Matrix GeoTechnologies Ltd.

Geophysical Survey Assessment Report

GRADIENT and DIPOLE-DIPOLE Array TDIP/RESISTIVITY SURVEYS at the Hess Property, Ontario, on behalf of CHAMPION BEAR RESOURCES LTD. Calgary, Alberta
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1. INTRODUCTION

- MGT Project No: QS-160
- Project Name: Hess Property
- Survey Type: 1) Gradient Time Domain Induced Polarization 2) Pole Dipole Time Domain Induced Polarization
- Client: Champion Bear Resources Ltd.
- Client Address 200-9 Street S.W. Calgary, Alberta, T2T 3C4
- Client Representative: Mr. Seymour Sears
  Sears, Barry and Associates Ltd.

- Objectives:
  1. Using IP\Resistivity, to map bulk conductivity and chargeability distributions in order to locate potential base-metal sulphide concentrations associated with diabase dykes for the purposes of drill targeting, and to assist in general geologic mapping of lithology, structure and alteration.
  2. The n=1-6 Dipole-dipole array was chosen based on its simplicity, cross-sectional imaging capabilities and shallow to moderate depth penetration characteristics. The gradient profiling technique was later chosen due to better signal-to-noise, improved survey economics, and superior lateral resolution and depth penetration.

- Report Type: Summary interpretation, suitable for assessment
2. GENERAL SURVEY DETAILS

2.1. LOCATION
- Township or District: Hess Property
- Province or State: Ontario
- Country: Canada
- Nearest Settlement: Sudbury, ON

2.2. ACCESS
- Base of Operations: Sudbury, On
- Mode of Access: Road and Ski-doo trail

2.3. SURVEY GRID
- Coordinate Reference System: Local exploration grid
- Line Separation: 100 meters
- Station Interval: 25 meters
- Method of Chaining: Metric, slope-chained

Figure 1: Champion Bear Properties General Location
3. **SURVEY WORK UNDERTAKEN**

### 3.1. GENERALITIES

- **Survey Dates:** Feb 6\(^{th}\) to Feb 9\(^{th}\), 2001; Feb 16\(^{th}\) to Feb 23, 2001
- **Survey Period:** 12 days
- **IP Survey Days (read time):** 12 days
- **Total km Surveyed:**
  - Gradient: 15.8 km
  - Pole Dipole: 2.7 km
- **Standby/BW Days**

### 3.2. PERSONNEL

- **Project Supervisor:** Jack MacNeil, Halifax, N.S.
- **Project Manager:** Maurice Parent, Edmundston, N.B.
- **Field Technician:** Frederick (Brent) Thomas, NFLD
- **Field Assistants:**
  - Arthur Andrews, NFLD
  - Tyson Andrews, NFLD

### 3.3. SURVEY SPECIFICATIONS

- **Array:**
  - Gradient (see Figure 2)
  - Dipole Dipole (see Figure 3)
- **AB (Tx dipole spacing):** 1.6 km Gradient
- **MN (Rx dipole spacing):**
  - 50 meters Gradient
  - 50 meters Dipole Dipole (n=1-6)
- **Sampling Interval:** 50 meters TDIP
- **Profile Spacing:** 50-100m
- **Total Gradient Blocks:** 4 Blocks
- **Number of Dipole Dipole Lines:** 6
Figure 2: Gradient Array Layout

Figure 3: Pole-Dipole Roll-Along (n=6) Array Layout
SURVEY COVERAGE

1. Reconnaissance Gradient IP: 15.8 km
2. Pole Dipole IP Detail follow up: 2.7 km
3. Total Field Magnetic:

<table>
<thead>
<tr>
<th>LINE</th>
<th>BLOCK</th>
<th>MIN. EXTENT</th>
<th>MAX. EXTENT</th>
<th>TOTAL (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hess</td>
<td></td>
<td></td>
<td></td>
<td>15,800</td>
</tr>
</tbody>
</table>

Total 15,800

Table I: Reconnaissance Gradient TDIP Survey Coverage

<table>
<thead>
<tr>
<th>LINE</th>
<th>BLOCK</th>
<th>MIN EXTENT</th>
<th>MAX EXTENT</th>
<th>TOTAL (m)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hess</td>
<td></td>
<td></td>
<td></td>
<td>2700</td>
</tr>
</tbody>
</table>

Total 2700

Table II: Dipole Dipole TDIP Survey Coverage

INSTRUMENTATION

3.1.1. TDIP Survey

- Receiver: Iris ELREC IP6 (time domain / 6 channels)
- Receiver Settings:
  - Delay time = 160 msec.
  - M1 = 140 msec. M2 = 160 msec.
  - M3 = 160 msec. M4 = 160 msec.
  - M5 = 160 msec. M6 = 160 msec.
  - M7 = 160 msec. M8 = 160 msec.
  - M9 = 160 msec. M10 = 160 msec.
- Transmitter: Phoenix IPT1
- Transmitter Settings:
  - 2 sec. On/Off Time
  - 8 sec. Total duty cycle
- Power Supply: Phoenix IP Honda Generator (400 Hz / 2.5Kw output)
3.1.2. TDIP Survey

- **Input Waveform:** 0.125 Hz square wave at 50% duty cycle (2 seconds On/Off)
- **Receiver Sampling Parameters:** IRIS Cole-Cole windows
- **Measured Parameters:**
  1) Chargeability in millivolts/Volt. 20 time slices are used for the calculation of decay curve parameters. Total Chargeability is calculated over an integration period of 20 to 1850ms (Cole – Cole windows).
  2) Primary Voltage in millivolts and Input Current in amperes for Resistivity calculation according to the gradient array geometry factor (Appendix C).

**Table III: Decay Curve Sampling Iris IP6 (Cole-Cole windows)**

**Measurement Accuracy and Repeatability**

- **Chargeability:** generally $\pm 0.5 \text{ mV/V}$ but acceptable to $\pm 1.0 \text{ mV/V}$.
- **Resistivity:** less than 5% cumulative error from Primary voltage input current measurements.

**Data Presentation**

3.1.3. Gradient Survey

- **Maps:**
  - **Plan Maps:** Posted/contoured plan maps of Total Chargeability and Apparent Resistivity, compiled for all Gradient Blocks, at 1:2500 scale.
  - **Interpretation Plan Maps:** Interpreted Gradient chargeability axes, according to strength and resistivity association, geoelectric contacts and areas of priority follow-up, compiled with dipole-dipole, at 1:2500 scale.
• **Digital:** Raw data: Iris IP-6 digital dump file (See also Appendix D).

  Processed data: Geosoft .XYZ format.

  using the following format:

  Column 1 = Station/Line position, in meters
  Column 2 = Station/Line position, in meters
  Column 3 = Total Chargeability, in mV/V
  Column 4 = Vp in millivolts
  Column 5 = Mcc in mV/V
  Column 6 = Tau in seconds

3.1.4. Dipole Dipole Survey

• **Maps:**

  Pseudosections: Posted/contoured pseudo depth section maps of combined Apparent Resistivity (interpreted) and Total Chargeability (M), for n=1-6, at 1: 2500 scale.

• **Digital:**

  Raw data: IRIS IP6 digital dump file

  Processed data: Geocsoft .XYZ format.
4. RESULTS AND INTERPRETATION

4.1. OVERVIEW

The following discussion summarizes the results of the Gradient/ Dipole-Dipole TDIP/Resistivity surveys over the Hess Grid, undertaken by Matrix GeoTechnologies Ltd. The exploration target consists of offset dyke deposit, with the mineralization occurring as disseminated to massive sulphides.

The present geophysical interpretation makes use of both the Resistivity and Time Domain Induced Polarization surveyed parameters, but puts particular emphasis on the chargeability parameter, due to its ability to detect and discern sulphide mineralization ranging from disseminate to massive concentrations. Furthermore, given its property wide coverage, the gradient array survey results are relied upon as a bulk conductivity/chargeability mapping tool – with the more limited dipole-dipole coverage used to better define and detail the cross-sectional nature of the TDIP responses at depth. Of note, regarding the differences in information provided by the dipole-dipole and gradient arrays, in contrast to the dipole-dipole array data, which are more localized in their application, the nature of the information obtained, and the depth control, the present gradient surveys map are more regional in character - owing to the broader and stationary Tx array used and the resulting single stationary field distribution for the entire survey. The large transmit dipole employed provides significant depth of investigation in the central region of the grid and the narrow receiver dipoles also offer significant lateral resolution, but are none the less subject to significant volume averaging.

Based on the array geometry chosen, gradient investigation depths approaching 250 meters were obtained - with the deepest penetration in the middle third of the array and shallower depths of investigation progressively closer to the transmit electrodes. The gradient apparent resistivity and chargeability data therefore represent a bulk average, from surface to depth, when observed in plan view – this also contrast the dipole-dipole results, which are best considered in cross-sectional representation format. Furthermore, the gradient array anomaly patterns are essentially subvertical (i.e. without complex, asymmetric pant-leg shapes, as in dpdp), and can be visualized in plan in the same manner as magnetic data. However, in the presence of moderate to shallow dips, the gradient array anomalies tend to be shifted down-dip relative to shallower arrays, such as dipole-dipole – greater discrepancies can also occur with dipole-dipole, owing to the asymmetric array geometry, which tends to bias anomalies towards the infinity pole.

The geophysical interpretation plan presents the interpreted anomaly axes, highlighting the strength and resistivity association of the IP axes to their source/alteration type:

a) **High resistivity** IP axes, related to either disseminated sulphides or magnetite possibly associated with quartz-carbonate alteration or, alternatively, more felsic/less porous geology and/or bedrock/overburden topographic effects;

b) **Nil (flat) resistivity and contact-type** IP axes likely correspond to possibly more weakly-altered and/or thin/buried sulphide zones and/or mineralization along geologic contacts, or magnetite/hematite; and

c) **Low (conductive) resistivity** IP axes representing the key target signature relating to possible massive to stringer sulphides or, alternatively, faulted or clay-altered disseminated sulphides ± magnetite/hematite.

Clearly, while all anomaly types (high \( \rho \) / low \( \rho \) / nil \( \rho \)), could potentially represent equally valid exploration targets, the high resistivity/high chargeability association best represents the key geophysical target signature, based on the geologic model.
The chargeability axes identified on the anomaly axis map have been: a) categorized according to their strength (weak, moderate, strong, very strong) using symbols, and b) classified according to their resistivity association (high $\rho$, nil $\rho$/contact-type, low $\rho$) using colored axes. The line-to-line correlation of anomalies into axes is based primarily on the resistivity association (i.e. resistive and conductive anomalies never aligned along the same axis due to likely dissimilar mineralogy/alteration/origin) – thereby providing some measure of geologic/geophysical control to the interpretation. Note that, due to the relative insensitivity of Gradient to depth of burial, target depths have not been determined for the anomalies of interest.

In order to better highlight the close relationship between the IP (sulphide ± magnetite) and Resistivity (lithology, structure, alteration), the areas of geophysical interest have been identified on the interpretation plan, using variable cross-hatching styles: a) contrasting zones of resistivity, highlighting potential geological contacts, alteration zones and fault-fracture structure, b) zones of high chargeability, outlining potential regions of increased sulphide mineralization. In addition, fault structures have also been interpreted based on evidence from the TDIP results, generally represented by lower resistivity and lower chargeability.

**HESS GRID**

**GRADIENT TDIP SURVEY RESULTS**

The following represent the geophysical interpretation of the gradient survey over the Hess Grid, making use of Resistivity and TDIP surveyed parameters, particularly emphasis on the chargeability parameter, due to its ability to detect and discern sulphide mineralization ranging from disseminate to massive concentrations. Furthermore, given its property wide coverage, the gradient array survey results are relied upon as a bulk conductivity/chargeability mapping tool.

The total chargeability and apparent resistivity show that the Hess Grid is characterized by moderate to strong IP responses, ranging from 10 mV/V to 14 mV/V. This is associated with high/nil resistivity, which form NE-SW bands following – suggesting possible disseminated to semi-massive sulphides. Hence, in addition to more favorable, in terms of strength of chargeability the nil/high resistivity association of the highest priority targets also best fit the geologic target model, likely representing the mineralization along an offset dyke and/or contact deposit type. On the other hand, low resistivity/strong to moderate IP responses are observed, suggesting possible presence of massive mineralization in the property, implying the property is characterized by two type of geophysical targets.

More moderate chargeabilities associated with similar resistivity either indicate more deeply buried mineralization or weaker sulphide/magnetite content.

The gradient chargeability responses at Hess Grid are characterized by the broad range in strength, varying between weak to very strong (1.0 to 19.4 mV/V) but generally falling in the weak category (avg. 6.0 mV/V) – consistent with non-polarizable geological units and/or moderate overburden cover. The total chargeability shows a well-defined chargeability contact in the north, associated with resistivity contact, likely defining the geological contact between more polarizable units to the north, consistent to intrusives and less polarizable metasediments. The strong measured chargeabilities observed in the central part of the grid are consistent to massive sulphides, when conductive, otherwise important concentration of disseminated sulphides and/or magnetite (when magnetic), particularly when high resistivity. The most important IP axes are generally strike extensive (>200 m), displaying generally strong responses, either reflecting high in concentration or shallow depth of burial along the strike. In addition to, the high IP features display wide, oval shape, occurring along high/low resistivity contacts, suggesting contact deposit types, likely with semi-massive to massive mineralization in the center rimmed by disseminated sulphides.

QS160-February, 2001
The apparent resistivities display a wide range, varying between 195 ohm-m to 77.5 k ohm-m (avg. 19.6k Ω-m), indicative of a mixed low porosity bedrock at depth – with the average consistent with outcropped or shallow buried volcanics. Generally, the apparent resistivity plan map shows a more complicated distribution of the geological units, with higher resistivity units in the north and grid center, likely representing intrusives or metavolcanics. The very high resistivity values possibly reflect the outcropping and/or shallow occurrence. The conductive units likely represent metasediments and/or deep overburden, following the same trends as weak chargeability geology. As previously mentioned, the high/low resistivity contact observed in the north, approximately following the TL2+00S, likely represents the geological contact between volcanics and the more porous metasedimentary units.

Nearly all the strong anomalies present good geophysical targets, especially those exhibiting conductive and nil/contact type resistivity association represent the primary geophysical target – the list presented in Table VII is designed to help direct follow-up and possibly also DDH-testing into the best portion of the major axes.

<table>
<thead>
<tr>
<th>LINE</th>
<th>STATION</th>
<th>STRENGTH</th>
<th>RES. ASSOC.</th>
<th>PRIORITY</th>
<th>DEPTH</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>L700E</td>
<td>4+75S</td>
<td>Strong</td>
<td>Low</td>
<td>1.5</td>
<td>--</td>
<td>Prominent low resistivity signature associated with strong IP. Not strike extensive axis. Likely dipping to south. Geophysical follow-up recommended.</td>
</tr>
<tr>
<td>L600E</td>
<td>5+75S</td>
<td>Strong</td>
<td>High</td>
<td>1.5</td>
<td>--</td>
<td>Strong IP response centered on high resistivity axis. Strike extensive axis (more than 400m). Likely representing mineralization along offset dyke. Geophysical follow-up recommended.</td>
</tr>
<tr>
<td>L300E</td>
<td>6+25S</td>
<td>Strong</td>
<td>Nil/Contact</td>
<td>1.5</td>
<td>--</td>
<td>Prominent strong IP response centered on high resistivity axis. Located in the same IP axis with the target at L600E, st.5+75S. Likely representing contact type of mineralization. Geophysical follow-up recommended.</td>
</tr>
<tr>
<td>L200E</td>
<td>3+75S</td>
<td>Moderate</td>
<td>High</td>
<td>2</td>
<td>--</td>
<td>Moderate IP signature associated with high/contact resistivity. Wide, oval shape anomaly, likely still open to west, and interpreted as contact type of mineralization. Geophysical follow-up recommended.</td>
</tr>
<tr>
<td></td>
<td>5+25S</td>
<td>Moderate</td>
<td>Nil</td>
<td>2</td>
<td></td>
<td>Moderate IP signature associated with high/contact resistivity. Likely still open to west, and interpreted as contact type of mineralization. Geophysical follow-up recommended.</td>
</tr>
</tbody>
</table>

Table VII : Recommended IP Targets for Follow up at Hess Grid
Hess Grid

The Hess Grid exhibits moderate to strong IP anomalies in plan, dominant high/nil/contact resistivity association, suggest the possibility of disseminated mineralization. In addition, low resistivity/strong chargeability present in the grid likely are related with heavily disseminated to massive. The geophysical axes of significance predominate the central part of the survey area. The gradient data shows a NE-SE band of high resistivity/weak to moderate chargeability likely representing disseminated volcanics or deeper zones of interest.

In response to the survey objectives, three (3) high priority targets have been identified in the central part of the grid area, which are of significant strength to warrant geophysical follow-up prior DDH-drilling program. For the most part, these also feature high bulk resistivities, consistent with disseminated sulphide mineralization. As many as two (2) lower priority targets are also defined, which either feature weaker chargeability - ground geophysical follow-up is strongly recommended prior DDH-drilling program.

We recommend the interpreted anomalous chargeability zones delineated by the combination of gradient and dipole-dipole surveys, represented as Quantitative Sections, to be examined by drill-testing. Also, ground magnetic survey can provide useful information regarding the geological structures and the delineation of offset dyke in the property.

Further evaluation of the geophysical results in combination with existing geoscientific data is also recommended. Drill testing the interpreted geophysical targets described above has been recommended according to target specifications defined based primarily on the combined interpretation of gradient and dipole-dipole cross-sectional coverage, finalized in Quantitative Sections.

The chargeability axes display a variety of strengths and resistivity associations, such that, based on the gradient survey alone, all the most significant anomalies represent equally good targets, particularly the conductors – possibly differing only in their type-alteration. Particular attention should be given to the probable type of mineralization and alteration indicated by the resistivity association (i.e. high $p$ = silicic, nil $p$ = weak silicic/argillic, low $p$ = argillic or stringer-to-massive). Additional comparisons against recommended ground magnetics could provide insight on the source mineralogy of many IP targets, i.e. magnetic = probable pyrrhotite or magnetite iron formation. The continued use of combined geophysical techniques, such as magnetics and TDIP, should prove useful in fully determining physical property distributions and mineral composition throughout the property.

Clearly, we recommend that the ground surveys be extended, as the strongest IP anomalies remain open, and additional geophysical follow-up are strongly recommended in the grids with gradient survey coverage only, in order to obtain information regarding the depth extension of the geological structures and/or mineralization. Also, as previously mentioned additional ground magnetics survey is recommended helping to define the non-magnetic targets and/or structural geology.

RESPECTFULLY SUBMITTED

[Signatures]  
Senck Kallfa  
Senior Geophysicist  

Ludvig Kapllani, Ph.D.  
Senior Geophysicist
THEORETICAL BASIS AND SURVEY PROCEDURES

GRADIENT INDUCED POLARIZATION SURVEY

The Gradient Array measurements are unique in that they best represent a bulk average of the surrounding physical properties within a relatively focused sphere of influence, roughly equal to the width of the receiver dipole, penetrating vertically downward from surface to great depths. These depth of penetration and lateral resolution characteristics are typically presented in plan.

The resistivity is among the most variable of all geophysical parameters, with a range exceeding 10^5. Because most minerals are fundamentally insulators, with the exception of massive accumulations of metallic and submetallic ores (electronic conductors) which are rare occurrences, the resistivity of rocks depends primarily on their porosity, permeability and particularly the salinity of fluids contained (ionic conductors), according to Archie's Law. In contrast, the chargeability responds to the presence of polarizable minerals (metals, submetallic sulphides and oxides, and graphite), in amounts as minute as parts per hundred. The quantity of individual chargeable grains present, and their distribution with in subsurface current paths are significant in controlling the level of response. The relationship of chargeability to metallic content is straightforward, and the influence of mineral distribution can be understood in geologic terms by considering two similar, hypothetical volumes of rock in which fractures constitute the primary current flow paths. In one, sulphides occur predominantly along fracture surfaces. In the second, the same volume percent of sulphides are disseminated throughout the rock. The second example will, in general, have significantly lower intrinsic chargeability.

Figure B1: Gradient array configuration
Using the diagram in Figure B1 for the gradient array electrode configuration and nomenclature, the gradient array apparent resistivity is calculated:

where:
- the origin O is selected at the center of AB
- the geometric parameters are in addition to $a = AB/2$ and $b = MN/2$
- $X$ is the abscissa of the mid-point of MN (positive or negative)
- $Y$ is the ordinate of the mid-point of MN (positive or negative)

**Gradient Array Apparent Resistivity:**

$$\rho_a = K \frac{V_p}{I} \text{ ohm-metres}$$

where:

$$K = \frac{2\pi}{(AM^{-1} - AN^{-1} - BM^{-1} + BN^{-1})}$$

$$AM = \sqrt{(a + x - b)^2 + y^2}$$

$$AN = \sqrt{(a + x + b)^2 + y^2}$$

$$BM = \sqrt{(x - b - a)^2 + y^2}$$

$$BN = \sqrt{(x + b - a)^2 + y^2}$$

Using the diagram in Figure B2 for the Total Chargeability:

![Diagram](image)

**Figure B2:** The measurement of the time-domain IP effect

---

the total apparent chargeability is given by:

\[ M_T = \frac{1}{t_p V_p} \sum_{i=1}^{10} \int_{t_i}^{t_{i+1}} V_s(t) \, dt \text{ millivolts per volt} \]

where \( t_i \) and \( t_{i+1} \) are the beginning and ending times for each of the chargeability slices.

More detailed descriptions on the theory and application of the IP/Resistivity method can be found in the following reference papers:


DIPOLE DIPOLE

The collected data sets are reduced, using IP10 receiver, to apparent resistivity and total chargeability as explained in the following figures and equations:

Using the following diagram (Fig. B3) for the electrode configuration and nomenclature: \(^4\)

![Figure B3: Pole-Dipole Electrode Array](image)
the apparent resistivity is given by:

$$\rho a = 2\pi n (n + 1) a \times \frac{VP}{I} \text{ ohm - metres}$$

where:
- "a" is the MN dipole spacing (metres)
- "n" is the separation parameter between C1 and P1P2
- "VP" is the primary voltage measured between P1P2 (volts)
- "I" is the output current between C1C2 (amperes)

Using the following diagram (Figure B4) for the Total Chargeability:

![Figure B4: Measurement of the IP Effect in the Time-Domain](image)

the total chargeability: is given by:

$$M_{Total} = \frac{1}{VP} \sum_{i=1}^{i+1} V_{s}(t) dt \text{ millivolt - seconds per volt}$$

where $t_i$ to $t_{i+1}$ are the beginning and ending times for each of the chargeability slices.

The sets are then ready for plotting, profiling using the Geosoft Sushi program. The Apparent Resistivity and total Chargeability results of the Dipole-Dipole surveys are presented in pseudo section format. All resistivities are in $\Omega$-metres and chargeabilities in mV/V.

---

5. From Terraplus/BRGM, IP-6 Operating Manual, Toronto, 1987
I, Ludvig Kapllani, declare that:

1. I am a consulting geophysicist with residence in Toronto, Ontario and am presently working in this capacity with Matrix GeoTechnologies Ltd. of Toronto, Ontario.

2. I obtained a Bachelor's of Science Degree, (B.Sc.), Geophysics, in spring 1976, a Masters of Science Degree, (M.Sc.), Geophysics, in June 1986, and a Ph.D in January 1995, Geophysics, from Polytechnic University of Tirana, Albania.

3. I have practiced my profession continuously since May 1976, in North America and Europe.

4. I have no interest, nor do I expect to receive any interest in the properties or securities of Champion Bear Resources Ltd.

5. I am the author of this report and the statements contained represent my professional opinion based on my consideration of the information available to me at the time of writing this report.

Toronto, Ontario
March, 2001

Ludvig Kapllani, Ph.D.
Senior Geophysicist
Matrix GeoTechnologies Ltd.
STATEMENT OF QUALIFICATIONS:

I, Genc Kallfa, declare that:

1. I am a consulting geophysicist with residence in Toronto, Ontario and am presently working in this capacity with Matrix GeoTechnologies Ltd. of Toronto, Ontario.

2. I obtained a Bachelor's of Science Degree, (B.Sc.), Geophysics, from the Polytechnic University, in Tirana, Albania, in spring 1987.

3. I have practiced my profession continuously since May 1987, in North America and Europe.

4. I have no interest, nor do I expect to receive any interest in the properties or securities of Champion Bear Resources Ltd.

5. I am the author of this report and the statements contained represent my professional opinion based on my consideration of the information available to me at the time of writing this report.

Toronto, Ontario
March, 2001

Genc Kallfa, B.Sc.
Senior Geophysicist
Matrix GeoTechnologies Ltd.
APPENDIX B

INSTRUMENT SPECIFICATIONS

IRIS ELREC 6 Receiver
(from IRIS Instruments IP 6 Operating Manual)

Weather proof case

Dimensions: 31 cm x 21 cm x 21 cm
Weight: 6 kg with dry cells
7.8 kg with rechargeable bat.
Operating temperature: -20°C to 70°C
(-40°C to 70°C with optional screen heater)
Storage: (-40°C to 70°C)
Power supply: 6 x 1.5 V dry cells (100 hr. @ 20°C) or
2 x 6 V NiCad rechargeable (in series) (50hrs @ 20°C) or 1 x 12 V external
Input channels: 6
Input impedance: 10 Mohm
Input overvoltage protection: up to 1000 volts
Input voltage range: 10 V maximum on each dipole
15 V maximum sum over ch 2 to 6
DC compensation: automatic ± 10 V with linear drift correction
up to 1 mV/s
Noise rejection: 50 to 60 Hz powerline rejection
100 dB common mode rejection (for Rs=0)
automatic stacking
Primary voltage resolution:
accuracy: 1 μV after stacking
0.3% typically; maximum 1 over whole
Secondary voltage windows:
temperature range
up to 10 windows; 3 preset window specs.
plus fully programmable sampling.
Sampling rate:
10 ms
Synchronization accuracy:
10 ms, minimum 40 μV
Chargeability resolution:
accuracy: 0.1 mV/V
typically 0.6%. maximum 2% of reading ± 1 mV/V for
V_p > 10 mV
Battery test:
manual and automatic before each measurement
Grounding resistance:
0.1 to 467 kohm
Memory capacity:
2505 records, 1 dipole/record

Day-21: **Operating: Bear Tag Property Gradient Array**

Read 2500 meters. Read L-600W from BL-0+00 to 1000S; L-700W from 25 N to 975S; L-800W from BL-0+00 to 500S.


Day-22: **Operating: Bear Tag Property Gradient Array**

Read 2050 meters. Read L-800W from 500S to 1000S; L-900W from BL-0+00 to 1000S; L-1000W from BL-0+00 to 550S.

Monday, February 5, 2001

Day-23: **Operating: Bear Tag Property Gradient Array**

We went to pick up the equipment and the infinite wires and rods. We went to the Hess property to try and get to L-500E on the lake but there is too much slush on the lake. It took 21/2 hours to get the snowmobiles back to the truck. We put a hole in the ice to check how thick it was and there seemed to be only 5 inches. We returned to the motel and called Seymore.

Tuesday, February 6, 2001.

Day-24: **Operating: Hess Property Gradient Array**

Gradient. Read 2000 meters. Read L-400E from BL-0 to 1000S; L-500E from BL-0 to 1000S. We were lucky to find a trail that brought us to 1175S on L-500E. After setting up the infinite (500n to 1175s) on L-500E we started reading.


Day-25: **Operating: Hess Property Gradient Array**

Gradient. Read 3400 meters. Read L-300E from BL-0 to 1000S; L-600E from BL-0 to 1000S; L-700E from BL-0 to 700S; L-800E from BL-0 to 700S.

Thursday, February 8, 2001.

Day-26: **0.5 Operating: Hess Property Gradient Array**

Gradient. Read 1000 meters. Read L-200E from BL-0 to 1000S. The line cutters had to finish cutting L-200E. we read the line then picked up the infinite wire and rods. We started the dipole-dipole on L-500E.

End of Hess Block # A

*Logistics Report*
Thursday, February 8, 2001.
Day-26: **0.5 Operating:** Hess Property Dipole-Dipole
Read 600 meters. Read L-500E, from 1100S to 500S. We had done gradient also.

Friday, February 9, 2001.
Day-27: **0.5 Operating:** Hess Property Dipole-Dipole
Read 500 meters. Read L-500E from 500S to BL-0.
**0.5 Bad Weather:** We finished the dipole-dipole survey on block # A and then packed the equipment and drove back to Windy Lake Motel. We had freezing rain and it rained hard starting at 11:00 am.
Operator Journal:

Project # 0049-3 - February 16 to 23, 2001

Friday, February 16, 2001
Day-1: 0.5 Operating: Hess property Gradient array
( Finished the project with the other client this morning.) Then we returned to the Hess property to lay the infinite wire on L-1000E from 500N to 1200S. Block-B.

Saturday, February 17, 2001.
Day-2: Operating: Hess property Gradient array
Read 2800 meters. Read L-800E from BL-0 to 700S, L-900E from BL-0 to 700S, L-1000E from BL-0 to 700S, L-1100E from BL-0 to 700S. We were delayed a bit because we had to repair a broken wire on the power board of the generator. Everything is working fine now.

Day-3: Operating: Hess property Gradient array
Read 3100 meters. Read L-1200E from BL-0 to 700S, L-1300E from BL-0 to 700S. End of Block-B. We laid the infinite on L-1500E from 450N to 1200S for Block-C and read L-1300E from BL-0 to 700S, L-1400E from BL-0 to 500S, and L-1500E from BL-0 to 500S.

Monday, February 19, 2001
Day-4: Operating: Hess property Gradient array
Read 2550 meters. Read L-1600E from 25S to 525S, L-1700E from BL-0 to 500S, and L-1800E from BL-0 to 500S. We set the Block-D infinite on L-2000E from 500N to 1150S and read L-1800E from BL-0 to 500S, L-1900E from BL-0 to 550S.

Tuesday, February 20, 2001
Day-5: Operating: Hess property dipole-Dipole
Read 1700 meters. Read L-300E from BL-0 to 1000S, L-700E from BL-0 to 700S.
Wednesday, February 21, 2001

Day-6: **Operating**: Hess property Dipole-Dipole
Read 1000 meters. Read L-500E from BL-0 to 1000S.

**0.5 Operating**: Hess property Gradient array
Read 1300 meters. Read L-2000E from BL-0 to 600S and L-2100E from BL-0 to 700S on Block-D.

Thursday, February 22, 2001

Day-7: **Operating**: Hess property Gradient array
Read 3200 meters. Block-D. Read L-2200E from BL-0 to 750S, L-2300E from BL-0 to 800S. Block-E, read L-2300E from BL-0 to 800S; L-2400E from BL-0 to 850S. Infinite on L-2500E from 500N to 1150S.

Friday, February 23, 2001

Day-8: **Operating**: Hess property Gradient array
BlockE. Read 2850 meters. Read L-2500E from BL-0 to 900S, L-2600E from BL-0 to 950S, L-2700E from BL-0 to 1000S. We picked up the infinite and equipment and returned to the hotel.

END OF HESS PROPERTY.
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<th>Line #</th>
<th>From</th>
<th>To</th>
<th>Distance (m)</th>
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CHAMPION BEAR RES.
Hess Grid
Line 1300 E
Block C  AB=1650 metres
MN= 50m Read interval= 50m
Equipment: ELREC IP-6,
PHOENIX IPT-1 and HONDA MG-2
IP Gradient Survey

Scale 1:15000 Date: 01/02/16
NTS Ref: BL-Az: TN
EASTERN GEOPHYSICS

CHAMPION BEAR RES.
Hess Grid
Line 1400 E
Block C  AB=1500 metres
MN= 50m Read interval= 50m
Equipment: ELREC IP-6,
PHOENIX IPT-1 and HONDA MG-2
IP Gradient Survey

Scale 1:15000 Date: 01/02/16
NTS Ref: BL-Az: TN
EASTERN GEOPHYSICS

CHAMPION BEAR RES.
Hess Grid
Line 1500 E
Block C  AB=1850 metres
MN= 50m Read interval= 50m
Equipment: ELREC IP-6,
PHOENIX IPT-1 and HONDA MG-2
IP Gradient Survey

Scale 1:15000 Date: 01/02/16
NTS Ref: BL-Az: TN
EASTERN GEOPHYSICS
Resistivity (ohm-m)

Chargeability (mV/V)

Resistivity (ohm-m)

Filter

Filter

Chargeability (mV/V)

Filter

Filter

Topography

Logarithmic

Contours 1, 1.5, 2, 3, 5, 7.5, 10...

EQUIPMENT SPECIFICATIONS

Receiver: ELREC IP-6
Settings: Delay Time 160 mSec.
M1 = 140 mSec. M2 = 160 mSec.
M3 = 160 mSec. M4 = 160 mSec.
M5 = 160 mSec. M6 = 160 mSec.
M7 = 160 mSec. M8 = 180 mSec.
M9 = 160 mSec. M10 = 160 mSec.

Transmitter: Phoenix IP-1 3 kW
Settings: 2 Sec. on/off Time
8 Sec. Total Duty Cycle

Generator: Phoenix MG-2 2.5 kVA

Transmitter: Phoenix IP-1 3kW
Settings: 2 sec. on/off time
8 sec. Total duty cycle

Generator: Phoenix MG-2 2.5 kVA

Scale: 1:5000

50 0 50 100 150 200 250 300
(meters)

CHAMPION BEAR RESOURCES

INDUCED POLARIZATION SURVEY

Hess Grid
Cartier, Ontario

Date: 01/02/21
Operator: M. Parent
NTS ref:
Baseline Azimuth:
Prepared by: B. d'Eon

Eastern Geophysics Limited
Resistivity (ohm-m) and Chargeability (mV/V) data are presented in the form of contour plots and tables.

The Resistivity contour plots show variations in resistivity across the surveyed area, with different filter settings (n=1, n=2, n=3, n=4, n=5, n=6).

The Chargeability contour plots display similar variations but with a different scale.

Some key specifications for the equipment used:

- **Receiver:** ELREC IP-6
  - **Settings:** Delay Time 160 mSec.
  - **Filters:** n=1, n=2, n=3, n=4, n=5, n=6

- **Transmitter:** Phoenix PT-1 3 kW
  - **Settings:** 2 Sec. on/off Time
  - **Duty Cycle:** 8 Sec.

- **Generator:** Phoenix MG-2 2.5 kVA

**Logarithmic Contours:**
- 1.0, 1.5, 2.0, 3.0, 5.0, 7.5, 10...

**Topography:**
- Plot point a = 50 m

**Scale:** 1:5000

**INDUCED POLARIZATION SURVEY**
- Hess Grid
- Cartier, Ontario

**Date:** 01/02/22
- **Operator:** M. Parent
- **Prepared by:** B. d'Eon

**CHAMPION BEAR RESOURCES**
- **INDUCED POLARIZATION SURVEY**
- **Hess Grid**
- **Cartier, Ontario**
- **Date:** 01/02/22
- **Operator:** M. Parent
- **Prepared by:** B. d'Eon

**Eastern Geophysics Limited**
Line 700 E

**Dipole-Dipole Array**

- Filter:
  - a
  - b
  - c

- Plot point: o = 50 m

**Logarithmic Contours**
1, 1.5, 2, 3, 5, 7.5, 10...

**EQUIPMENT SPECIFICATIONS**

- **Receiver:** ELREC IP-6
  - Settings: Delay Time 160 mSec.
    - M1 = 140 mSec.
    - M2 = 160 mSec.
    - M3 = 180 mSec.
    - M4 = 160 mSec.
    - M5 = 160 mSec.
    - M6 = 160 mSec.
    - M7 = 160 mSec.
    - M8 = 160 mSec.
    - M9 = 160 mSec.
    - M10 = 160 mSec.

- **Transmitter:** Phoenix IPT-1 3 kW
  - Settings: 2 Sec. on/off Time
  - 8 Sec. Total Duty Cycle

- **Generator:** Phoenix MG-2 2.5 kW

**Scale:** 1:5000

**CHAMPION BEAR RESOURCES**

**INDUCED POLARIZATION SURVEY**

- Hess Grid
- Cartier, Ontario

**Date:** 01/02/22
**Operator:** M. Parent
**NTS ref:** Baseline Azimuth:
**Prepared by:** B. d'Eon

**Eastern Geophysics Limited**
### Work Report Summary

- **Transaction No:** W0170.30695  
- **Status:** APPROVED
- **Recording Date:** 2001-SEP-12  
- **Work Done from:** 2001-FEB-01  
- **Approval Date:** 2001-DEC-05  
- **to:** 2001-SEP-12

**Client(s):**  
116945  
CHAMPION BEAR RESOURCES LTD.

**Survey Type(s):**  
IP

#### Work Report Details:

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|         | $25,620 | $16,000        | $16,000 | $16,000       | $9,620 | $9,620         |

- **Status of claim is based on information currently on record.**
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.

Assessment work credit has been redistributed, as outlined on the attached Work Report Summary to better reflect the location of the work.

If you have any question regarding this correspondence, please contact LUCILLE JEROME by email at lucille.jerome@ndm.gov.on.ca or by phone at (705) 670-5858.

Yours Sincerely,

Ron Gashinski
Supervisor, Geoscience Assessment Office

Cc: Resident Geologist

Champion Bear Resources Ltd.
(Claim Holder)
Seymour M Sears
(Agent)

Assessment File Library

Champion Bear Resources Ltd.
(Assessment Office)
Gradient Array

APPARENT RESISTIVITY (ohm-metres)

Champion Bear Resources Ltd.
Hess Mining
Ermitinga Twp., ON

Time Domain IP Survey
Gradient Array
Apparent Resistivity
400-1600 meters

Transmitter Frequency
0.003 Hz (100% duty cycle)
Transmitter Current
1.0 Amps
Decoy Curve
Semilogarithmic
Decoy Current
10 Gates
Station Interval
50 metres
Resistivity Contour Interval
50 ohm-metre
Colour Scale
Equal area zoning

Survey Date
Jan. - Feb. 2001
Instrumentation
Rx = IRIS IP-6 (6 channels)
Tx = Phoenix IPT-1 + Hondo 1.5

Surveyed
Processed by
MATRIX GEOTECHNOLOGIES LTD.

Scale 1:5000

4111185298 E. D. ASPEY 42048 HESS 210
TOTAL CHARGEABILITY (mV/V)

Gradient Array

AB = 1600 metres

Transmitter Frequency: 0.0625 Hz (50% duty cycle)
Transmitter Current: 1.0 A
Decoy Curve: Semilogarithmic Windows
Station Interval: 50 metres
Chargeability Contour Interval: 0.5, 2.5 mV/V
Colour Scale: Equal Area Zoning

Survey Date: Jan. - Feb. 2001
Instrumentation:
Rx = IRI IP-6 (6 channels)
Tx = Phoenix IPT-1 * Hondo 1.5

Surveyed & Processed by:
MATRIX GEOTECHNOLOGIES LTD.