**GEOPHYSICAL REPORT** 

## **3D INDUCED POLARIZATION SURVEY**



ON THE

## **GS1 Grid**

FOR

**GOLDSOURCE MINES INC.** 

639052E 5960229N (NAD83 ZONE 09) (53° 46' 19"N 126° 53' 24"W)

> Location: Houston, British Columbia NTS Sheet: L2 Mining Zone: Omineca Mining Division

SURVEY CONDUCTED BY SJ GEOPHYSICS LTD. JUNE – JULY 2004

Report Written by Shawn Rastad S.J.V. Consultants Ltd. October 2004

### TABLE OF CONTENTS

9778

1. Introduction	1
2. Location and Line Information	1
3. Field Work and Instrumentation	3
4. Geophysical Techniques	4
<ul><li>4.1. IP Method</li></ul>	4
5. Data Presentation	6
<ul><li>5.1. Cross Sections.</li><li>5.2. Plan Maps.</li></ul>	6
6. Discussion of Results	7
7. Conclusions and Recommendations	12
8. Appendix 1 – Statement of Qualifications	13
8.1. Shawn Rastad	13
9. Appendix 2 – Summary Tables	14
10. Appendix 3 – Instrument Specifications	16
10.1.IRIS ELREC 10 IP Receiver	16
10.2.GDD Tx II IP Transmitter.	17

SJ Geophysics Ltd. / S.J.V. Consultants Ltd. 11762-94<sup>th</sup> Ave., Delta, BC Canada i Tel: (604) 582-1100 Fax: (604) 589-7466 E-mail: <u>sydv@sjgeophysics.com</u>

### ILLUSTRATIONS

Figure 1: Interpreted Chargeability @ 150m depth	8
Figure 2: Interpreted Resistivity @ 100m depth	9
Figure 3: Chargeability (Isosurface >40ms)	10

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	MAD MANTE CELCOTO DI AM MADE
PLAIE #	MAP NAME – GSI GRID PLAN MAPS
Plate G1-a	Interpreted Resistivity – 25m Below Surface
Plate G2-a	Interpreted Chargeability – 25m Below Surface
Plate G1-b	Interpreted Resistivity – 50m Below Surface
Plate G2-b	Interpreted Chargeability – 50m Below Surface
Plate G1-c	Interpreted Resistivity – 75m Below Surface
Plate G2-c	Interpreted Chargeability – 75m Below Surface
Plate G1-d	Interpreted Resistivity – 100m Below Surface
Plate G2-d	Interpreted Chargeability – 100m Below Surface
Plate G1-e	Interpreted Resistivity – 150m Below Surface
Plate G2-e	Interpreted Chargeability – 150m Below Surface
Plate G1-f	Interpreted Resistivity – 200m Below Surface
Plate G2-f	Interpreted Chargeability – 200m Below Surface
Plate G1-g	Interpreted Resistivity – 250m Below Surface
Plate G2-g	Interpreted Chargeability – 250m Below Surface

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Line Number	Cross Sectional Maps – GS1 GRID PLAN MAPS
1000E	Interpreted Resistivity / Interpreted Chargeability : Line 1000E
1100E	Interpreted Resistivity / Interpreted Chargeability : Line 1100E
1200E	Interpreted Resistivity / Interpreted Chargeability : Line 1200E
1300E	Interpreted Resistivity / Interpreted Chargeability : Line 1300E
1400E	Interpreted Resistivity / Interpreted Chargeability : Line 1400E
1500E	Interpreted Resistivity / Interpreted Chargeability : Line 1500E
1600E	Interpreted Resistivity / Interpreted Chargeability : Line 1600E
1700E	Interpreted Resistivity / Interpreted Chargeability : Line 1700E
1800E	Interpreted Resistivity / Interpreted Chargeability : Line 1800E
1900E	Interpreted Resistivity / Interpreted Chargeability : Line 1900E
2000E	Interpreted Resistivity / Interpreted Chargeability : Line 2000E

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#### **1. INTRODUCTION**

This report describes the ground geophysical exploration program that was undertaken for Gold Source Mines Inc. on their Rox claim from the period of June 13 to July 7 2004. A 3D Induced Polarization (3D-IP) survey was conducted by SJ Geophysics Ltd. The survey grid covered just under a 2 square kilometre region. The geophysical survey incorporated 100m line spacing with 50m dipoles. After reviewing the field results from several lines, it was decided to record more detailed data on the central portion of the grid after the initial survey was completed. As a result, a half square kilometre section of the grid was re-surveyed at 50m line spacing and 25m dipoles.

The geophysical data was gathered to provide additional information in determining the location of future drill targets, and to ascertain the extent of mineralization in the region. The interpretation of the IP results are solely based on this geophysical program, as little geology was known. For a detailed interpretation of this geophysical data, this data needs to be combined with known geology, geochemistry and drill data. This report, is written as an addendum to a more complete; therefore, this does not cover items such as location maps, discussions of the background geology, or costs associated with the survey.

#### 2. LOCATION AND LINE INFORMATION

The property is situated approximately 1 hour south of Houston, BC. SJ Geophysics' crew was based from a camp located at the Huckleberry Mine. Access to the property was via the crew's vehicle along forestry service roads. The project grid was located at the base of Mosquito Hill which is an hour's drive from the mine site along a decommissioned road leading from Reach Road.

The terrain for the project consisted of low lying, mostly clearcut hills as well as some marsh and forest. The project consisted of a single grid consisting of 11 lines ranging in lengths from 1700m to 2000m with a line separation of 100m. The survey grid lines were set off at an azimuth of 336°, with pickets placed every 50m and were labelled from Line 1000E to Line 2000E. The station numbers ranged from 300N to 2300N. This grid was called GS1.

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In the central region of the grid, four lines were added to give a region with 50m line spacing. The geophysical crew re-surveyed this central region with 25m dipoles to acquire data with better resolution in the near surface. The detailed grid also consisted of 9 lines ranging in lengths of 950 to 1100m. The lines recorded were lines 1400E to 1800E.

The two data sets were combined during the processing phase and inverted as a single block. A detailed summary of the line breakdown for both grids is located in Appendix 2.

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#### **3.** FIELD WORK AND INSTRUMENTATION

For the majority of the project, the SJ Geophysics crew consisted of six SJ Geophysics employees: Jon Jacobson, Robert Ewen, Greg Amos, Allan Meidlein, Jeff Moorcroft, and Tom Flyn. A small crew change occurred between the recording of the initial grid and the detailed grid. On June 30, Greg and Jeff left and were replaced by Kyle Reynolds. Tom left the crew a few days early and for these last few days of production, the crew was down to 4 workers.

A modified pole-dipole 3D-IP configuration array was used with a combination of 10 dipoles of 50m, 100m and 150m separation; for the detailed survey this was reduced to a combination of 25m, 50m and 75m separations. The dipole array used was situated on the potential line, centred by two adjacent current lines.

The IP data was collected using IRIS instrumentation, an ELREC-10 receiver (Rx). The current was injected with a 2 seconds on, 2 seconds off duty cycle into the ground via a transmitter (Tx). As for the transmitter, a GDD Tx II 3.6 KW was used during the duration of the program.

The potential array was implemented using standard 8 conductor cables configured with 25m and 50m takeouts for the potential rods. At each current station, the electrodes used consisted of 5/8" stainless steel rods of approximately 1m in length. For the potential line, the electrodeds consisted of 3/8" stainless steel "pins" of 0.5m in length. The location of the remote current is used explicitly in the geophysical calculations.

The IP readings from each day's surveying were downloaded to a computer and entered into a database archive every evening. The database program allows the operator to display the IP decay curves in an efficient manner, and this provides a visual review of the data quality.

#### 4. **Geophysical Techniques**

#### 4.1. IP Method

The time domain IP technique energizes the ground surface with an alternating square wave pulse via a pair of current electrodes. On most surveys, such as this one, the IP/Resistivity measurements are made on a regular grid of stations along survey lines.

After the transmitter (Tx) pulse has been transmitted into the ground via the current electrodes, the IP effect is measured as a time diminishing voltage at the receiver electrodes. The IP effect is a measure of the amount of IP polarizable materials in the subsurface rock. Under ideal circumstances, IP chargeability responses are a measure of the amount of disseminated metallic sulfides in the subsurface rocks.

Unfortunately, there are other rock materials that give rise to IP effects, including some graphitic rocks, clays and some metamorphic rocks (serpentinite for example). So from a geological point of view, IP responses are almost never uniquely interpretable. Because of the non-uniqueness of geophysical measurements it is always prudent to incorporate other data sets to assist in interpretation.

Also, from the IP measurements the apparent (bulk) resistivity of the ground is calculated from the input current and the measured primary voltage.

IP/resistivity measurements are generally considered to be repeatable to within about five percent. However, they will exceed that if field conditions change due to variable water content or variable electrode contact.

IP/resistivity measurements are influenced, to a large degree, by the rock materials nearest the surface (or, more precisely, nearest the measuring electrodes), and the interpretation of the traditional pseudosection presentation of IP data in the past have often been uncertain. This is because stronger responses that are located near surface could mask a weaker one that is located at depth.

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#### 4.2. Inversion Programs

"Inversion" programs have recently become available that allow a more definitive interpretation, although the process remains subjective.

The purpose of the inversion process is to convert surface IP/Resistivity measurements into a realistic "Interpreted Depth Section." However, note that the term is left in quotation marks. The use of the inversion routine is a subjective one because the input into the inversion routine calls for a number of user selectable variables whose adjustment can greatly influence the output. The output from the inversion routines do assist in providing a more reliable interpretation of IP/Resistivity data, however, they are relatively new to the exploration industry and are, to some degree, still in the experimental stage.

The inversion programs are generally applied iteratively to evaluate the output with regard to what is geologically known, to estimate the depth of detection, and to determine the viability of specific measurements.

The Inversion Program (DCINV3D) used by the SJ Geophysical Group was developed by a consortium of major mining companies under the auspices of the UBC-Geophysical Inversion Facility. It solves two inverse problems. The DC potentials are first inverted to recover the spatial distribution of electrical resistivity, and, secondly, the chargeability data (IP) are inverted to recover the spatial distribution of IP polarizable particles in the rocks.

The interpreted depth section maps represent the cross sectional distribution of polarizable materials, in the case of IP effect, and the cross sectional distribution of the apparent resistivity, in the case of the resistivity parameter.

#### 5. DATA PRESENTATION

#### 5.1. Cross Sections

As described above, the IP data is processed through an inversion program that outputs one possible subsurface distribution of resistivity and polarizable materials that would produce the observed data. These results are presented in a false-colour cross section and these displays can be directly interpreted as geological cross sections.

Cross sections are presented as 1:5000 scale plots in map folders at the back of this report.

#### 5.2. Plan Maps

False colour contour maps of the inverted resistivity and chargeability results can be produced for selected depths. Data is positioned using UTM coordinates gathered during the field work. This display illustrates the areal distribution of the geophysical trends, outlining strike orientations and possible fault offsets.

Plan maps are plotted for both resistivity and chargeability at depths of 25m, 50m, 75m, 100m, 150m, 200m, 250m below surface at a 1:10000 scale and included in map folders at the back of this report.

#### 6. **DISCUSSION OF RESULTS**

The 3D-IP results are in the form of block models and as such can be viewed in 3D visualization programs. For interpretation purposes, two types of sections are cut from the block models, constant depth (below surface) plans, and longitudinal cross sections along the survey lines as discussed above. For the purposes of this discussion, the Interpreted Chargeability plan map at 150m below the surface and the Interpreted Resistivity map at 100m depth will primarily be used to illustrate the prominent features and anomalous bodies within this data set. These maps are illustrated in Figure 1 and Figure 2 respectively below. In addition, the data was also viewed with the UBC's Meshtools program to allow the data to be viewed in a 3D perspective.

In Figure 2, the resistivity data clearly shows three prominent linear features possibly indicating structural features such as shear zones or faults. These are depicted on the maps as black dashed lines. One linear feature runs north-south parallel to line 1200E from stations 300N to approximately 1600N. The other two run in a southwest to northeast direction. The southern most line runs from station 1000E/500N to 2000E/1400N, while the northern line features runs from 1000E/1450N to 2000E/2000N.

Similarly, these lines were also drawn onto the Interpreted Chargeability plan and are shown in Figure 1. These linear structures are less prominent; however, examination of the data may show a correlation between the resistivity and the chargeability data. For example, for the northsouth running feature, a chargeable zone appears to be elongated along this feature. Secondly, on the northern line running to the northeast, an anomalous chargeability feature may be indicative of a fault. The anomalous body appears to have a bend in it which may be a sign that the anomalous body has a shift in it. Reviewing the chargeability at 100m depth gives a stronger indication of this theory.

The two northeast running structures gives a general separation of the survey grid into three zones. The southern and middle zones appear to have similar characteristics, while the northern zone demonstrates slightly a different pattern of resistivity and chargeability. Each zone will be looked at individually.

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Goldsource - GS1 2004

#### Goldsource - GS1 2004

The southern zone contains a strong chargeability body in the southeast corner of the survey grid. This body is surrounded by a distinct region of low chargeable material as indicated by the dashed arc on Figure 2. Continuing to move away from this body exists a region of additional chargeable material surrounding the body. Unfortunately, this anomalous feature is situated on the southern edge of the grid and was not fully covered by the IP survey; therefore, it is difficult to truly determine the true extent of these two chargeable bodies.

By superimposing the drawn arc onto the two images in Figure 1 and 2, it can be clearly seen that there is a strong correlation between the resistivity and chargeability values recorded during the survey. Although the resistivity is more broken up than the IP data, the resistivity data shows a similar pattern of a circular feature in the southeast corner of the survey.

Examining the chargeability results in a visualization program allows further insight into this interpretation. The snapshot below, Figure 3, shows the chargeability model with an arbitrary isosurface set at >40ms. This clearly illustrates the strong IP anomaly in the southeastern corner of the survey and the additional material surrounding it. It also shows a third anomalous body to the northwest.



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The region between the two northeast running structures, shows a distinctive circular resistivity response. This is highlighted in the above figures by the dashed oval. The chargeability results in this region show a possible zone of relatively low IP response surrounded by scattered chargeable features. To the northeast of this oval is the third anomalous body indicated earlier in the visualization snapshot. The interesting thing here is that this body is at a greater depth than the others.

Finally, the northern zone shows completely different characteristics than the first two zones discussed. Here the region appears to be of more highly resistive material that has very little chargeability response compared to the other zones. In addition, reviewing plan maps at the shallower depths shows that the data in this region is less scattered and broken up. This maybe indicative of a change in lithological units.

Unfortunately, background geology information was not supplied with this project to allow a detailed interpretation. The discussion here has been strictly based on the resistivity and chargeability inversion results. For a detailed analyze and interpretation of this region, this data should be combined with known geology, geochemistry and drill data.

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#### 7. Conclusions and Recommendations

SJ Geophysics Ltd. conducted a 3D-IP survey for Goldsource Mines Inc. on their Rox claim. The geophysical crew surveyed approximately a 2 square kilometre region. The data was processed and inverted using the UBC-Geophysical Inversion Facility inversion code. The interpreted inversion are then output as section and/or plan maps.

Interpretation of this 3D-IP data set gives indication of some linear structures running through the grid, as well as a few significant chargeablility anomalous bodies. It is believed that the geophysical data gives enough evidence to warrant further investigation. Initially, a detailed interpretation of the area should be conducted that includes geology, geochemistry and other geophysical data.

To fully image the strong chargeability anomaly in the southeast corner of the survey, it is recommended that additional data be collected by extending the IP grid to the south and east.

Respectfully Submitted,

X allart

Shawn Rastad.

### 8. Appendix 1 – Statement of Qualifications

#### 8.1. Shawn Rastad

I, Shawn Rastad, of the city of Coquitlam, Province of British Columbia, hereby certify that:

- 1. I graduated from the University of British Columbia 1996 with a Bachelor of Science degree majoring in geophysics.
- 2. I have been working in mineral and oil exploration since 1997.
- 3. I have no interest in Goldsource Mines Inc., or in any property within the scope of this report, nor do I expect to receive any.

Signed by:

Shawn Rastad Geophysicist

Date: Nov. 4, 2004

### 9. Appendix 2 – Summary Tables

#### GS1 Grid

Line	L.Series	BOL	St.Series	EOL	St.Series	Length
		Station		Station		
1000	E	300	N	2000	N	1700
1100	Е	300	N	2000	N	1700
1200	E	300	N	2000	N	1700
1300	E	300	N	2300	N	1700
1400	E	300	N	2300	N	2000
1500	E	300	N	2300	N	2000
1600	E	300	N	2300	N	2000
1700	E	300	Ń	2300	N	2000
1800	E	300	N	2300	N	2000
1900	E	300	N	2300	N	2000
2000	E	300	Ν	2300	N	2000

Total Line Kilometres for GS1 grid: 20.80Km

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Line	L.Series	BOL	St.Series	EOL	St.Series	Length
		Station		Station		
1400	E	500	Ν	1600	N	1100
1450	Е	600	N	1600	N	1000
1500	E	600	N	1600	N	1000
1550	E	600	N	1600	N	1000
1600	E	600	Ν	1600	N	1000
1650	Е	600	N	1600	Ν	1000
1700	E	600	Ν	1600	N	1000
1750	E	625	N	1575	N	950
1800	E	625	N	1575	N	950

GS1 Central Block Grid

Total Line Kilometres of IP for Central Block - 9Km

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### **10.** Appendix **3** – Instrument Specifications

#### 10.1. IRIS ELREC 10 IP Receiver

Technical: 10 Mohm Input impedance: Input overvoltage protection up to 1000V Automatic SP bucking with linear drift correction Internal calibration generator for a true calibration on request of the operator 3200 dipoles reading Internal memory: Automatic synchronization and re-synchronization process on primary voltages signals whenever needed Proprietary intelligent stacking process rejecting strong non-linear SP drifts More than 100 dB (for Rs = 0) Common mode rejection: : range:-15V - + 15V Self potential (Sp) : resolution: 0.1 mV Ground resistance 0.1-100 kohms measurement range: : range: 10µV - 15V Primary voltage : resolution: 1µV : accuracy: typ. 1.3% Chargeability : resolution: 10µV/V : accuracy: typ. 0.6%

General:	
Dimensions:	31x21x25 cm
Weight (with the internal	9 kg
battery):	
Operating temperature range:	-30°C to 70°C
Case in fiber-glass for resisting t	o field shocks and vibrations

### 10.2. GDD Tx II IP Transmitter

Input voltage:

Output power: Output voltage: Output current: Time domain: Operating temp. range Display Dimensions (h w d): Weight: 120V / 60 Hz or 240V / 50Hz (optional)

1.4 kW maximum.
150 to 2000 Volts
5 ma to 10Amperes
Transmission cycle is 2 seconds ON, 2 seconds OFF
-40° to +65° C
Digital LCD read to 0.001A
34 x 21 x 39 cm
20kg.

















-









) (2))) (state)





![](_page_34_Figure_1.jpeg)

![](_page_35_Figure_2.jpeg)

![](_page_36_Figure_0.jpeg)

![](_page_36_Picture_3.jpeg)

### in Lähenn fill

![](_page_37_Figure_1.jpeg)

![](_page_37_Picture_4.jpeg)

![](_page_38_Figure_0.jpeg)

![](_page_38_Picture_4.jpeg)

![](_page_39_Figure_0.jpeg)

![](_page_39_Picture_3.jpeg)

![](_page_40_Figure_0.jpeg)

![](_page_40_Picture_3.jpeg)

![](_page_41_Figure_0.jpeg)

![](_page_41_Figure_1.jpeg)

![](_page_41_Figure_2.jpeg)

![](_page_41_Picture_4.jpeg)

![](_page_42_Figure_0.jpeg)

0.5

0 **6**0

![](_page_42_Figure_1.jpeg)

![](_page_42_Figure_2.jpeg)

![](_page_42_Figure_3.jpeg)

![](_page_42_Picture_5.jpeg)

![](_page_43_Figure_0.jpeg)

![](_page_43_Figure_3.jpeg)

![](_page_43_Figure_4.jpeg)

![](_page_43_Picture_6.jpeg)

![](_page_44_Figure_0.jpeg)

![](_page_44_Figure_1.jpeg)

![](_page_44_Figure_2.jpeg)

![](_page_44_Figure_3.jpeg)

![](_page_44_Figure_4.jpeg)

![](_page_44_Picture_6.jpeg)

![](_page_45_Figure_0.jpeg)

0.5

![](_page_45_Figure_1.jpeg)

![](_page_45_Figure_2.jpeg)

![](_page_45_Picture_5.jpeg)

![](_page_46_Figure_0.jpeg)

![](_page_46_Picture_3.jpeg)