING RIGHTS ONLY
S.R.O. SURFACE RIGHTS ONLY
M + S. MINING AND SURFACE RIGHTS

Description	Order No.	Date	Disposition	File
(R) LUND LAKE RES.	*REOPENING	12 FEB 91	SRO	
(R) SEC 36				

INDIAN HOUSE LAKE G 1796

TODD TOWNSHIP G 1789

MULCAHY TOWNSHIP G 3756

WOODLAND - CARIBOU PROVINCIAL PARK

Douglas Lake

Foley Lake

Pendelton Lake

Biron Bay

Scott Bay

Peninsula

Wellington

Bay

West Narrows

1184432
1184475
1184221
1184220
1184219
1184218
1184312
1184313
1184314
1184315
1184302
1184303
1184299
1184317
1184334
1144392
1144393
1215096
1215094
1215095
1206804
1206805
1206806
1206807
1206808
1208237
1208239

827874 827873 827872 827870 827871 827869 827865 827867 827866 827860 827859 827862 827863 827864 827861

LEGEND

HIGHWAY AND ROUTE No.
OTHER ROADS
TRAIL
RAILWAY
TRANSMISSION LINE (PRIMARY)
TRANSMISSION LINE (SECONDARY)
POWER LINE
PIPELINE
MARSH OR MUSKEG
CANAL
RAPIDS
INTERMITTENT STREAM
UNSURVEYED BOUNDARY
SURVEYED BOUNDARY
RIGHT OF WAY
TOWNSHIP OR BASE LINE
CONCESSION OR COMPOSITE LINE
RESERVATION
ORIGINAL SHORELINE
MARSH OR MUSKEG
MINE
GRAVEL PIT OR QUARRY

DISPOSITION OF CROWN LANDS

TYPE OF DOCUMENT	SYMBOL
PATENT, SURFACE & MINING RIGHTS	
SURFACE RIGHTS ONLY	
MINING RIGHTS ONLY	
LEASE, SURFACE & MINING RIGHTS	
SURFACE RIGHTS ONLY	
MINING RIGHTS ONLY	
LICENCE OF OCCUPATION	
ORDER IN COUNCIL	OC
RESERVATION	R
ANGLED	A
SAND & GRAVEL	S

NOTE: MINING RIGHTS INCLUDED IN PATENT, RESERVATION OR ORIGINAL PATENTED BY THE PUBLIC LANDS ACT, R.S.O. 1980, CHAP. 380, SEC. 61 SUBSEC. 1

SCALE 1:20 000

RED LAKE MINING DIVISION
MAR - 5 1997
RED LAKE, ONTARIO

THE INFORMATION THAT APPEARS ON THIS MAP HAS BEEN COMPILED FROM VARIOUS SOURCES, AND ACCURACY IS NOT GUARANTEED. THOSE WISHING TO STAKE MINING CLAIMS SHOULD CONSULT WITH THE MINING RECORDER, MINISTRY OF NORTHERN DEVELOPMENT AND MINES, FOR ADDITIONAL INFORMATION ON THE STATUS OF THE LANDS SHOWN HEREON.

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2.17105

JUL 17 RED LAKE MINING DIV.

2.17105 6701 (MP6) IP

TOWNSHIP

BALL

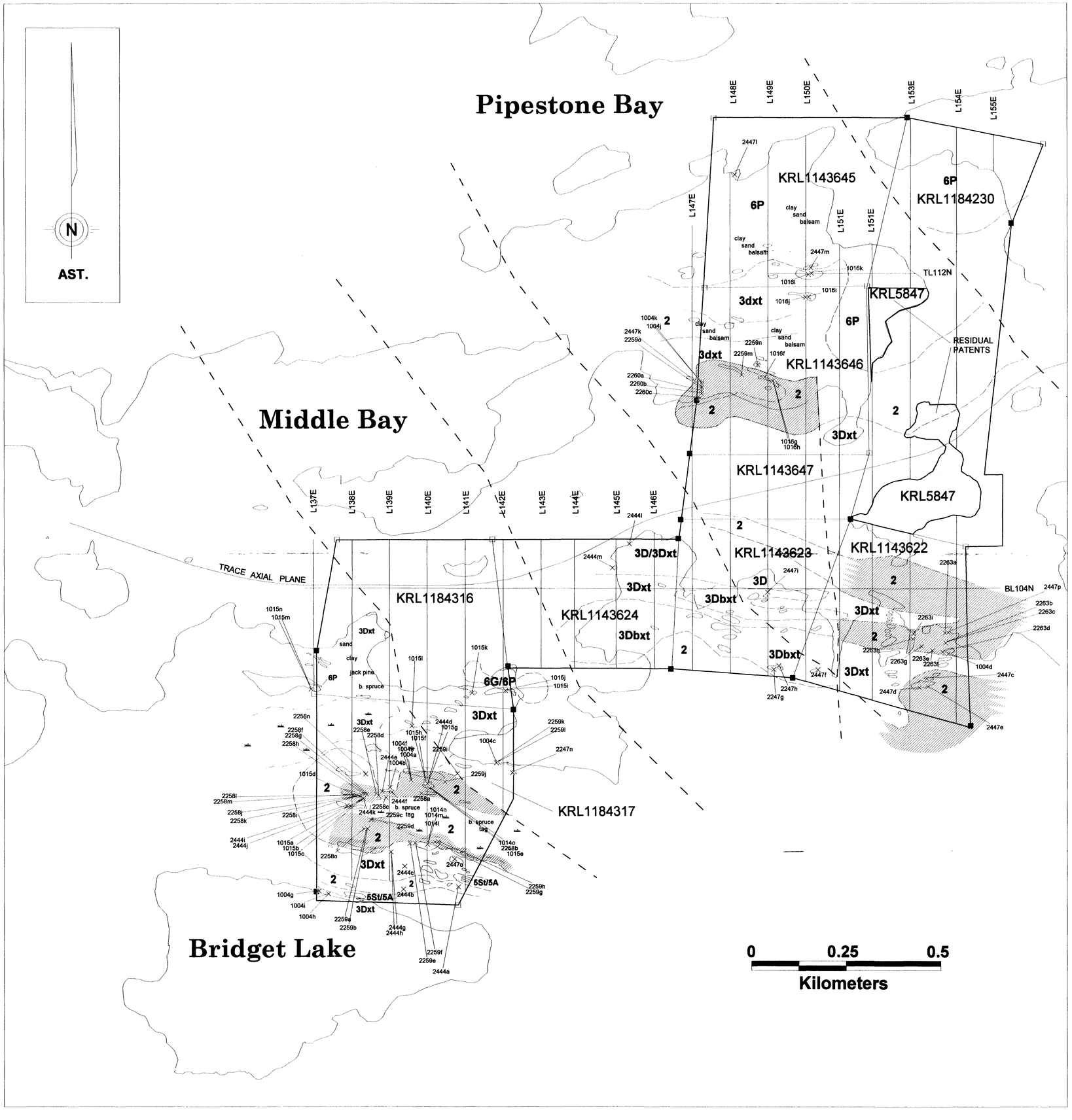
M N R ADMINISTRATIVE DISTRICT
RED LAKE
MINING DIVISION
RED LAKE
LAND TITLES / REGISTRY DIVISION
KENORA (Patricia Portion)

Ministry of Natural Resources
Ministry of Northern Development and Mines

SEPTEMBER 1996

G-3740

G-3740 BALL TWP



NW-ONT LEGEND

JANUARY 1997

LEGEND

8 Diabase (All Ages)

7 Felsic to Intermediate Intrusive Rocks (Unsubdivided)
- 7G Granite
- 7Gd Granodiorite, Quartz Monzonite
- 7T Tonalite
- 7S Syenite
- 7M Monzonite
- 7P Porphyry grf (quartz-feldspar)
- 7Pg Pegmatite
- 7A Aplite
- 7F Felsite

6 Mafic to Ultramafic Intrusive Rocks (Unsubdivided)
- 6D Diorite, Trondhjemite
- 6G Gabbro
- 6A Anorthosite
- 6P Peridotite, Pyroxenite
- 6L Lamprophyre

5 Clastic Sediments (Unsubdivided)
- 5Ar Argillite
- 5Gw Greywacke
- 5Cg Conglomerate
- 5Ss Sandstone
- 5Si Siltstone
- 5Q Quartzite
- 5A Arkose

4 Chemical Sediments (Unsubdivided)
- 4If Iron Formation (s.o.c facies)
- 4C Chert
- 4Gf Graphite

3 Felsic to Intermediate Volcanics (Unsubdivided)
- 3R Rhyolite
- 3D Dacite
- 3A Andesite
- 3T Trachyte

2 Mafic Volcanics (Unsubdivided)
- 2T Tholeiitic Basalt
- 2Fe Iron Tholeiitic Basalt
- 2Mg Magnesium Tholeiitic Basalt
- 2Ca Calc-Alkaline Basalt
- 2A Amphibolite

1 Ultramafic Volcanics (Unsubdivided)
- 1P Peridotite
- 1K Basaltic Komatiite

ABBREVIATIONS

Textural

agg	agglomerate
amy	amygdaloidal
aph	aphanitic
cg	coarse grained
fg	fine grained
fol	foliated
hya	hyaloclastic
lap	lapilli
mg	medium grained
m	massive
por	porphyritic
sch	schistose
t	tuffaceous
ves	vesicular
var	variolitic
sfx	spinifex
xt	crystal tuff
bxt	black crystal tuff

ALTERATION

Ab	albitization
Alt	altered
Ank	ankeritization
Bl	bleaching
C	carbonaceous
Cb	carbonatization
Chl	chloritization
Ep	epidotization
Gcb	green carbonate
Hem	hematization
Ht	hydrothermal
K	potassic
Ser	sericite
Sp	serpentinization(Srp)
Sil	silicification
Tc	talc

MINERALOGICAL

ank	ankerite
asp	arsenopyrite
bio	biotite
cal	calcite
cpy	chalcopyrite
cb	carbonate
chl	chlorite
ep	epidote
f	feldspar
fu	fuchsite
gn	galena (gal)
gf	graphite
hem	hematite
hbl	hornblende
lx	leucoxene
mo	molybdenite
mag	magnetite
po	pyrrhotite
q	quartz
ser	sericite
serp	serpentine
sil	silica
sph	sphalerite
tc	talc
tour	tourmaline
V.G.	visible gold

STRUCTURAL

bd	bedded
bnd	banded
bx	brecciated
ct	contact
f	fault
fl	flow
fr	fractured
g	gouge
hb	heterolithic
pil	pillowed
sh	sheared
z	zone

VEINING

av	ankerite vein
cv	calcite vein
qav	quartz-ankerite vein
qcv	quartz-calcite vein
qv	quartz vein
ftd	flooding
str	stringer
sw	stock work
v	vein

OTHER

diss	disseminated
int	intermittent
loc	locally (local)
mod	moderate
vs	very strong
st	strong
wk	weak

swamp

ankerite-silica/albite-biotite-fuchsite alteration

area of outcrop

geologic contact

fault

1014b sample number and location

Timmins,ONT.

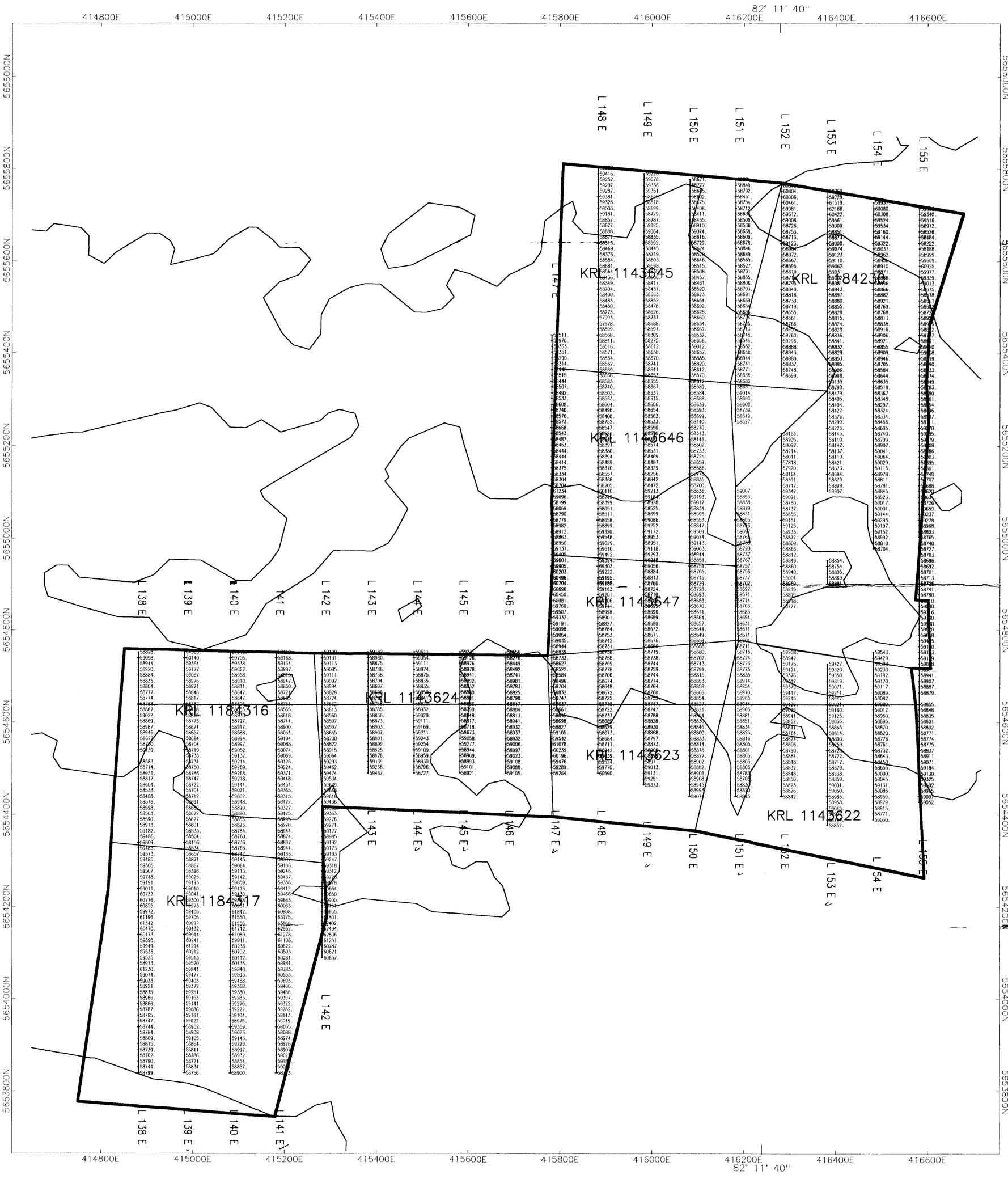
Battle Mountain Gold

Figure 3

PROPERTY GEOLOGY

PIPESTONE NARROWS OPTION

Interpreted by : D. TRUSCOTT	Scale : 1 : 5,000
Drawn by : D. TRUSCOTT	NTS number : 52 M/1
Revised :	Project number : 461
Date : JAN. 23, 1997	File number : PIPEMAP.WOR



220

Scale 1:5000

100 0 100 200 300 400

(metres)

2.17105

HEMLO GOLD MINES INC.

PIPESTONE NARROWS PROJECT
TOTAL FIELD MAGNETIC SURVEY
POSTED DATA

RED LAKE MINING DISTRICT
NTS 52 M/1
INSTRUMENT = SCINTREX OMNI IV
REFERENCE FIELD = 58000 nT

DATA SOURCE: HEMLO GOLD MINES INC.

82° 11' 40"

414800E 415000E 415200E 415400E 415600E 415800E 416000E 416200E 416400E 416600E

5656000N 5655800N 5655600N 5655400N 5655200N 5655000N 5654800N 5654600N 5654400N 5654200N 5654000N 5653800N

L 138 E L 139 E L 140 E L 141 E L 142 E L 143 E L 144 E L 145 E L 146 E L 147 E L 148 E L 149 E L 150 E L 151 E L 152 E L 153 E L 154 E L 155 E

KRL 1143645

KRL 1184230

KRL 1143646

KRL 1143647

KRL 1143624

KRL 1184316

1143623

KRL 1143622

I.P. INTERPRETATION

H HIGH RESISTIVITY

STRONG PHASE

WEAK TO MODERATE PHASE

N

RECEIVED
MAR 10 1997
MINING LANDS BRANCH

2.17105

Scale 1:5000

100 0 100 200 300 400
(metres)

52M01SE0078 2.17105 BALL

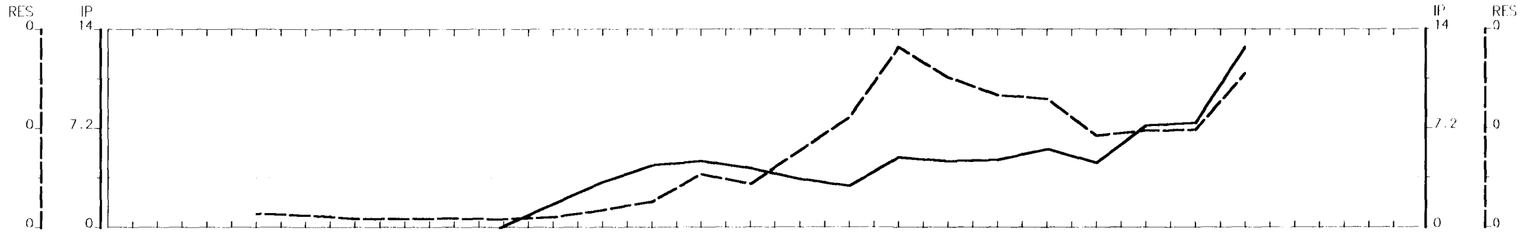
230

HEMLO GOLD MINES INC.

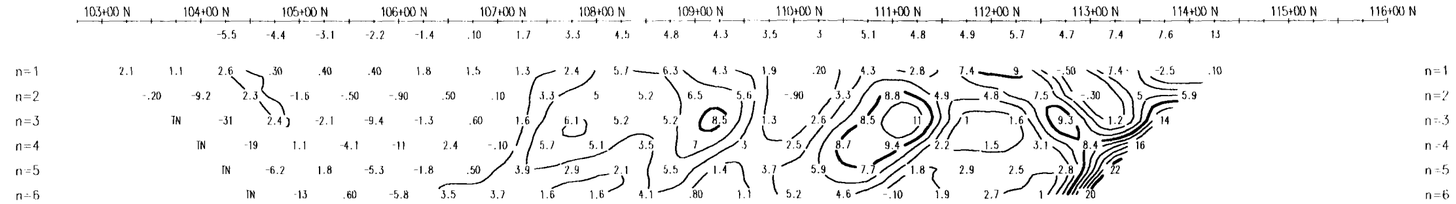
PIPESTONE NARROWS PROJECT
TOTAL FIELD MAGNETIC SURVEY - CONTOURS
INSTRUMENT = SCINTREX OMNI IV

RED LAKE MINING DISTRICT
NTS 52 M/1
CONTOUR INTERVALS = 50, 250, 1000 nT
REFERENCE FIELD = 58000 nT

DATA SOURCE: HEMLO GOLD MINES INC.

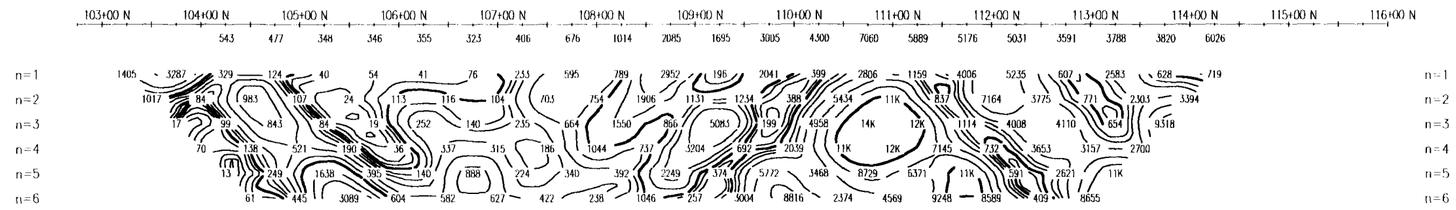


PHASE
mRad



PHASE
mRad

APPARENT
RESISISTIVITY
ohm-m

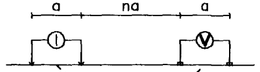


APPARENT
RESISISTIVITY
ohm-m

Filter

240

Dipole-Dipole Array



2.17105

plot point

DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n=1 6
Comments

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 2.5, 3, 4, 5, 7.5, 10,..

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

50 0 50 100 150
(metres)

PIPESTONE PROJECT

INDUCED POLARISATION

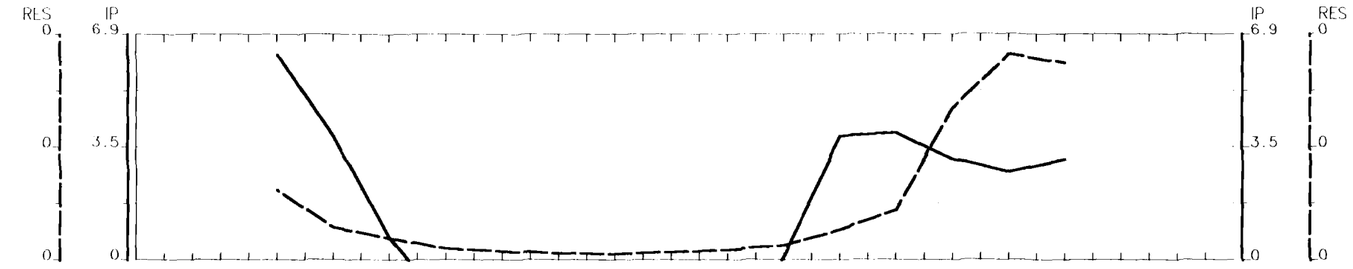
LINE 14900E

Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

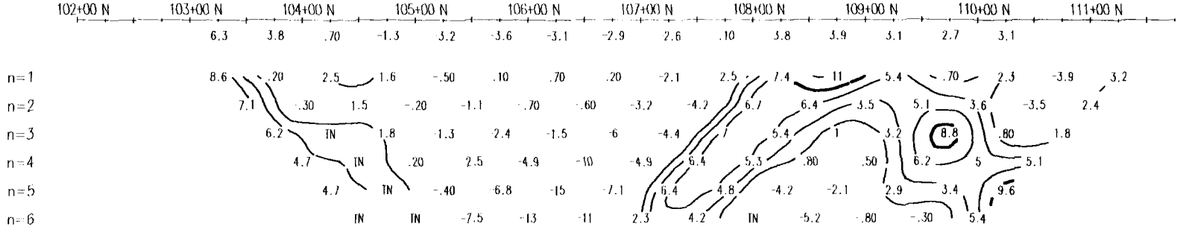
hemlo gold

250

52M01SE0078 2.17105 BALL

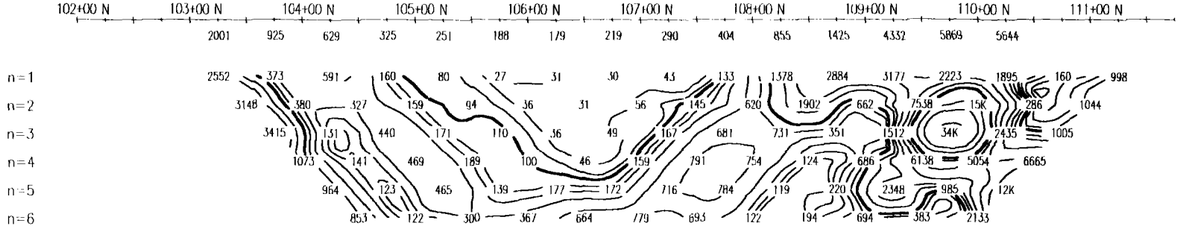


PHASE
mRad



PHASE
mRad

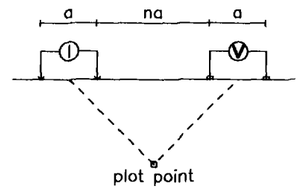
APPARENT
RESISISTIVITY
ohm-m



APPARENT
RESISISTIVITY
ohm-m

Filter

Dipole-Dipole Array



DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments :

Phase
Interval 2% 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10

2.17105

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

PIPESTONE PROJECT

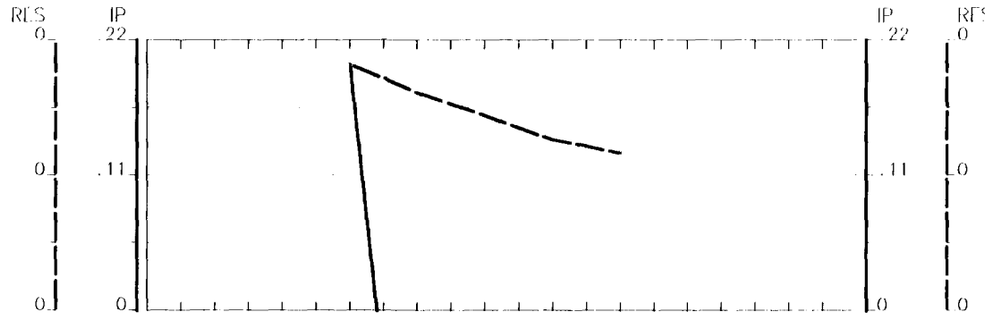
INDUCED POLARISATION

LINE 14700E

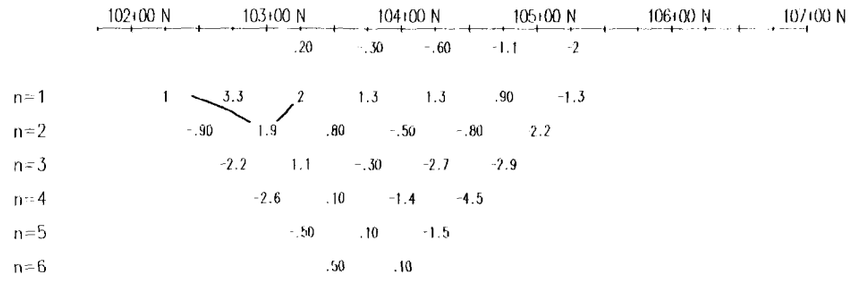
Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold

260

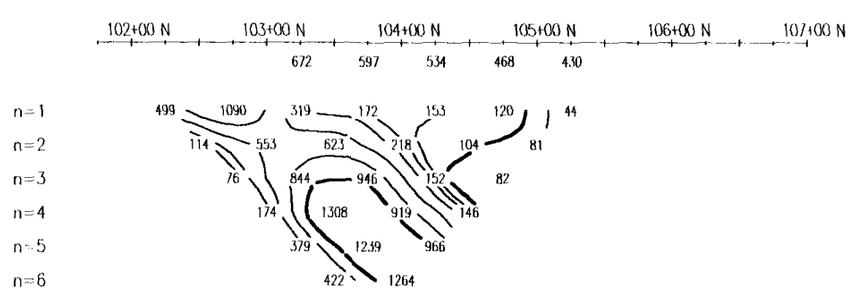


PHASE
mRad



PHASE
mRad

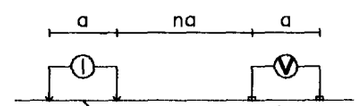
APPARENT
RESISISTIVITY
ohm-m



APPARENT
RESISISTIVITY
ohm-m

Filter

Dipole-Dipole Array



2.17105

plot point

DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments :

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10,..

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

50 0 50 100 150
(metres)

PIPESTONE PROJECT

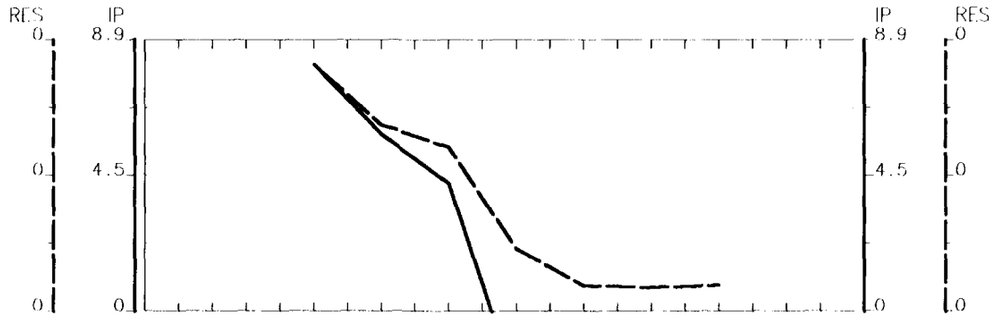
INDUCED POLARISATION

LINE 14400E

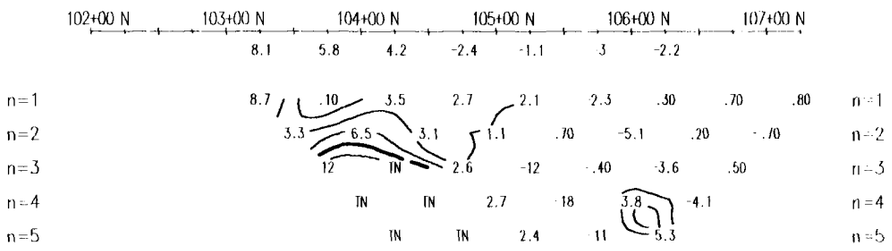
Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold

270

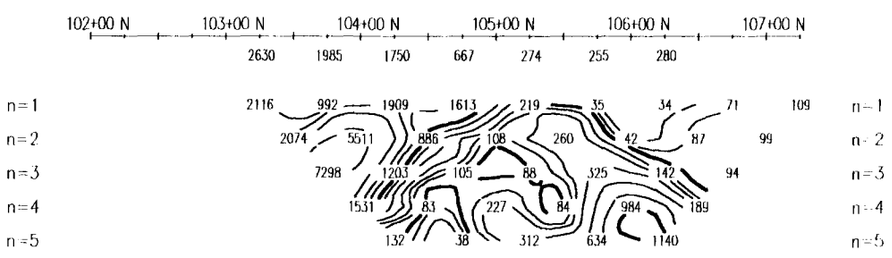


PHASE
mRad



PHASE
mRad

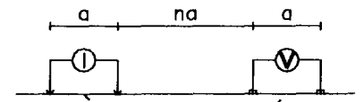
APPARENT
RESISISTIVITY
ohm-m



APPARENT
RESISISTIVITY
ohm-m

Filter

Dipole-Dipole Array



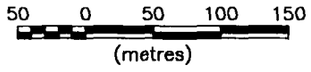
2.17105
plot point

DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments :

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10,..

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000



PIPESTONE PROJECT

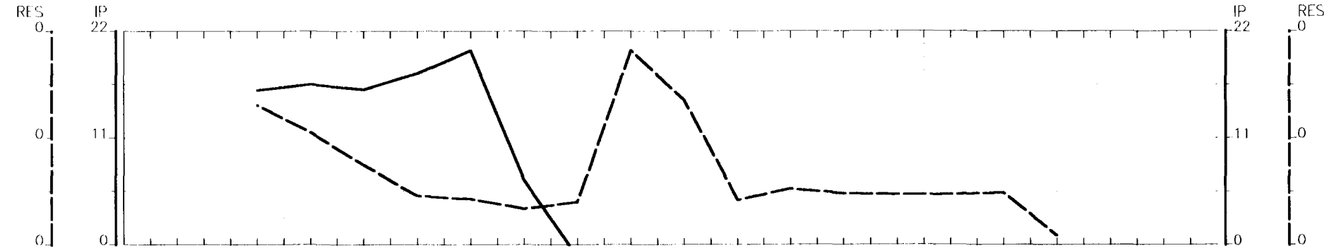
INDUCED POLARISATION

LINE 14500E

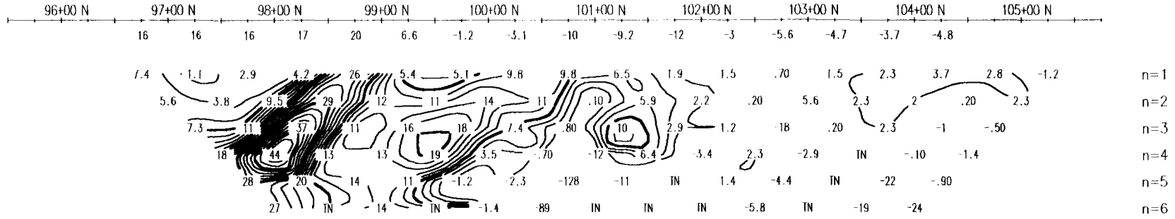
Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold

280

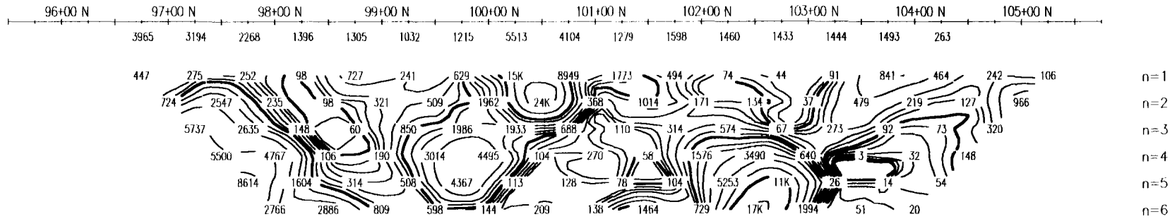


PHASE
mRad



PHASE
mRad

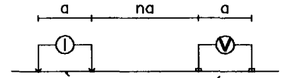
APPARENT
RESISISTIVITY
ohm-m



APPARENT
RESISISTIVITY
ohm-m

Filter

Dipole-Dipole Array



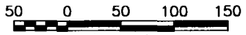
Pole-Point

DIPOLE LENGTH = 50m
DIPOLE SPACINGS = 1a
Comments :

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic, 1, 1.5, 2, 3, 5, 7, 10, ..

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000



PIPESTONE PROJECT

INDUCED POLARISATION

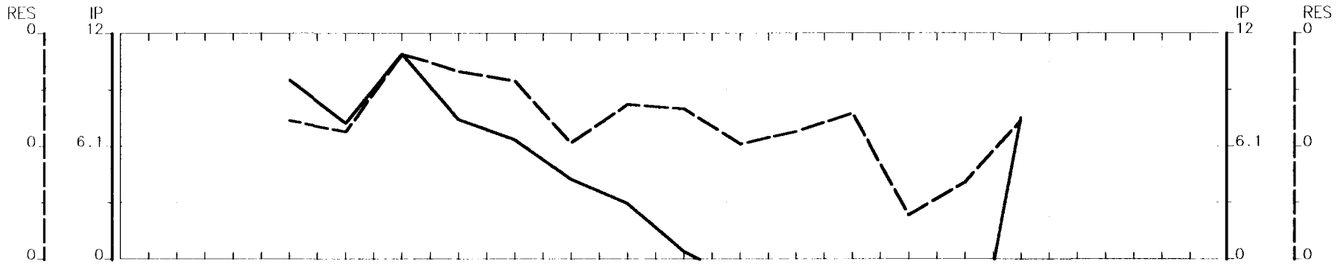
LINE 14100E

Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

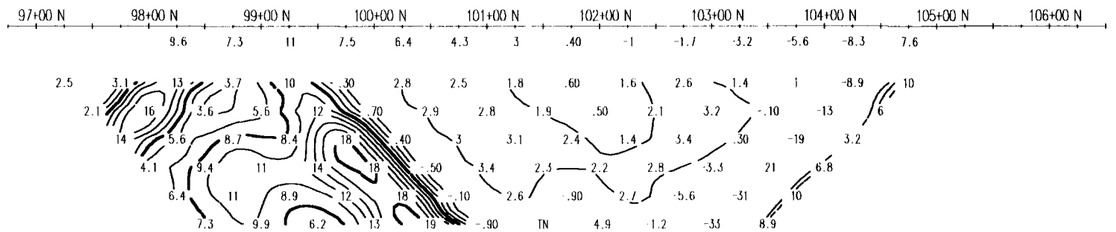
hemlo gold

290

52M01SE0078 2.17105 BALL

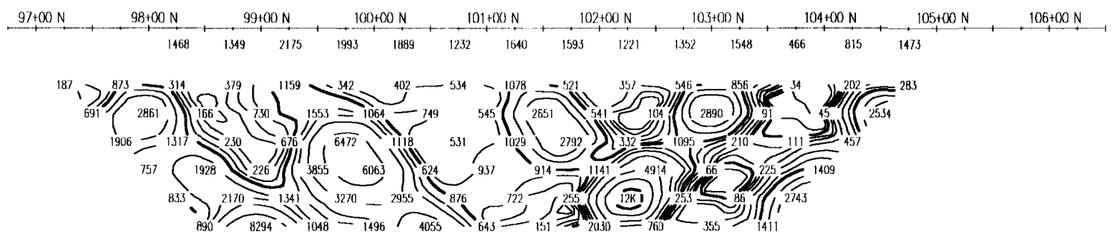


PHASE
mRad



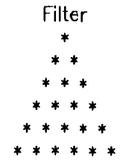
PHASE
mRad

APPARENT
RESISISTIVITY
ohm-m

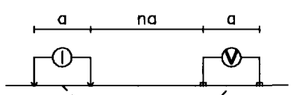


APPARENT
RESISISTIVITY
ohm-m

Filter



Dipole-Dipole Array



2.17105

DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments :

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10,..

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

50 0 50 100 150
(metres)

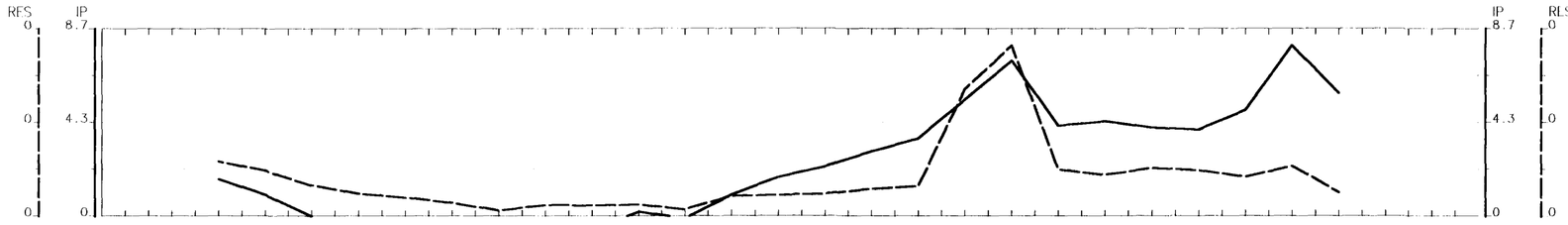
PIPESTONE PROJECT

INDUCED POLARISATION

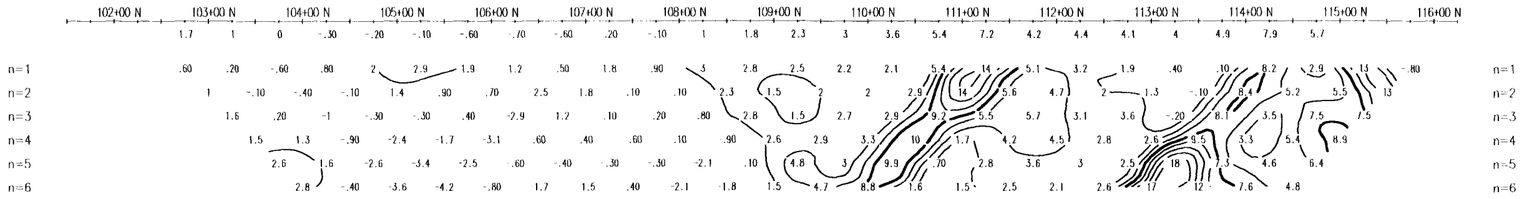
LINE 13900E

Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold

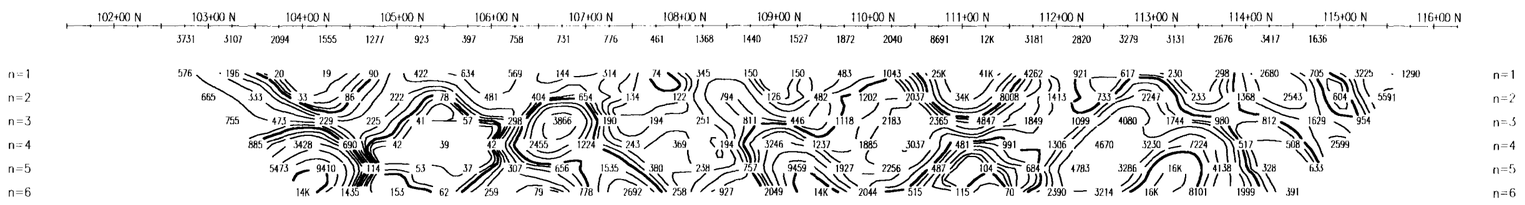


PHASE
mRad



PHASE
mRad

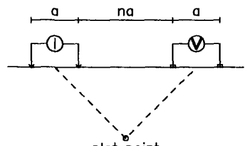
APPARENT
RESISISTIVITY
ohm-m



APPARENT
RESISISTIVITY
ohm-m

Filter

Dipole-Dipole Array



DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments

2.17105

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

PIPESTONE PROJECT

INDUCED POLARISATION

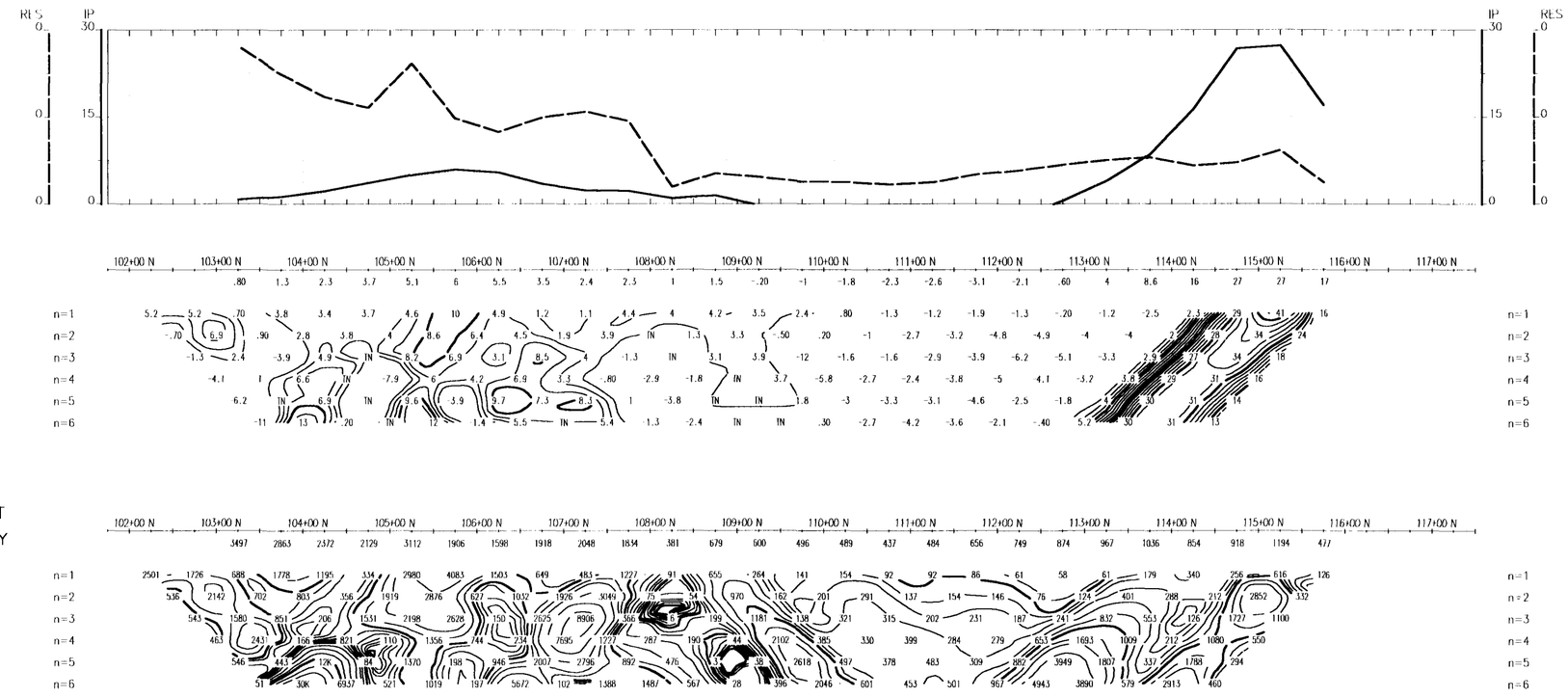
LINE 15100E

Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold

310

52M01SE0079 2.17105 BALL



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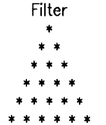
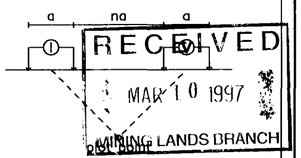


Dipole-Dipole Array



DIPOLE LENGTH : a=50m
DIPOLE SPACINGS : n = 6
Comments :

Phase
Interval 2%, 10%
RESISTIVITY
Logarithmic 1, 1.5, 2, 3, 5, 7.5, 10,..

2.17105

INSTRUMENTS
RECEIVER : PHOENIX TURBO V4
TRANSMITTER : PHOENIX IPT1

Scale 1:5000

50 0 50 100 150
(metres)

PIPESTONE PROJECT

INDUCED POLARISATION

LINE 15300E

Date : JAN 1996
Property : PIPESTONE
NTS : 52 M/1
Survey by : BELANGER GEOPHYSICS LTD.

hemlo gold