



#### **SUMMARY**

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During the period November 5 to November 21, 2003 Lloyd Geophysics Inc. carried out an induced polarization (IP) and resistivity survey, for Amarc Resources Ltd., over the Rad property in south central British Columbia.

One very weak IP chargeability anomaly, most probably caused by a small, shallow confined source, was detected on the most southerly line on the grid.

It is recommended that a geochemical soil survey be carried out over the southern half of the present grid prior to doing anymore IP survey work.

Unusually severe geomagnetic storms interrupted progress of the survey for extended periods of time, which in turn led to an increase in the overall cost of the survey.



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## 1.0 INTRODUCTION

During the period November 5 to November 21, 2003, Lloyd Geophysics Inc. carried out an induced polarization (IP) and resistivity survey for Amarc Resources Ltd., over the Rad property, near Tatla Lake in south central British Columbia.

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The Rad property is located in an area of extensive glacial cover and to date the only mineralized outcrop observed on the property was a bornite bearing breccia of unknown dimensions. However the property is situated in a geological and structural setting which is highly permissive for the discovery of a gold copper porphyry. Therefore the purpose of the IP survey was to search for any sulphide systems which may lead to the discovery of such a deposit.

# 2.0 PROPERTY LOCATION AND ACCESS

The property is located in the Clinton Mining Division approximately 250 km west of Williams Lake, British Columbia (Figure 1).

Access to the property for this work was by truck along the gravel Tatlayoko Lake and Choelquoit Lake Roads from the community of Tatla Lake, on Provincial highway 20. Immediately south of Tatla Lake, the Tatlayoko Lake road extends south for 20 kilometres and then the Choelquoit Lake Road extends southeast for 28 km to Henry's Crossing and the property area. The property is accessed from Henry's Crossing by crossing the Chilko River to the east and following the branch road for approximately 4 kilometres. The total road distance from Tatla Lake is 52 km and driving time is approximately 1 hour and fifteen minutes. Additional open roads provide access to most parts of the property.







#### 3.0 CLAIM HOLDINGS

Tenure Number	Claim Name	Units	Area (ha)	Map Sheet	Due Date
404674	RAD 3	20	500	092N 09E	18-Aug-2004
404675	RAD 4	20	500	092N 09E	17-Aug-2004
404676	RAD 1	20	500	092N 09E	18-Aug-2004
404676	RAD 2	20	500	092N 09E	19-Aug-2004

The following claim information was provided by Amarc Resources Ltd. at the time of writing this report.

The location of the IP survey grid, with respect to the above mentioned claims is shown in Figure 2.

#### 4.0 GEOLOGY

Regionally, the property is situated within the western-most Intermontane Belt, about 50 kilometres northeast of the Coast Plutonic Complex but within the boundary zone between the Coast and Intermontane morphogeological belts. The surrounding region is underlain by several poorly exposed lithotectonic assemblages of Late Palaeozoic to Cretaceous age, cut by mid-Cretaceous to early Tertiary plutons.

The project area is located on the northeast side of the Yalakom Fault, a major Eocene dextral strike-slip fault with postulated offsets of 80 kilometres to 190 kilometres (Tipper, 1969), 125 kilometres (Kleinspehn, 1985) or 115 kilometres (Ridell et al., 1993).

Bedrock exposure on the property is generally limited to those areas where construction of roads has provided for some bedrock exposure and as such the geology of the surrounding area is important to the interpolation of the property geology.







The oldest rocks in the project area are a sequence of Jurassic rocks comprised of tuff, and volcanic breccia; and conglomerate and shale. These rocks are exposed on the north west side of Choelquoit Lake some 2 kilometres from the property area.

In the immediate vicinity of the claim area Upper Creataceous Kingsvale Group rocks, specifically andesitic and basaltic breccia and tuff are present in the northeastern portion of the claim block. These rocks are overlain by Tertiary basalts and andesites, breccia and tuffs in the south and Quaternary till, gravel, sand and alluvium in the central and western portions of the claim area.

To date the only mineralized outcrop observed on the property was a bornite bearing breccia of unknown dimensions.

### 5.0 INSTRUMENT SPECIFICATIONS

The system used to carry out this survey was a 7.5 kw time domain unit consisting of a 400 hertz Onan/Wagner Leland motor generator set and a Mark II transmitter manufactured by Huntec Limited, Toronto, Canada and a 6 channel IP-6 receiver manufactured by Iris Instruments, Orleans, France.

The transmitter was operated with a cycle time of 8 seconds and the duty cycle ratio; [(time on)/(time off)] was 0.5 seconds. This means the cycling sequence of the transmitter was 2 seconds current "on" and 2 seconds current "off" with consecutive pulses reversed in polarity.

The IP-6 receiver can measure up to 6 dipoles simultaneously. It is microprocessor controlled, featuring automatic calibration, gain setting, SP cancellation and fault diagnosis. To accommodate a wide range of geological conditions, the delay time, the window widths and hence the total



integration time is programmable via the keypad. Measurements are calculated automatically every 2 to 4 seconds from the averaged waveform which is accumulated in memory.

The window widths of the IP-6 receiver can be programmed arithmetically or logarithmically. For this survey the instrument was programmed arithmetically into 10 equal window widths or channels, Ch<sub>0</sub>, Ch<sub>1</sub>, Ch<sub>2</sub>, Ch<sub>3</sub>, Ch<sub>4</sub>, Ch<sub>5</sub>, Ch<sub>6</sub>, Ch<sub>7</sub>, Ch<sub>8</sub>, Ch<sub>9</sub>, (Figure 3). These are recorded individually and summed up automatically to obtain the total chargeability. Similarly, the resistivity (R) in ohmmetres is also calculated automatically.

The instrument parameters chosen for this survey were as follows:

Cycle Time (T <sub>c</sub> )	= 8 seconds
Ratio	
(Time On)	
(Time Off)	= 1:1
Duty Cycle Ratio	• · · · · · · · · · · · · · · · · · · ·
(Time On)	
(Time On) + (Time Off)	= 0.5
Delay Time (T <sub>D</sub> )	= 120 milliseconds
Window Width (t <sub>p</sub> )	= 90 milliseconds
Total Integration Time (T <sub>p</sub> )	= 900 milliseconds





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# **IP-6 RECEIVER PARAMETERS**

Figure 3



#### 6.0 SURVEY SPECIFICATIONS

The pole-dipole array was used for this survey, with the dipole length (x) equal to 50 metres and measurements were recorded for n=1 through 6. The current electrode ( $C_1$ ) was always located to the **east** of the potential measuring dipole ( $P_1P_2$ ) as depicted on each pseudo-section drawing.

### 7.0 DATA PROCESSING AND PRESENTATION

The IP data was processed at the end of each survey day using a Pentium laptop computer and Fujitsu printer. In the Vancouver office, the data was transferred to a high-speed desktop computer coupled to an HP DesignJet colour plotter to make the final pseudo-sections and plan maps. The numerical value obtained from a 21 point triangular filter of the IP data, applied consecutively at every station on each line, is also plotted on the pseudo-sections.

The IP Data are presented on 6 pseudo-sections and 2 plan maps as follows:

Line No.	Drawing No.
5728900N	03456-01
5729200N	03456-02
5729500N	03456-03
5729800N	03456-04
5730100N	03456-05
5730400N	03456-06

#### **IP Pseudo-sections**



#### **Contoured Plan Maps**

Description	Drawing No.
Filtered Chargeability	03456-07
Filtered Resistivity	03456-08

## 8.0 DISCUSSION OF RESULTS

An IP response depends largely on the following factors:

- The volume content of sulphide minerals.
- The number of pore paths that are blocked by sulphide grains.
- The number of sulphide faces that are available for polarization.
- The absolute size and shape of the sulphide grains and the relationship of their size and shape to the size and shape of the available pore paths.
- The electrode array employed.
- The width, depth, thickness and strike length of the sulphide body and its location relative to the array.
- The resistivity contrast between the sulphide body and the barren host rock.

There are several critical factors that we would like to determine from IP field measurements made over a sulphide body. These are the sulphide content, the width, length, depth of burial and thickness of the body. Experience has shown that this is both difficult and unreliable because of the large number of variables, described above, which contribute to an IP response. The problem is further complicated by the fact that rocks containing magnetite, graphite, clay minerals and variably altered rocks produce IP responses of varying amplitudes.



The resistivity background over the IP survey grid is generally less than 750 ohm-metres. However a strong, 400 metre wide, resistivity high extends south from line 5730400N to line 5729800N for a distance of at least 600 metres. This resistivity high or "core" has been interpreted to outline a particular rock type different from rocks of the surrounding area where resistivity values are generally less than 500 ohm-metres. Because of these higher resistivity values it is at this location that the possibility of finding outcrop in situ is believed to be greatest.

On the chargeability side of the ledger there is only one area of mild interest. Unfortunately, this area occurs between 7850E and 8050E on the most southerly line on the grid, namely line 5728900N. Here a very weak "pant-leg" chargeability anomaly was detected. Unfortunately the maximum chargeability response barely reaches 8 milliseconds above a background of about 4 milliseconds. This IP signature most probably represents the presence of a small, shallow, confined source and does not augur well for the discovery of a large gold copper porphyry system. Notwithstanding this, it is pertinent to closeoff this weak anomaly by establishing a few lines immediately south of the present grid.

Unusually severe geomagnetic storms interrupted progress of the survey for extended periods of time, which in turn led to an increase in the overall cost of the survey.

#### 9.0 CONCLUSIONS AND RECOMMENDATIONS

From a study of the IP data described in this report it has been concluded that the IP chargeability "pant-leg" anomaly detected on line 5728900N, the most southerly line on the survey grid, is most probably caused by a small, shallow confined source.



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Prior to closing off this weak chargeability anomaly, by establishing a few lines immediately south of the present grid, it is recommended that a geochemical soil survey be carried out over the southern half of the present grid.

Respectfully submitted,

LLOYD GEOPHYSICS INC.

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John Lloyd, M. Sc., P. Eng., Senior Geophysicist.



# **APPENDICES**



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## APPENDIX A

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# COST OF INDUCED POLARIZATION SURVEY

Lloyd Geophysics contracted the acquisition of the IP data on a per diem basis. Mobilization, demobilization, traveling expenses, truck charges, data processing, computer plotting, consumables, reprographics, interpretation and report writing were additional costs:

Item	GST	Amount					
<ul> <li>Mobilization / Demobilization</li> </ul>	241.50	3,450.00					
<ul> <li>Living and Traveling Expenses</li> </ul>	353.05	6,061.19					
<ul> <li>Truck Charges</li> </ul>	188.31	2,946.91					
<ul> <li>IP Data Acquisition</li> </ul>	1,307.25	18,675.00					
<ul> <li>Data Processing and Computer Plotting</li> </ul>	56.00	800.00					
<ul> <li>Consumables and Reprographics</li> </ul>	19.07	272.40					
<ul> <li>Interpretation and Report Writing</li> </ul>	56.00	800.00					
	2,221.18	33,005.50					
Sub Total		33,005.50					
GST (as shown)		2,221.18					
TOTAL COST		35,226.68					



#### APPENDIX B

#### **CERTIFICATION OF THE AUTHOR**

I, John Lloyd of 805 – 4438 West 10<sup>th</sup> Avenue, in the City of Vancouver, in the Province of British Columbia, do hereby state that:

I graduated from the University of Liverpool, England in 1960 with a B.Sc. in Physics and Geology, Geophysics Option.

I obtained the diploma of the Imperial College of Science, Technology and Medicine (D.I.C.) in Applied Geophysics from the Royal School of Mines, London University in 1961.

I obtained the degree of M.Sc. in Geophysics from the Royal School of Mines, London University in 1962.

I am a member in good standing of the Association of Professional Engineers in the Province of British Columbia, the Society of Exploration Geophysicists of America, the European Association of Exploration Geophysicists and the Canadian Institute of Mining and Metallurgy.

I have been practicing my profession for over forty years.

Vancouver, B.C.

April, 2004









7100 E 7200 E 7300 E 7400 E 7500 E 6400 E 6500 E 6600 E 6700 E 6800 E 6900 E 7000 E 357 426 432 414 441 413 441 477 633 581 545 618 546 487 488 37 42 59 85 115 146 214 33 n=1n=2 n=3 n=4 n=5 n=6



7300 E 7100 E 7200 E 7400 E 7500 E 6400 E 6500 E 6600 E 6700 E 6800 E 6900 E 7000 E RESISTIVITY 157 259 306 314 328 353 437 505 611 799 799 744 811 782 727 616 548 659 575 56 78 119 214 n=1n=2 n=3 n=4n=5 n=6

7300 E 6400 E 6500 E 6600 E 6700 E 6800 I 6900 E 7000 E 7100 E 7200 E 7400 E 7500 E 2.6 -0.33 2.3 2.7 2.7 2.7 2.9 2.9 2.6 2.4 2.4 2.5 2.5 2.7 3 3.2 3.4 3.8 3.7 3.9 4 3.9 4.2 3.9 n=1n=2 2.3 2.2





CHARGEABILITY







6400 E 6500 E 6600 E 6700 E 6800 E 6900 E n=1n=2 n=3n=4n=5 n=6







BILITY	6400 E		6400 E		6500 E		6600 E		6700 E		6800 E		6900 E		7000 E		7100 E		00 E	7.	300 E	. 74	00 E	75	7		
		1.7	1.8	1.9	1.9	2	2	2	2.1	2.3	2.4	2.4	2.4	2.3	2.6	2.7	2.9	3	3	2.9	2.6	1.8	2.5	2.7	3.1	3.1	
	n=1	1.5	1.8	1.7	1.7	1.7	1.8	1.5	1.7	12	1,2	1.8	1.9	1.8	2.5	2.8	3.1	2.4	2.1 -	-1.8	1.4	-2.4	1.7	1.9	2.6	1.8 -	
	n=2	1.	7 2	1	.7 1.	8 2	.1 1	.9 1	.8 2	.1 :	2.5 2	2.2	2.2	2.1 2.	1 3	.1 2	.1	2.3 2.	7 2	.9 2	.1 2	.2	2 2.	2 2	.7 3	.3	
	n=3		1.7	2	1.9	2.3	2.1	1.9	1.9	2.4	2.9	2.6	2.1	2,3	2.4	2.4	2.1	3.4	3.3	3_	2.7	2.4	2.2	2.6	3.2	14.2	
	n=4		1	7 1	.8 2.	1	2	2	2 2	.2	2.6 2	2.9	2.2	2.4 2.	6 2	.9 2	.4	3.2 3.	5 3	.4 3	.4 ) 2	.7 2	.4 2.	3 2	.8 3	.8	
	n=5			1.6	2.5	2.2	) 2	2.1	2.3	2.7	2.8	2.4	2.6	2.8	2.8	2.8	3.3	2.9	3.6	14	2.8	2.7	2.3	2.6	3.6	4.4	
	n=6			2	4 1	5 1	.9	2 2	.3 2	.5	2.7	2	2.6	2.9 2.	9 2	.8 2	.9 ;	3.5 3	j	4	4	3 2	.7 2.	7 2	9 3	.9	

FACTOR		6400 E		3400 E 6500 E		6600 E		6700 E			6800 E		6900 E		7000 E		7100 E		7200 E		E .	7300 E		7400 E		Ε	7500 E		76	
		44	38	22	13	9.9	7.9	6.2	4.8	4.5	4.3	3	5.5 3	5	3	2.7	2.8	2.5	2	.6	2.7	2.8	3.4	1.	2	2.6	3.2	2.4	2.7	1
	n=1	69	67 1	30 /	15	13	10	8.3	5.7	5.5	7.1	6	.3 5.	5	4.6	2.3	2.8	2.2	3.	.7	4.5	5.7	6.5	-7		1.5	3.6	2.1	3.(	
	n=2	39	43	1 15	5 9	8	.6 1	8.2 6	i.7	5.3	7	3.8	2.9	2.2	2.5	2.	.6 3	2.3	1.9	2.6	3.	4	3	5.3	1.8	3	3	3.1	1.4	3.8
	n=3		25 —	- 29	12	7.2	6.7	8.1	5.2	4.5	4.7		3 1.	9	2.4	3.2	2.3	2.3	2.	.8	2	2.2	2.7	2.1	8	3.4	3.1	2.5	1.5	
	n=4		19	2		۹ 5	.4 2	4.7	5	4.8	3.4	3.4	1.9	2.2	2.9	4.	.3 1	2.2	4.1	2.2	1.	3	1.8	1.5	5.6	3.	1	2.6	2.4	1.3
	n=5			15	21	8.8	4.2	3.9	4.4	4,1	2.6	2	.2 2.	5	2.5	3.3	3.9	2.3	2.	.8	1.5	1.3	1.2	2.	7	5	2.8	2.8	2.0	
	n=6			17	7 1	1 6		3.6 3	1.6	3.6	3.2	1.4	1.8	2.6	2.8	3.	1	3.8	2.2	1.9	1.	3	0.59	1.9	2.7	5	5	2.7	3	1.9



