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# SINO MINERALS CORP.

# Magnetometer and VLF EM Surveys Over the

# East Grid Greenlaw Property Greenlaw and Cunningham Townships, Ontario



#### Magnetometer and VLF EM Surveys Greenlaw Property Greenlaw and Cunningham Townships, Ontario

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## 1. SURVEY DETAILS

This project is known as the Greenlaw Property.

## 1.1 CLIENT

Sino Minerals Corp.

7-145 Riviera Drive Markham, Ontario L3R 5J6

## 1.2 LOCATION

The Greenlaw Property is located approximately 50km southeast of Chapleau, Ontario.

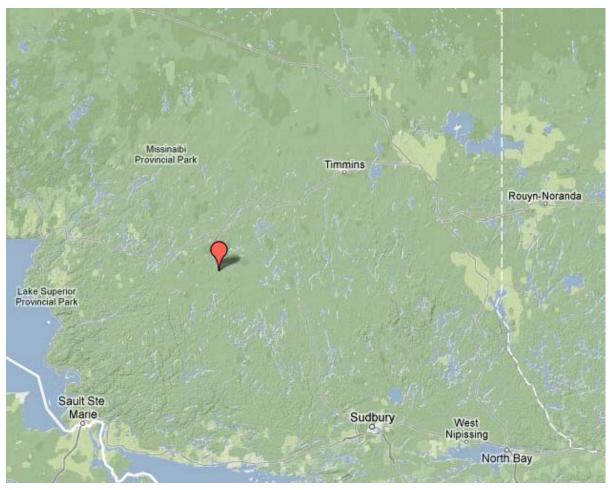


Figure 1: Location of the Greenlaw Property

## 1.3 ACCESS

Access to the property was attained with a 4x4 truck via an access road heading north from highway regional road 667 more commonly known as the Sultan Highway. Approximately 50km east of the intersection with highway 667, there is a forestry access road heading north from the Sultan Highway. This access road is travelled for an additional 13 kilometers to the survey area.

## 1.4 SURVEY GRID

The grid consists of 11 grid lines spaced at interval of approximately 200-400 meters. The baseline was cut with a strike of 0 degrees and a total distance of 3.8 kilometers. Grid lines were established every 200-400 meters and picketed every 25 meters for a total of 25.9 line kilometers.

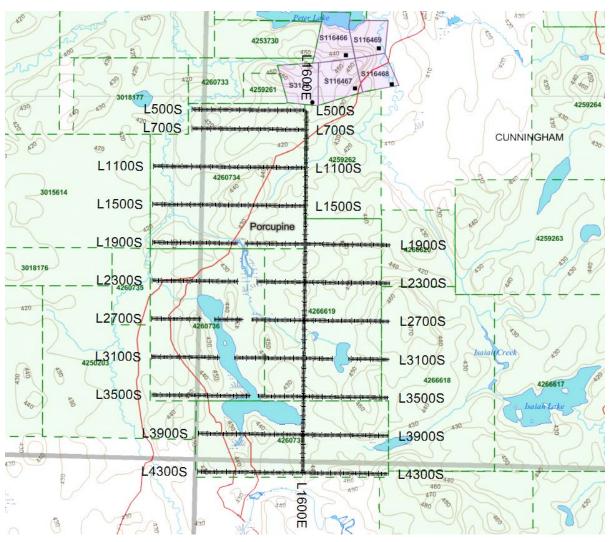


Figure 2: Claim Map with Grid



# 2. SURVEY WORK UNDERTAKEN

#### 2.1 SURVEY LOG

Date	Description	Line	Min Extent	Max Extent	Total
					Survey
					(m)
September 27, 2012	Locate survey area and begin survey.	500S	400E	1600E	1200
		700S	400E	1600E	1200
		1100S	0	1600E	1600
		1500S	0	1600E	1600
		1900S	975E	1600E	625
		1600E	2500S	500S	2000
September 28, 2012	Continue survey and demobilize from				
	grid.	1900S	0	2500E	1875
		2300S	1100E	2500E	1400
		2700S	650E	1600E	950
October 16, 2012	Re-occupy grid and complete survey.	2300S	0	900E	900
		2700S	0	2500E	1550
		3100S	0	2500E	2500
		3500S	0	2500E	2500
		3900S	500E	2500E	2000
		4300S	500E	2500E	2000
		1600E	4300S	2500S	1800

## Table 1: Survey Log

#### 2.2 PERSONNEL

Bruce Lavalley and of Britt, Ontario and Tyler Potts of Larder Lake, Ontario conducted all the magnetic data collection.

## 2.3 SURVEY SPECIFICATIONS

The survey was conducted with a GSM-19 v7 Overhauser magnetometer/VLF with a second GSM-19 magnetometer in base station mode for diurnal correction.

A total of 25.7 line kilometers of magnetic survey was conducted on September 27<sup>th</sup> and October 16<sup>th</sup>, 2012. This consisted of 2056 magnetometer and VLF EM samples taken at 12.5m intervals.



# 3. OVERVIEW OF SURVEY RESULTS

3.1 SUMMARY INTERPRETATION

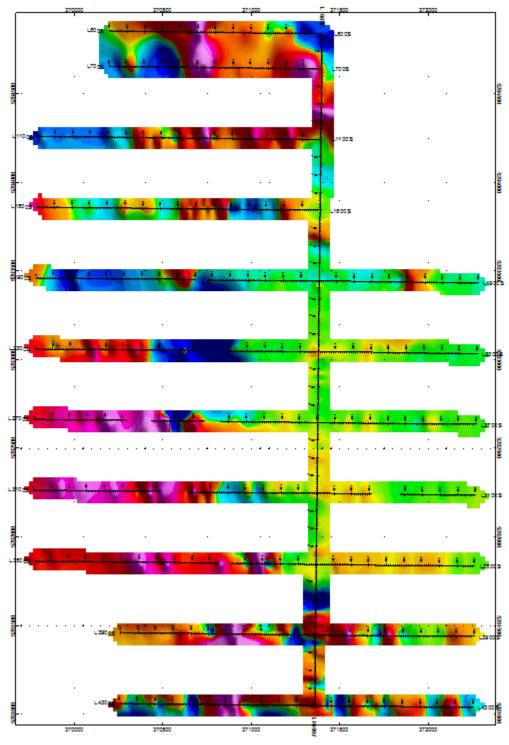
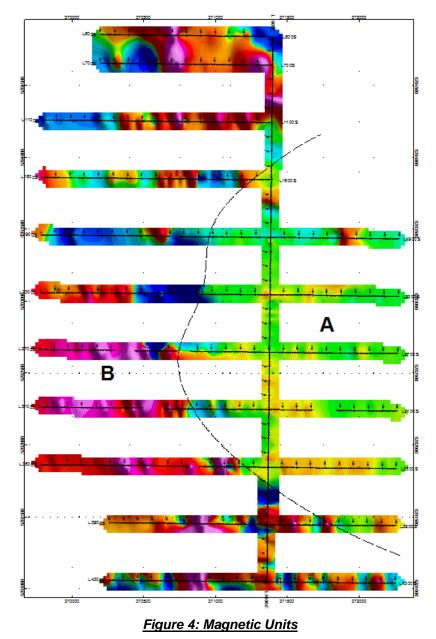


Figure 3: Magnetic Plan Map



The magnetic survey indicates dominant magnetic units. The first of these (unit A) exists in the east part of the survey area. This unit is generally uniform in magnetic response and most likely a result of an intrusive system such as a granite.

Unit B appears to be a more erratic magnetic signature. This could be from numerous tightly spaced units or a larger magnetic unit such as a gabbro. With the wide line spacing, this is more than likely from a gabbro. There may, however, be some narrow geological units between the potential granite and gabbro.





The VLF fabric indicates a north east trend. This axis most likely is a result of the structural trends in the area. Within the VLF signatures, two anomalies of merit are highlighted. Both of these represent strong axis that appear to be related to the contact region between the two magnetic units.

Anomaly C appears as a strong VLF EM axis near the contact of magnetic units A and B. Even though this axis strikes similar to those expected to be related to structure, this axis appears broad near the southern extent as it is in the vicinity of the baseline. This may indicate a mineralized zone along the contact and that merits follow-up.

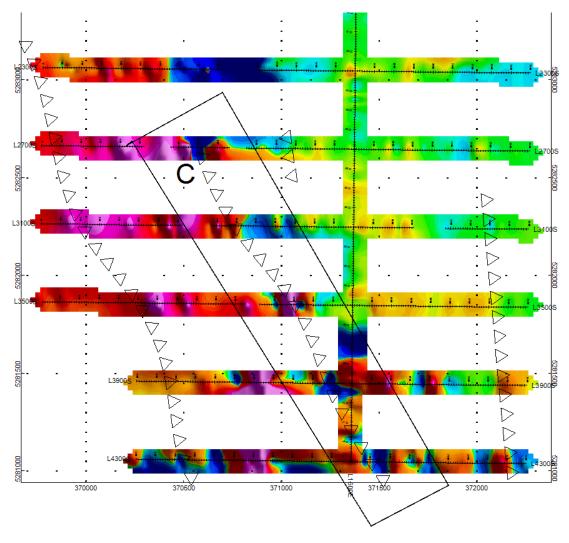
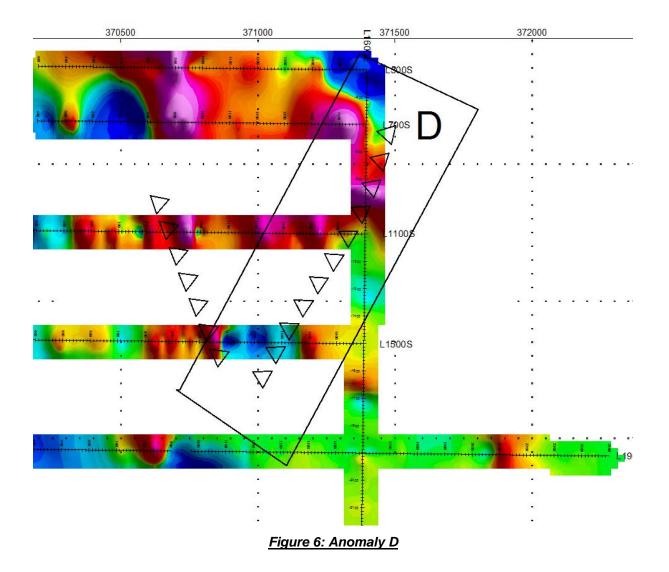


Figure 5: Anomaly C



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Anomaly D is similar to C. The one key difference is the strike being northeast instead of northwest. This anomaly appears to occur along the northern edge of the probable granite intrusive. This again may be related to mineralization along the edge of the intrusive.



Between anomaly C and D appear an intense magnetic low. This intense low may be related to additional sources; however, it may be related to a concentration of non-conductive magnetic sulphides. This may include minerals associated to zinc and iron.

I would recommend infill line cutting to cover the probable contact zone and anomalies C and D. For this I would recommend additional geophysics including magnetometer, VLF and IP. This would better characterize the anomalies.

A compilation with historic work should also be performed. This could possibly identify the sources of the anomalies and better focus further work.



#### **APPENDIX A**

#### **STATEMENT OF QUALIFICATIONS**

I, C. Jason Ploeger, hereby declare that:

- 1. I am a professional geophysicist with residence in Larder Lake, Ontario and am presently employed as a Geophysicist and Geophysical Manager of Canadian Exploration Services Ltd. of Larder Lake, Ontario.
- 2. I am a Practicing Member of the Association of Professional Geoscientists, with membership number 2172.
- 3. I graduated with a Bachelor of Science degree in geophysics from the University of Western Ontario, in London Ontario, in 1999.
- 4. I have practiced my profession continuously since graduation in Africa, Bulgaria, Canada, Mexico and Mongolia.
- 5. I am a member of the Ontario Prospectors Association, a Director of the Northern Prospectors Association and a member of the Society of Exploration Geophysicists.
- 6. I do not have nor expect an interest in the properties and securities of **Sino Minerals Corp.**
- 7. I am responsible for the final processing and validation of the survey results and the compilation of the presentation of this report. The statements made in this report represent my professional opinion based on my consideration of the information available to me at the time of writing this report.



C. Jason Ploeger, P.Geo., B.Sc. Geophysical Manager Canadian Exploration Services Ltd.

> Larder Lake, ON November 2, 2012



## **APPENDIX B**

#### THEORETICAL BASIS AND SURVEY PROCEDURES

#### TOTAL FIELD MAGNETIC SURVEY

Base station corrected Total Field Magnetic surveying is conducted using at least two synchronized magnetometers of identical type. One magnetometer unit is set in a fixed position in a region of stable geomagnetic gradient, and away from possible cultural effects (i.e. moving vehicles) to monitor and correct for daily diurnal drift. This magnetometer, given the term 'base station', stores the time, date and total field measurement at fixed time intervals over the survey day. The second, remote mobile unit stores the coordinates, time, date, and the total field measurements simultaneously. The procedure consists of taking total magnetic measurements of the Earth's field at stations, along individual profiles, including Tie and Base lines. A 2 meter staff is used to mount the sensor, in order to optimally minimize localized near-surface geologic noise. At the end of a survey day, the mobile and base-station units are linked, via RS-232 ports, for diurnal drift and other magnetic activity (ionospheric and sferic) corrections using internal software.

For the gradiometer application, two identical sensors are mounted vertically at the ends of a rigid fiberglass tube. The centers of the coils are spaced a fixed distance apart (0.5 to 1.0m). The two coils are then read simultaneously, which alleviates the need to correct the gradient readings for diurnal variations, to measure the gradient of the total magnetic field.

## VLF Electromagnetic

The frequency domain VLF electromagnetic survey is designed to measure both the vertical and horizontal inphase (IP) and Quadrature (OP) components of the anomalous field from electrically conductive zones. The sources for VLF EM surveys are several powerful radio transmitters located around the world which generate EM radiation in the low frequency band of 15-25kHZ. The signals created by these long-range communications and navigational systems may be used for surveying up to several thousand kilometres away from the transmitter. The quality of the incoming VLF signal can be monitored using the field strength. A field strength above 5pT will produce excellent quality results. Anything lower indicates a weak signal strength, and possibly lower data quality. A very low signal strength (<1pT) may indicate the radio station is down.

The EM field is planar and horizontal at large distances from the EM source. The two components, electric (E) and magnetic (H), created by the source field are orthogonal to each other. E lies in a vertical plane while H lies at right angles to the direction of propagation in a horizontal plane. In order to ensure good coupling, the strike of possible conductors should lie in the direction of the transmitter to allow the H vector to pass through the anomaly, in turn, creating a secondary EM field.

The VLF EM receiver has two orthogonal aerials which are tuned to the frequency of the transmitting station. The direction of the source station is located by rotating the sensor around a vertical axis until a null position is found. The VLF EM survey procedure consists of taking measurements at stations along each line on the grid. The receiver is rotated about a horizontal axis, right angles to the traverse and the tilt recorded at the null position.



#### **APPENDIX C**

#### **GSM 19**



#### Specifications

**Overhauser Performance** 

Resolution: 0.01 nT Relative Sensitivity: 0.02 nT Absolute Accuracy: 0.2nT Range: 20,000 to 120,000 nT Gradient Tolerance: Over 10,000nT/m Operating Temperature: -40°C to +60°C

#### **Operation Modes**

Manual: Coordinates, time, date and reading stored automatically at min. 3 second interval. Base Station: Time, date and reading stored at 3 to 60 second intervals. Walking Mag: Time, date and reading stored at coordinates of fiducial. Remote Control: Optional remote control using RS-232 interface. Input/Output: RS-232 or analog (optional) output using 6-pin weatherproof connector.

#### **Operating Parameters**

Power Consumption: Only 2Ws per reading. Operates continuously for 45 hours on standby. Power Source: 12V 2.6Ah sealed lead acid battery standard, other batteries available Operating Temperature: -50°C to +60°C

#### Storage Capacity

Manual Operation: 29,000 readings standard, with up to 116,000 optional. With 3 VLF stations: 12,000 standard and up to 48,000 optional.

Base Station: 105,000 readings standard, with up to 419,000 optional (88 hours or 14 days uninterrupted operation with 3 sec. intervals)

Gradiometer: 25,000 readings standard, with up to 100,000 optional. With 3 VLF stations: 12,000, with up to 45,000 optional.

#### Omnidirectional VLF

Performance Parameters: Resolution 0.5% and range to ±200% of total field. Frequency 15 to 30 kHz.

Measured Parameters: Vertical in-phase & out-of-phase, 2 horizontal components, total field coordinates, date, and time.

Features: Up to 3 stations measured automatically, in-field data review, displays station field strength continuously, and tilt correction for up to  $\pm 10^{\circ}$  tilts.

Dimensions and Weights: 93 x 143 x 150mm and weighs only 1.0kg.

Dimensions and Weights

Dimensions: Console: 223 x 69 x 240mm Sensor: 170 x 71mm diameter cylinder Weight:



Console: 2.1kg Sensor and Staff Assembly: 2.0kg

Standard Components

GSM-19 magnetometer console, harness, battery charger, shipping case, sensor with cable, staff, instruction manual, data transfer cable and software.

#### Taking Advantage of a "Quirk" of Physics

Overhauser effect magnetometers are essentially proton precession devices except that they produce an orderof magnitude greater sensitivity. These "supercharged" quantum magnetometers also deliver high absolute accuracy, rapid cycling (up to 5 readings / second), and exceptionally low power consumption.

The Overhauser effect occurs when a special liquid (with unpaired electrons) is combined with hydrogen atoms and then exposed to secondary polarization from a radio frequency (RF) magnetic field. The unpaired electrons transfer their stronger polarization to hydrogen atoms, thereby generating a strong precession signal-- that is ideal for very high-sensitivity total field measurement. In comparison with proton precession methods, RF signal generation also keeps power consumption to an absolute minimum and reduces noise (i.e. generating RF frequencies are well out of the bandwidth of the precession signal).

In addition, polarization and signal measurement can occur simultaneously - which enables faster, sequential measurements. This, in turn, facilitates advanced statistical averaging over the sampling period and/or increased cycling rates (i.e. sampling speeds).

• The unique Overhauser unit blends physics, data quality, operational efficiency, system design and options into an instrumentation package that ... exceeds proton precession and matches costlier optically pumped cesium capabilities



#### **APPENDIX D**

## LIST OF MAPS (IN MAP POCKET)

Posted Contoured TFM Plan Map (1:10000)

1) SINO-GREENLAW-EAST-MAG-CONT

Posted Profiled Fraser Filtered VLF EM Plan Map (1:10000)

2) SINO-GREENLAW-EAST-VLF

Summary Interpretation Plan Map (1:10000)

3) SINO-GREENLAW-EAST-INTERP

Grid Sketch on Claim Map (1:40000)

4) SINO-GREENLAW-EAST-GRID

TOTAL MAPS=4