**Report on Magnetics Surveys** 

at the

Santa Maria Prospect **Cobalt Area, NE Ontario** 





ClearView Geophysics Inc.



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# Report on Magnetics Surveys

# at the

# Santa Maria Prospect Cobalt Area, NE Ontario

On behalf of:

# Cabo Mining Enterprises Corp.

595 Howe Street Suite 502 Vancouver, B.C. V6C 2T5 telephone: (604) 681-8899 facsimile: (604) 681-0870 E-mail: seymour@searsbarry.com

Contact: Mr. Seymour Sears

By:

# **ClearView Geophysics Inc.**

12 Twisted Oak Street Brampton, Ontario L6R 1T1 telephone: 905.458.1883 facsimile: 905.792.1884 cellular: 416.617.1884 E-mail: clearview@geophysics.ca

Contact: Mr. Joe Mihelcic

ClearView Ref: 10106a

ClearView Geophysics Inc.

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## 1. INTRODUCTION

*ClearView Geophysics Inc.* carried out total field magnetics surveys for *Cabo Mining Enterprises Corp.* (hereafter Cabo) at their Santa Maria Prospect, located approximately nine (9) kilometres southeast of the town of Cobalt. The work was completed in early June 2004. The following sections (2) through (6) were supplied by Cabo personnel (references at end of report).

# 2. Access

Access is via the Coleman Road that departs eastwards from Highway 11A at the southwestern end of the town of Cobalt for 5 km to the abandoned "Mayfair" minesite and for  $4\frac{1}{2}$  km south along an ATV trail. The south end of the grid is easier reached via the Houndchutes Road (a Hydro Dam access road that extends southward form the Coleman Road at a point  $1\frac{1}{2}$  kms south of Cobalt).

# 3. TOPOGRAPHY & VEGETATION

Maximum relief on the property is approximately 80 metres. Topography is generally rolling with local steep ledges and cliffs and occasional swamp. The property drains into the Botha and Borden Lake system (both of which occur within the grid), which flows southward and westward through the grid area and into the Montreal River.

Overburden is relatively shallow over much of the grid except for local swamps. Vegetation consists mainly of mature mixed forest with abundant dense underbrush.

# 4. CLAIMS

The grid covers parts of four unpatented mining claims numbered as follows:

K 1098668 K 1135378 K 1140509 K 1221535

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The following map indicates the location of the Santa Maria Prospect Grid and claims relative to topographic features:

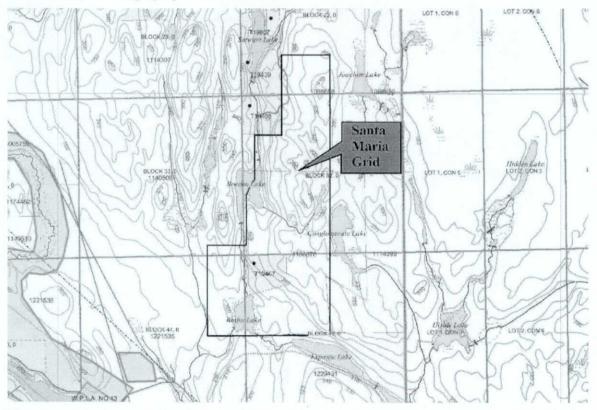


Figure - Santa Maria Grid Location Map

### 5. GEOLOGY

The grid is located in the southern part of the Cobalt mining camp. The eastern half of the grid is underlain by highly deformed Archean aged mafic to felsic metavolcanic rocks. These rocks are steeply dipping and trend in a northwest – southeast direction. A Nipissing aged diabase sill believed to be up to 300 metres thick occupies the western part of the grid and dips gently (25 degrees) eastward into the Archean volcanic rocks. In the extreme southeast and southwest corners of the grid, there is a shallow cover of relatively flat lying, Huronian aged, Coleman Group conglomerate.

Numerous "Cobalt Type" prospects, consisting of silver-cobalt-base metals hosted within calcite-quartz veins and vein breccia, are known to exist within the grid area. At least 4 shallow shafts and 1 short adit have explored these. None of these report any past production.

## 6. PREVIOUS WORK

Previous work, including the underground exploration shafts and adit, is thought completed between 1900 and 1930. There is very little documentation in the assessment files. A large silver nugget (estimated to contain 9000 oz of silver) is reported discovered in the northern part of the grid in the 1920's. Santa Maria Mines Ltd. completed trenching, sampling and a 16-hole drill program in this general area between 1946 and 1960.

Cabo Mining Corp. (the predecessor of Cabo Mining Enterprises Corp.) completed an airborne geophysical survey that included this grid in 1998 (High Sense Geophysical Surveys). Cabo Mining Enterprises Corp. completed 6 drill holes in the immediate area of the Santa Maria shaft in the north part of the grid in March of 2004 (Sears, 2004).

# 7. LOGISTICS

Mr. Denis Presseault, Timiskaming Economic Res. & Dev.; Field Technician:

Mr. Presseault carried out the magnetics fieldwork on June 8 through June 11, 2004. He was responsible for ensuring that data were acquired and edited in a proper manner.

# Mr. Joe Mihelcic; Geophysicist:

Mr. Mihelcic processed the data received from Mr. Presseault, prepared this report and is responsible for data storage.

Base Station	GEM Systems GSM-19 Proton Precession
Field System	GEM Systems GSM-19 Overhauser
Mode	Total Field Magnetics
Station interval	12 <sup>1</sup> / <sub>2</sub> metres
Total Coverage	37.3375 km

# **Table 1 – Survey Specifications**

Line	X-Min	X-Max	Y-Min	Y-Max	# Readings	Distance (m)
L500W	-500	-500	0	900	73	900
L450W	-450	-450	0	900	73	900
L400W	-400	-400	0	900	73	900
L350W	-350	-350	0	900	73	900
L300W	-300	-300	0	900	73	900
L250W	-250	-250	0	900	73	900
L200W	-200	-200	0	900	73	900
L100W	-100	-100	800	1300	41	500
L50W	-50	-50	800	1275	39	475
L50E	50	50	800	1200	33	400
L150E	150	150	0	2000	136	2000
L250E	250	250	0	2050	142	2050
L300E	300	300	400	2800	114	2400
L350E	350	350	0	2800	226	2800
L400E	400	400	1900	2800	73	900
L450E	450	450	0	2800	226	2800
L500E	500	500	1900	2800	73	900
L550E	550	550	0	2800	226	2800
L600E	600	600	1900	2800	73	900
L650E	650	650	0	2800	226	2800
L700E	700	700	1900	2800	73	900
BL0	-500	700	0	0	92	1200
TL400N	-500	700	400	400	97	1200
TL900N	-500	700	900	900	97	1200
TL1900N	50	700	1900	1900	53	650
TL2400N	300	700	2400	2400	33	400
TL2800N	225	700	2800	2800	42	475
				Total:	2606	37337.5

 Table 2 – Survey Grid Coverage

# 8. SURVEY METHODOLOGY

## 8.1 MAGNETOMETER SURVEYS

The base station magnetometer was established in a low gradient location. Base readings were automatically recorded at 5-second intervals. The operator carried the field unit sensor at head-level. He ensured that all metallic objects that could influence the measurements were absent from the setup and his body. Readings were taken at regular intervals and referenced to grid coordinates. The location of readings taken between pickets was estimated.

## 9. DATA PROCESSING AND PRESENTATION

Magnetics data were diurnally corrected using in-house software. This software straight-line interpolates base station data to time-match field data. The interpolated base readings, along with line, station, time, uncorrected and corrected magnetics, are output as separate columns in the processed file. These data were subsequently imported to *Geosoft Oasis* software for plotting.

All plots were output to an HP Designjet 800PS 42" Colour Plotter.

## **10.** DISCUSSION OF RESULTS

A brief discussion of the magnetic survey results follows. Refer to the plan maps in Appendix B.

The main area with the largest magnetic anomalies is located in the south-central to southeastern part of the grid. Readings peak up to 1600 nT above background levels on L650E south of TL900N (refer to Plate 2). These could be due to sulphide mineralization. Several sub-zones are visible on the contour map (refer to Plate 1) and appear to trend northwest-southeast in the south side. A broad zone of highly variable magnetics can be seen along TL900N between L100W and L150E. These anomalies could be associated with the highly deformed Archean aged mafic to felsic metavolcanic rocks known to occur within the grid. The relatively flat magnetic response south of TL400S likely coincides with the Huronian aged, Coleman Group conglomerate.

Between ~TL900N and 1600N readings are relatively flat. North of stn.1600N, the magnetic response is more variable and likely indicates a different rock formation. Some of the strongest discrete magnetic high anomalies north of 1600N are at L650E/1575N, L500E/2150N, and TL2400N/stn.625E. Readings are up to 1100 nT above background at these locations, and could indicate sulphides and/or geologic variations. A strong magnetic high anomaly at L300E/stn.2725N is approximately 3800 nT above background. This could indicate the presence of magnetite/pyrrhotite mineralization.

## 11. CONCLUSIONS

The surveys were successful in defining a number of magnetic regions. Within these regions are anomalous zones and trends that could indicate favourable mineralization. These anomalies should be correlated with geologic data to determine their sources. Many of the magnetic zones appear to extend beyond the survey limits. Coverage beyond these limits is recommended where anomalies/zones prove favourable for exploration. Additional geophysical surveys, such as IP/resistivity, are recommended to further prioritize targets.

If there are any questions about the surveys, please do not hesitate to contact the undersigned.

Sincerely, ClearView Geophysics Inc.

Joe Mihelcic, P.Eng., M.B.A. Geophysicist/President



# 12. References

Ontario Geological Survey

2000: Airborne magnetic and electromagnetic surveys, Temagami area; Ontario Geological Survey, Maps 82067 & 82069, scale 1:20 000.

High Sense Geophysics Ltd 1998: Assessment Report for Cabo Mining Corp

Born, P. and Hitch, M.W.

1990: Precambrian Geology, Bay Lake Area; Ontario, Geological Survey Report 276; including map 2551, Eastern half; 1:20,000.

## Lovell, H.L., and de Grijs, J.

1978: Lorrain Township, Southern Part, Concessions I to VI, District of Timiskaming; Ontario, Geological Survey Preliminary Map, P1559; Scale 1:15,840.

Sears, S.M.

2004: Drill Hole Logs, Holes CSM-1 to CSM-6, Santa Maria Area; Gillies Limit North Twp., Cobalt Area Project, Assessment Report for Cabo Mining Corp.

Assessment Files of the Ontario Geological Survey, Larder Lake Office.

# 13. STATEMENT OF QUALIFICATIONS, JOE MIHELCIC

- I, Joe Mihelcic, Hereby certify that:
  - 1) I am a geophysicist with business office at 12 Twisted Oak Street, Brampton, Ontario L6R 1T1.
  - 2) I am a principle of ClearView Geophysics Inc., a company performing geophysical services.
  - 3) I am a graduate of Queen's University in Applied Science, Geological Engineering (B.Sc. 1988) and of Ivey Business School (M.B.A. 1995).
  - 4) I am a member of the Professional Engineers of Ontario (PEO).
  - 5) I have practiced my profession for over 15 years.
  - 6) I do not have a direct or indirect interest in Cabo Mining Enterprises Corp. securities.

Signed /

Joe Mihelcic, P.Eng., M.B.A. Brampton, Ontario July 3, 2004

**APPENDIX A – Instrument Specifications** 

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## **Key System Components**

Key components that differentiate the GSM-19 from other systems on the market include the sensor and data acquisition console. Specifications for components are provided on the right side of this page.

#### Sensor Technology

GEM's sensors represent a proprietary innovation that combines advances in electronics design and quantum magnetometer chemistry.

Electronically, the detection assembly includes dual pick-up coils connected in series opposition to suppress far-source electrical interference, such as atmospheric noise. Chemically, the sensor head houses a proprietary hydrogen-rich

## About GEM Systems, Inc. Advanced Magnetometers

GEM Systems, Inc. delivers the world's only magnetometers and gradiometers with built-in GPS for accurately-positioned ground, airborne and stationary data acquisition. The company serves customers in many fields including mineral exploration, hydrocarbon exploration, environmental and engineering, Unexploded Ordnance Detection, archeology, earthquake hazard prediction and observatory research.

Key products include the QuickTracker<sup>™</sup> Proton Precession, Overhauser and SuperSenser<sup>™</sup> Optically-Pumped Potassium instruments. Each system offers unique benefits in terms of sensitivity, sampling, and acquisition of high-quality data. These core benefits are complemented by GPS technologies that provide metre to sub-metre positioning.

With customers in more than 50 countries globally and more than 20 years of continuous technology R&D, GEM is known as the only geophysical instrument manufacturer that focuses exclusively on magnetic technology advancement.

> At GEM, "Our World is Magnetic!"



liquid solvent with free electrons (free radicals) added to increase the signal intensity under RF polarization.

From a physical perspective, the sensor is a small size, light-weight assembly that houses the Overhauser detection system and fluid. A rugged plastic housing protects the internal components during operation and transport.

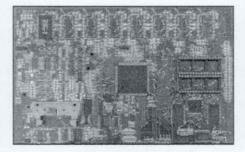
All sensor components are designed from carefully screened non-magnetic materials to assist in maximization of signal-tonoise. Heading errors are also minimized by ensuring that there are no magnetic inclusions or other defects that could result in variable readings for different orientations of the sensor.

Optional omni-directional sensors are available for operating in regions where the magnetic field is near-horizontal (i.e. equatorial regions). These sensors maximize signal strength regardless of field direction.

#### Data Acquisition Console Technology

Console technology comprises an external keypad / display interface with internal firmware for frequency counting, system control and data storage / retrieval. For operator convenience, the display provides both monochrome text as well as real-time profile data with an easyto-use interactive menu for performing all survey functions.

The firmware provides the convenience of upgrades over the Internet via the GEMLinkW software. The benefit is that instrumentation can be enhanced with the latest technology without returning the system to GEM -- resulting in both timely implementation of updates and reduced shipping / servicing costs.



GEM Systems, Inc. 52 West Beaver Creek Road, 14 Richmond Hill, ON Canada L4B 1L9 Email: info@gemsys.on.ca Web: www.gemsys.ca

### Specifications

<u>Performance</u>	
Sensitivity:	< 0.015 nT / √Hz
Resolution:	0.01 nT
Absolute Accuracy:	+/- 0.1 nT
Range:	10,000 to 120,000 nT
Gradient Tolerance:	> 10,000 nT/m
Samples at: 60+, 5	5, 3, 2, 1, 0.5, 0.2 sec
Operating Temperatu	ure: -40C to +55C

#### Operating Modes

Manual: Coordinates, time, date and reading stored automatically at minimum 3 second interval.

Base Station: Time, date and reading stored at 3 to 60 second intervals.

Remote Control: Optional remote control using RS-232 interface.

Input / Output: RS-232 or analog (optional) output using 6-pin weatherproof connector.

### Storage - 4Mbytes (# of Readings)

Nobile:	209,715
Base Station:	699,050
Gradiometer:	174,762
Valking Mag:	299,593
Dimensions	

# Console: 223 x 69 x 240 mm Sensor: 175 x 75mm diameter cylinder Weights

Console with	Belt:	2.1 kg
Sensor and S	taff Assembly:	1.0 kg

#### Standard Components

GSM-19 console, GEMLinkW software, batteries, harness, charger, sensor with cable, RS-232 cable, staff, instruction manual and shipping case.

#### Optional VLF

Resolution:

Frequency Range: Up to 3 stations between 15 to 30.0 kHz

Parameters: Vertical in-phase and out-of-phase components as % of total field. 2 components of horizontal field amplitude and total field strength in pT.

0.1% of total field

Represented By:

# **Proton Precession Theory of Operation**

In a typical proton magnetometer, current is passed through a coil wound around a sensor containing a proton rich liquid. The auxiliary DC field **B** created by the coil (>100 Gauss) polarizes the protons in the liquid which build up to a higher thermal equilibrium with the auxiliary magnetic field. The current and hence the field is abruptly terminated, allowing the polarized protons to precess around the Earth's magnetic field direction with a frequency **f**, which is strictly proportional to the applied field value:

### f = 42.5763751 MHz/T

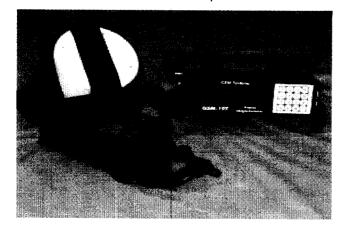
The scalar component of the Earth's field is derived from the frequency of the precession signal which decays exponentially and lasts till the protons return to steady state. The quality of the measurement can be derived from the signal amplitude and its decay characteristics and is averaged over the sampling period and recorded.

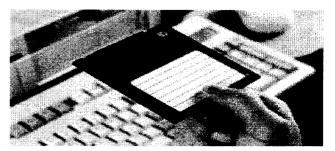
The light weight and variable cycling speed (1 reading per 3 to 60 second - 0.5 sec for walking option) and exceptionally low power consumption over a wide temperature range and low noise levels combine to make possible a superior magnetic field measuring device. An option for low field measurement is accomplished by creating a small auxiliary magnetic flux density while polarizing.

## **Optional Omnidirectional VLF**

With GEM Systems' omnidirectional VLF option, up to three transmitter stations of VLF data can be acquired without orienting the sensor. Moreover, the operator is able to record both magnetic and VLF data with a single operation on the key pad.

Frequency Range:	15 - 30.0 kHz
Parameters Measured:	Vertical in-phase & out- of-phase components as % of total field. 2 relative components of the horizontal field. The absolute amplitude of the total field.
Resolution:	0.1%
Number of Stations:	Up to 3 at a time.





Data editing, processing, compiling and interpreting software options available with GSM-19T series

## **GSM-19T Sensor Specifications**

Sensitivity:	0.2 nT/√Hz
Resolution:	0.01 nT
Absolute Accuracy:	1.0 nT
Dynamic Range:	20,000 to 100,000 nT
Gradient Tolerance:	>7,000 nT/meter
Sampling Rate:	1 reading per 3 to 60 seconds
Console:	223 x 69 x 240 mm, 2.1 kg
Sensor:	140 x 75 mm diameter cyl.
Sensor and Staff Assembly:	(1) 2.0 kg, (2) 3.0 kg
VLF Sensor:	160 x 150 x 150 mm, 1.3 kg

#### Environmental:

Storage Temperature: -70°C to 60°C. Operating Temperature: -40°C to 60°C. Humidity: 0 to 100%, splashproof console.

#### **Power Requirements:**

12 V 2.2 Ah battery will operate continuously for 45 hours on standby

#### **Power Consumption:**

12 watt-seconds per reading typical at 20 degrees C.

#### **Outputs:**

Direct readings of the Earth's magnetic field in ascii format at selectable baud rates and optional analog 200-step voltages for chart recorders.

## About GEM Systems Inc.

GEM Systems has provided its clients with quality instrumentation for magnetic measurements of the Earth's magnetic field since 1980. A commitment to high performance, small size and weight and low power consumption has been the GEM Systems' philosophy since the introduction of its first instrument.

52 West Beaver Creek Rd. #14 Richmond Hill, ON L4B 1L9 Canada Tel (905) 764 8008 Fax (905) 764 2949 http://www.GEMSys.on.ca email: info@GEMSys.on.ca



**APPENDIX B – Plates** 

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ClearView Geophysics Inc.



# Work Report Summary

Transaction No:	W0480.01084	Status:	APPROVED			
Recording Date:	2004-JUL-12	Work Done from:	2004-MAY-01			
Approval Date:	2004-JUL-13	to:	2004-JUL-03			
Client(s):						
178510	OUTCROP EXPLORA	TIONS LIMITED				
302234	SIMPSON, MURRAY	SIMPSON, MURRAY D				
302646	WAREING, SIMON K	EITH				
Survey Type(s):						
	LC	MAG				
Work Report Detail	<u>s:</u>	· · · · · · · · · · · · · · · · · · ·				
	Perform	Applied	Assign			

CI	aim#	Perform	Perform Approve	Applied	Applied Approve	Assign	Assign Approve	Reserve	Reserve Approve	Due Date
L	1098668	\$6,468	\$6,468	\$0	\$0	\$6,468	6,468	\$0	\$0	2005-APR-02
L	1135378	\$6,724	\$6,724	\$0	\$0	\$6,724	6,724	\$0	\$0	2004-DEC-02
L	1140509	\$784	\$784	\$0	\$0	\$784	784	\$0	\$0	2005-APR-02
L	1221535	\$3,913	\$3,913	\$0	\$0	\$3,913	3,913	\$0	\$0	2005-APR-05
L	1221540	\$0	\$0	\$5,600	\$5,600	\$0	0	\$0	\$0	2005-MAY-11
L	1230445	\$0	\$0	\$4,180	\$4,180	\$0	0	\$0	\$0	2004-OCT-21 E
L	1230446	\$0	\$0	\$1,709	\$1,709	\$0	0	\$0	\$0	2005-JUL-21
L	1230454	\$0	\$0	\$6,400	\$6,400	\$0	0	\$0	\$0	2005-JUL-21
		\$17,889	\$17,889	\$17,889	\$17,889	\$17,889	\$17,889	\$0	\$0	-

External Credits:	
Reserve:	

\$0 Reserve of Work Report#: W0480.01084

\$0 T

\$0

D Total Remaining

Status of claim is based on information currently on record.



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Ministry of Northern Development and Mines

Date: 2004-JUL-14

Ministère du Développement du Nord et des Mines



GEOSCIENCE ASSESSMENT OFFICE 933 RAMSEY LAKE ROAD, 6th FLOOR SUDBURY, ONTARIO P3E 6B5

OUTCROP EXPLORATIONS LIMITED 12 MARTIN DRIVE COBALT, ONTARIO P0J 1C0 CANADA Tel: (888) 415-9845 Fax:(877) 670-1555

Submission Number: 2.28057 Transaction Number(s): W0480.01084

Dear Sir or Madam

## Subject: Approval of Assessment Work

We have approved your Assessment Work Submission with the above noted Transaction Number(s). The attached Work Report Summary indicates the results of the approval.

At the discretion of the Ministry, the assessment work performed on the mining lands noted in this work report may be subject to inspection and/or investigation at any time.

If you have any question regarding this correspondence, please contact STEVEN BENETEAU by email at steve.beneteau@ndm.gov.on.ca or by phone at (705) 670-5855.

Yours Sincerely,

Rom c Gashingh.

Ron.C. Gashinski Senior Manager, Mining Lands Section

Cc: Resident Geologist

Outcrop Explorations Limited (Claim Holder)

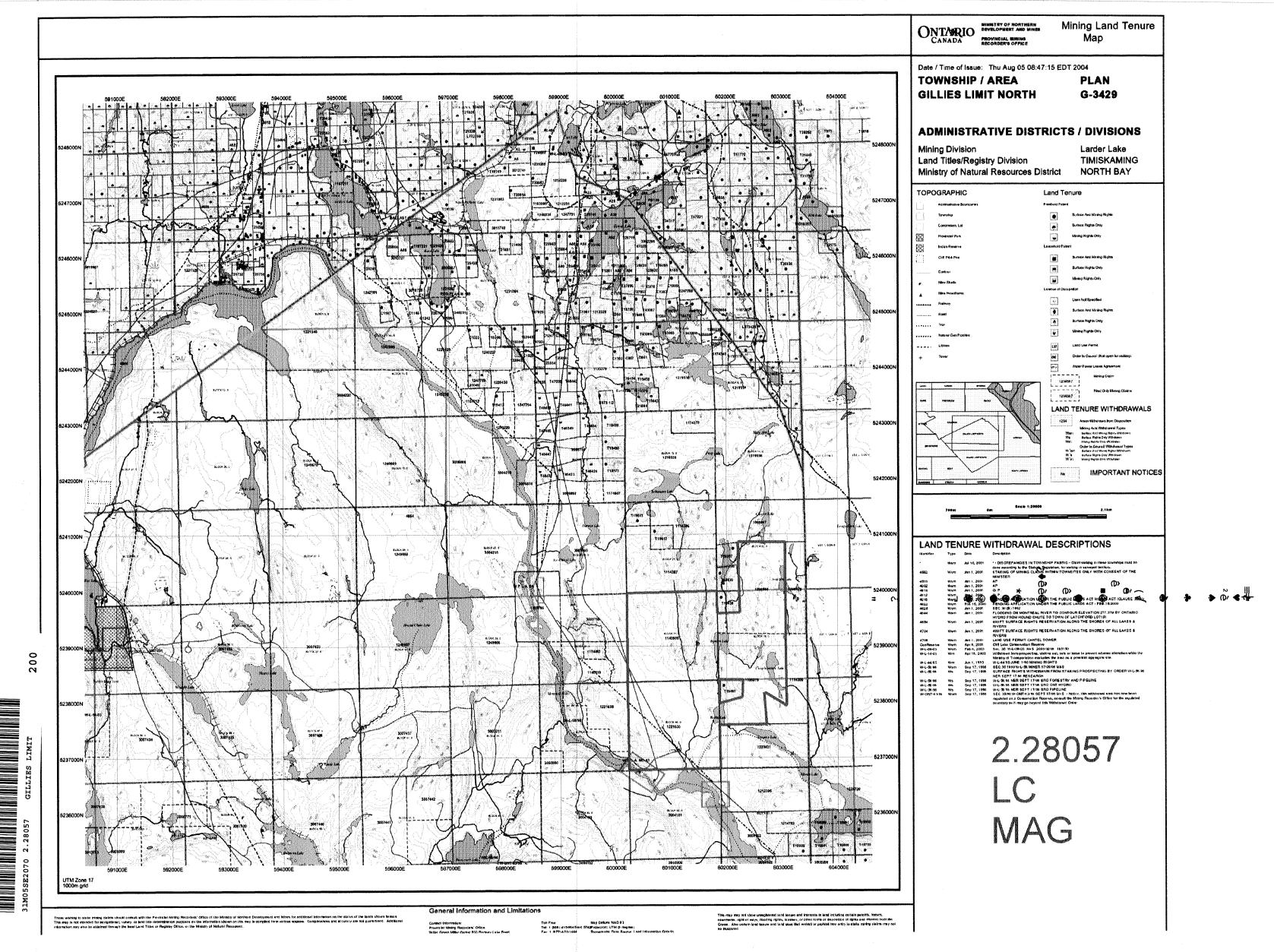
Seymour M Sears (Agent)

Simon Keith Wareing (Claim Holder)

Assessment File Library

Outcrop Explorations Limited (Assessment Office)

Murray D Simpson (Claim Holder)



LIMIT

