PREMIER LAKE RESOURCES
SAPAWE, ONTARIO

TRANSIENT ELECTROMAGNETIC BOREHOLE SURVEY
LUMBY LAKE PROPERTY
REGION OF ATIKOKAN

OCTOBER 1988

RECEIVED
APR 24 1989
MINING LANDS SECTION

SAGAX 88310

SAGAX Géophysique inc.
6700 Avenue du Parc, suite 110, Montréal, Québec, Canada H2V 4H9
Fax: (514) 271-4579  Telex: 05-826577  Téléphone: (514) 271-3150
# TABLE OF CONTENTS

1. INTRODUCTION ............................................................................... 4

2. GENERAL SURVEY DETAILS ....................................................... 4
   2.1 Localization and access
   2.2 Survey personnel

3. SURVEY WORK UNDERTAKEN ................................................. 6
   3.1 Generalities
   3.2 The downhole time-transient EM method (TEM)
   3.3 Equipment and survey procedure
   3.4 Difficulties encountered
   3.5 Presentation of survey results

4. INTERPRETATION AND RECOMMENDATIONS ......................... 10
   4.1 Drillhole PL 88-1
   4.2 Drillhole PL 88-2
   4.3 Drillhole PL 88-3
   4.4 Drillhole PL 88-4
   4.5 Drillhole PL 88-5
   4.6 Drillhole PL 88-6
   4.7 Drillhole PL 88-7

5. SUMMARY AND CONCLUSION .................................................... 15
APPENDIX

A) Crone PEM profiles (7)

PL 88-1 B1
PL 88-3 B1
PL 88-4 B1-B2-B3
PL 88-5 B1
PL 88-7 B1
1. INTRODUCTION

At the request of Geocom Consulting Inc., SAGAX Geophysics Inc. carried out a down-hole transient electromagnetic survey on the Lumby Lake property near Sapawe, Ontario. The purpose of the survey was to detect the presence of massive sulfides and to ascertain the direction and extension of these sulfides in order to trace the gold which is though to be associated with them.

Within this report, the survey technique is exposed, the geophysical results are discussed and pertinent recommendations are formulated in order to better advance exploration work over the property.

2. GENERAL SURVEY DETAILS

2.1 Localization and access

The Lumby Lake property is situated approximately thirty five (35) kilometres north of Sapawe near the Atikokan region of Ontario (figure 1). It is located north of the Ramsey Wright Township (NTS 52 G) and is accessible from Thunder Bay by highway 11 West and a secondary road (623) leading to Sapawe and to Lumby lake.

2.2 Survey personnel

The SAGAX field crew consisted of Mr. Alain Zubrzycki, geophysicist and crew chief, Mr. Hugues Potvin, field geophysicist and one field technician. Mr. Eddy Canova, project geologist for Geocom Consulting Inc. was informed on a daily basis as to the progress of the survey team in order to ensure the smoothest and most efficient undertaking of the geophysical campaign.
Figure 1: Location of Lumby Lake property
3. SURVEY WORK UNDERTAKEN

3.1 Generalities

Out of the seven (7) diamond drillholes which were meant to be logged with the borehole Pulse EM method, two (2) were blocked at surface (PL 88-2, 6). Therefore a total of five (5) diamond drillholes were logged by the SAGAX field crew.

The field work, totalling six (6) days excluding mobilization and demobilization, was executed between the 11th and the 19th of October 1988. The field crew undertook the deployment of the surface loops, as directed by Mr. Zubrzycki. Readings were taken at 10- and 5-metre intervals along the holes.

<table>
<thead>
<tr>
<th>DDH #</th>
<th>Length surveyed (ft)</th>
<th># of loops</th>
<th>Total surveyed (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PL 88-1</td>
<td>312</td>
<td>1</td>
<td>312</td>
</tr>
<tr>
<td>PL 88-3</td>
<td>492</td>
<td>1</td>
<td>492</td>
</tr>
<tr>
<td>PL 88-4</td>
<td>597</td>
<td>3</td>
<td>1 791</td>
</tr>
<tr>
<td>PL 88-5</td>
<td>529</td>
<td>1</td>
<td>529</td>
</tr>
<tr>
<td>PL 88-7</td>
<td>459</td>
<td>1</td>
<td>459</td>
</tr>
<tr>
<td>-------</td>
<td>---------------------</td>
<td>------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>5 DDH</td>
<td>2 389</td>
<td>7</td>
<td>3 583</td>
</tr>
</tbody>
</table>
3.2 The down-hole time-transient EM method (TEM)

The borehole electromagnetic technique encompasses a small family of EM methods in the time domain, which are most often identified by the manufacturer's name. The Crone Pulse EM is the most commonly known. The primary signal transmitted consists of a pulsed current in a large rectangular loop of wire which is laid out at surface. The secondary electromagnetic field is measured, using a long cylindrical coil, in the absence of the primary field, during the "off time", much like induced polarization but at higher frequencies. Using a cable and winch, the receiver coil probes the diamond drillhole measuring the axial component of the secondary magnetic field.

Practically speaking, the measurement consists of sampling the secondary field over eight (8) time slices, from $t_1$ to $t_8$, and stacking successive samples until a stable measurement is achieved. The receiver is synchronized to the transmitter via a cable, a radio antenna or a quartz crystal clock. The operator fixes the zero time at the receiver since the shape of the signal varies from site to site, depending on the Tx loop perimeter and the conductivity of the overburden.

As in all electromagnetic methods, TEM detects the presence of a conductor which permits the circulation of eddy currents (figure 2). This condition is essential if we are to measure the induced secondary magnetic field. We must therefore be in the presence of a conductor having a sufficient size which is also electrically continuous. A very good conductor is characterized by a response which is equal in amplitude over all channels, whereas a poor conductor produces a secondary field which decays quite rapidly over time, hence a response in the first channels only. Figure 3 shows various borehole TEM responses known as "in-hole", "edge" and "off-hole" anomalies.
Figure 2: Schematic showing the borehole TEM measurement in the presence of a conductor.

Figure 3: Borehole PEM/TEM type response curves.
3.3 Equipment and survey procedure

The equipment used in this survey was the 400W downhole Crone Pulse EM system. The receiver used was a Crone analogger. The probe used measured dBz/dt (serial #39, head #22). The survey consisted in laying a square transmitter loop of 330 feet on the surface (see figure 2), and lowering the probe into the hole to take measurements.

3.4 Difficulties encountered

The quality of measurements of dBz/dt was closely monitored during the course of the survey and no technical weaknesses affected the reliability of these readings.

Two (2) diamond drillholes (PL 88-2,6) were blocked within ten (10) feet of the collar. These blockages were probably due to a bad cementation of the collar to the bedrock. Apart from these blockages the acquisition of the data and the survey went smoothly.

3.5 Presentation of survey results

The results are presented in the form of stacked multi-channel profiles along an abscissa which represents the hole axis, thereby providing a distinct profile for each of the eight channels. The axial scale is 1:600. The ordinate axis is a plot of amplitude of the secondary field measured parallel to the axis of the hole. The ordinate scale is linear in the 0 to 10 range (10 units over 1.5 cm), and logarithmic in the 10 to 1 000 range (1 decade per 3.5 cm).

Profiles for each of the loops are presented here, such that, for the five (5) holes, seven (7) sets of profiles are shown. The profiles are easily identified by a header, which includes the name of the drillhole, the loop used, its position relative to the collar, technical specifications, the date, etc.

A plan view map, presented at the 1:2500 scale, is also included. It shows the projection at the surface of the geophysically logged drillholes, as well as an indication of their surveyed extent. The map also shows the surface loops as they had been spread out on the field.
4. INTERPRETATION AND RECOMMENDATIONS

As no important conductor was detected in this Pulse EM survey, the discussion which follows will rather be descriptive and will relate to field observations. As previously mentioned, out of the seven (7) holes SAGAX Geophysics Inc. was mandated to survey, two (2) were blocked at surface. Each of the remaining five (5) holes were logged with a maximum coupling loop (figure 4). Only hole PL 88-4 resulted in anomalous PEM readings; for this reason two more loops were used to log that hole (figure 5 and 6).

4.1 Drillhole PL 88-1

The hole PL 88-1 has its collar located at coordinates 12+25E, 1+25S. It was drilled due south. The drill collar has a -45 degree dip. The hole has been surveyed between 65 feet and 377 feet along its axis. A very flat profile is observed which indicates that in any direction away from the hole, there are no EM conductors present within 300 feet of the axis of the hole.

4.2 Drillhole PL 88-2

The hole PL 88-2 has its collar located at coordinates 18+00E, 4+12S. It was drilled due south. The drill collar has a -45 degree dip. The hole was blocked on surface.

4.3 Drillhole PL 88-3

The hole PL 88-3 has its collar located at coordinates 10+00E, 1+25S. It was drilled due south. The drill collar has a -45 degree dip. The hole has been surveyed between 65 feet and 557 feet along its axis. A very flat profile is observed which indicates that in any direction away from the hole, there are no EM conductors present within 300 feet of the axis of the hole.

4.4 Drillhole PL 88-4

The hole PL 88-4 has its collar located at coordinates 7+00E, 0+80S. It was drilled due south. The drill collar has a -45 degree dip. The hole has been surveyed between 65 feet and 662 feet along its axis. Three loops were used to log this hole.

The type of PEM curve obtained is an "in-hole" edge-type curve. Its large amplitude as well as the fact that each channel is responding well indicates that the causative body is a good conductor. Despite the use of multiple loops and multiple couplings the response due to the body does not vary. This leads us to believe that the body was intersected in its center and that it is spherical in shape. Its radius is probably ten (10) feet. However care must be taken in assessing a shape and dimension to this body since at least 5% of pyrrhotite has been detected in the hole and even a small quantity of pyrrhotite could cause this type of anomaly.
Figure 4: Trou PL 88-3, boucle 1.
Figure 5: Trou PL 88-4, boucles 1 et 2.
Figure 6: Trou PL 88-4, boucle 3.
4.5 Drillhole PL 88-5

The hole PL 88-5 has its collar located at coordinates 3+50E, 1+00S. It was drilled due south. The drill collar has a -50 degree dip. The hole has been surveyed between 65 feet and 594 feet along its axis. A very flat profile is observed which indicates that in any direction away from the hole, there are no EM conductors present within 300 feet of the axis of the hole.

4.6 Drillhole PL 88-6

The hole PL 88-6 has its collar located at coordinates 0+52E, 1+00S. It was drilled due south. The drill collar has a -41 degree dip. The hole was blocked on surface.

4.7 Drillhole PL 88-7

The hole PL 88-7 has its collar located at coordinates 16+00E, 1+50S. It was drilled due south. The drill collar has a -45 degree dip. The hole has been surveyed between 65 feet and 524 feet along its axis. A very flat profile is observed which indicates that in any direction away from the hole, there are no EM conductors present within 300 feet of the axis of the hole.

Although the Pulse EM survey responded to the intersected sulfides in the holes, it determined that there are no massive sulfides in periphery of the holes (600 feet in diameter along the axis of the hole). In general the survey has failed at identifying the direction of the richest zone of mineralization. For this reason we suggest that if other borehole geophysics is to be done on the property, borehole IP or variants of borehole IP should be used (such as directional survey, mise-à-la-masse etc.). Borehole IP is sensitive to both massive and disseminated sulfides and should give valuable information as to the direction and the emplacement of the richest zone of mineralization on the Lumby Lake property.
5. SUMMARY AND CONCLUSION

At the request of Geocom Consulting Inc., SAGAX Geophysics Inc. carried out a Pulse EM survey of five (5) drillholes on the Lumby Lake property. Although the technique responded to the intersected sulfides, no massive sulfides were detected in periphery of the surveyed holes. In the event that additional borehole geophysics is considered, it is recommended to carry out a borehole IP survey to investigate for non-conductive, massive to disseminated sulfides.

Respectfully submitted,

SAGAX Geophysics Inc.

Alain Zubrzycki, D.Sc.A.
Geophysicist

October 1988
BOREHOLE PULSE-EM  HOLE PL-881

PREMIER LAKE RESOURCES  LUMBY LAKE PROPERTY  ATIKOKAN REGION, ONT.

Channels 1-8  ramp time : 1.0ms
275 : 249ms  gain : 500
1x loop #1 : 100 x 100 metre

Instrumentation : CRONE PEM
Date : October 1988
Surveyed by : H. POTVIN
Interpreted by : A. ZUBRZYCKI
Horizontal scale 1 in : 50 feet

SAGAX GEOPHYSICS INC.
E PULSE-EM  
HOLE PL-883

LOOP #1

PREMIER LAKE RESOURCES
LUMBY LAKE PROPERTY
ATIKOKAN REGION, ONT.

Channels 1-8
Time base: 10ms  
Ramp time: 1.0ms
ZTS: 249ms  
Gain: 500
Tx loop #1:  
100 x 100 metre

Instrumentation: CRONE PEM
Date: October 1988
Surveyed by: H. POTVIN
Interpreted by: A. ZUBRYCH
Horizontal scale 1 in : 50 feet

SAGAX GEOPHYSICS INC.
REHOLE PULSE-EM
HOLE PL-884

LOOP #1

PREMIER LAKE RESOURCES
LUMBY LAKE PROPERTY
ATIKOKAN REGION, ONT.

Channels 1-8
- Time base: 10ms
- Ramp time: 1.0ms
- 275: 249ms
- 1x loop #1: 100 X 100 metre

Instrumentation: CRONE PEM
Date: October 1988
Surveyed by: H. POTVIN
Interpreted by: A. ZUBRYCKI
Horizontal scale: 1 in : 50 feet

SAGAX GEOPHYSICS INC.
BOREHOLE PULSE-EM
HOLE PL-884

CRONE UNITS

dB/dt (ft/ft)

Feet
PREMIER LAKE RESOURCES
LUMBY LAKE PROPERTY
ATIKOKAN REGION, ONT.

Channels 1-8
Time base: 10ms
ZTS: 249ms
Gain: 500
Tx loop #3: 122 x 100 metre

Instrumentation: CRONE PEM
Date: October 1988
Surveyed by: H. POTVIN
Interpreted by: A. ZUBRYCKI
Horizontal scale: 1 in : 50 feet

SAGAX GEOPHYSICS INC.
PREMIER LAKE RESOURCES
LUMBY LAKE PROPERTY
ATIKOKAN REGION, ONT.

Channels 1-8
Time base: 10ms
ramp time: 1.0ms
ZTS: 249ms
gain: 500

Tx loop #1:
100 X 100 metre

Instrumentation: CRONE PEM
Date: October 1988
Surveyed by: H. POTVIN
Interpreted by: A. ZUBRZYCKI
Horizontal scale: 1 in = 50 feet

SAGAX GEOPHYSICS INC.
BOREHOLE PULSE-EM

HOLE PL-885
PREMIER LAKE RESOURCES
LUMBY LAKE PROPERTY
ATIKOKAN REGION, ONT.

Channels 1-8
Time base: 10ms ramp time: 1.0ms
ZTS: 249ms gain: 500
Tx loop #1: 100 x 100 metre

Instrumentation: CRONE PEM
Date: October 1988
Surveyed by: H. POTVIN
Interpreted by: A. ZUBRZECKI
Horizontal scale: 1 in : 50 feet

SAGAX GEOPHYSICS INC.
FINAL INVOICE

Geocom Consulting
4902 St-Charles
Suite 202
Pierrefonds QC
H4H 3E3

DATE OF INVOICE : 88/12/31
PROJECT NUMBER : 88310 B
TERMS : NO days

Professional Fees
Pulse EM Survey
Premier Lake Property

Mobilization/Demobilization
5.0 days @ 1 550 $ per day

Crew in standby
0.0 day

Final Report:
15% of the survey cost (7 750 $)

RECEIVED
MAY 31 1989

MINING LANDS SECTION

3 000,00 $

7 750,00 $

0 $

1 162,50 $

11 912,50 $

10 750,00 $

1 162,50 $

TOTAL :
LESS INVOICE 2501 :
TOTAL OF THIS LAST INVOICE :

Overdue accounts are subject to 2% interest per month.

PAYÉ
JAN 8 1989
Par...........................

Total footage: 3,583 feet

Overdue accounts are subject to 2% interest per month.

= #2.16/ft.
# MINING LANDS

**Mining Act**

**Type of Surveys:**
- Geophysical
- Geological
- Geochemical
- Expenditures

**Ministry of Nonhern Development**

## Report of Work

### (Geophysical, Geological, Geochemical and Expenditures)

**Mining Lands**

**Address:**
- **Premier Lake Resources**
- **2.12394**
- **Prospector's Licence No. T 4927**
- **Norway Lake**
- **Geophysical, Geological and Geophysical Surveys**

**Name and Address of Author of Geo-Technical report:**
- **Alain ZUBRZYCKI**, 6700 Park Ave, Suite 110, Montreal, PQ

### Mining Claims Traversed (List in numerical sequence)

<table>
<thead>
<tr>
<th>Mining Claim</th>
<th>Expended Days Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>50</td>
</tr>
<tr>
<td>899479</td>
<td>30</td>
</tr>
<tr>
<td>899450</td>
<td>20</td>
</tr>
<tr>
<td>899451</td>
<td>20</td>
</tr>
<tr>
<td>899452</td>
<td>20</td>
</tr>
<tr>
<td>899453</td>
<td>50</td>
</tr>
<tr>
<td>899454</td>
<td>40</td>
</tr>
</tbody>
</table>

**Man Days**

<table>
<thead>
<tr>
<th>Mining Claim</th>
<th>Expended Days Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TR</td>
<td>20</td>
</tr>
<tr>
<td>899455</td>
<td>20</td>
</tr>
<tr>
<td>899456</td>
<td>20</td>
</tr>
<tr>
<td>899457</td>
<td>40</td>
</tr>
<tr>
<td>899458</td>
<td>40</td>
</tr>
<tr>
<td>899459</td>
<td>23</td>
</tr>
<tr>
<td>899463</td>
<td>23</td>
</tr>
<tr>
<td>899464</td>
<td>23</td>
</tr>
<tr>
<td>899465</td>
<td>23</td>
</tr>
<tr>
<td>899466</td>
<td>23</td>
</tr>
<tr>
<td>899467</td>
<td>50</td>
</tr>
<tr>
<td>899468</td>
<td>24</td>
</tr>
</tbody>
</table>

**Expenditures (excludes power stripping)**

<table>
<thead>
<tr>
<th>Days per Claim</th>
<th>Expended Days Cr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geophysical</td>
<td>20</td>
</tr>
<tr>
<td>- Electromagnetic</td>
<td></td>
</tr>
<tr>
<td>- Magnetometer</td>
<td>20</td>
</tr>
<tr>
<td>- Radiometric</td>
<td>20</td>
</tr>
<tr>
<td>- Other</td>
<td>20</td>
</tr>
<tr>
<td>Geophysical</td>
<td>40</td>
</tr>
<tr>
<td>- Electromagnetic</td>
<td></td>
</tr>
<tr>
<td>- Magnetometer</td>
<td>40</td>
</tr>
<tr>
<td>- Radiometric</td>
<td>40</td>
</tr>
<tr>
<td>- Other</td>
<td>20</td>
</tr>
<tr>
<td>Geological</td>
<td>20</td>
</tr>
<tr>
<td>- Electromagnetic</td>
<td></td>
</tr>
<tr>
<td>- Magnetometer</td>
<td>20</td>
</tr>
<tr>
<td>- Radiometric</td>
<td>20</td>
</tr>
<tr>
<td>- Other</td>
<td>20</td>
</tr>
<tr>
<td>Geochemical</td>
<td>20</td>
</tr>
<tr>
<td>- Electromagnetic</td>
<td></td>
</tr>
<tr>
<td>- Magnetometer</td>
<td>20</td>
</tr>
<tr>
<td>- Radiometric</td>
<td>20</td>
</tr>
<tr>
<td>- Other</td>
<td>20</td>
</tr>
</tbody>
</table>

**Total Expenditures**

- $7750.00 + 15 = 516

**Instructions**

Total Days Credits may be apportioned at the claim holder's choice. Enter number of days credits per claim selected in columns at right.

**Date**

**Certification Verifying Report of Work**

- **Alain ZUBRZYCKI**, 6700 Park Ave, Suite 110, Montreal, PQ

I hereby certify that I have a personal and intimate knowledge of the facts set forth in the Report of Work annexed hereto, having performed the work or witnessed same during and/or after its completion and the annexed report is true.

**For Office Use Only**

- **Mineral Record No. 516**
- **Date Recorded**: APR 17/89
- **Data Approved**: JUNE 29/89

**Signatures**

- **R. ROYAL**
- **W. HUMPHREY**

**Certified by:**

- **K. T. F.**
- **A. T. ZUBRZYCKI**

**Date Certified**: APR 14/89