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#### METALLICA MINERALS TEM SURVEY RESULTS AND PROPOSED DRILL TARGETS FOR THE PROSPECT PROJECT.

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August 2006

Submitted to : Patrick Smith Exploration Manager Metallica Minerals Ltd Brisbane, QLD.

Report RG-MM03

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#### 1. Introduction

Ground time-domain electromagnetics (TEM) surveys were completed at the Prospect Project in August 2006 over previously defined airborne electromagnetics (AEM) anomalies.

This report outlines the specifications and results of those surveys and includes modelling of two targets for drill testing.

#### 2. TEM Survey Results & Target Modelling

A total of five lines of TEM were completed over three areas at Prospect. Complete survey specifications including coverage details are in the Appendix, and the digital data is included on a data CD supplied with this report.

Also provided on the data CD are PDF and JPG plot files which show the TEM data in profile form, and also a conductivity-depth image (CDI) of the data. The CDI is a transformation of each TEM channel to a conductivity and depth, and creates a conductivity pseudo-section that allows for a fast initial interpretation of the data. The CDI's were created using the Emax software package (Fullagar, 2005).

#### 2.1. Warrior

Two lines of ground TEM were completed over the Warrior AEM target in the north of the Prospect survey area. As little is known about the geological strike in this area, plus the occurrence of AEM anomalies on both EW flight lines and the NS tie line, one line of TEM was oriented NS (Line 1) and the other was oriented EW (Line 2).

The Line 1 TEM results show a significant late-time anomaly between 7918250N and 7919100N (ie over 800m long). This anomaly is suggesting an extremely conductive target with a very high time constant of over 30 ms. The CDI is suggesting that the source is strongest in the south and has a depth to the top of 100m at the north end and up to 200m at the south end. Line 2 is located over the north end of the anomaly on line 1 and confirms that the EM source is around 300m wide.

Note also that the TEM data suggests that the conductive overburden is less than 50m thick at Warrior.

In order to design drill holes to test the anomaly, the TEM data was imported into the industry standard EM processing and modelling software Maxwell. This allows multiple lines of EM data to be modelled using plate-like filament conductors as the EM sources.

The modelling results for Warrior are presented in Figure 1 which shows selected late time observed data as black profiles, the model response for the same channels in red profiles, the modelled EM target, and proposed drill holes to test this target. A number of views of the model are included to illustrate it's geometry.

The EM target is modelled as a flat-lying sheet that dips shallowly to the south. This suggests that Line 1 was surveyed along the dip direction of the target explaining why the anomaly on this line is over 800m long. The depth to the target agrees with the indication from the CDI, ie 100m at the north end and 200m at the south end.

Three drill holes have been proposed to test this target. Note that hole DH\_W1 is located towards the south of the EM target to test the most conductive part of the anomaly. It is highly recommended that holes drilled to test this EM target be cased with PVC to enable subsequent surveying with down-hole electromagnetics (DHEM). The DHEM surveys will indicate whether the conductive target has been intersected, and if not, what direction the conductor actually is. Full drill hole specifications are included in Section 3.

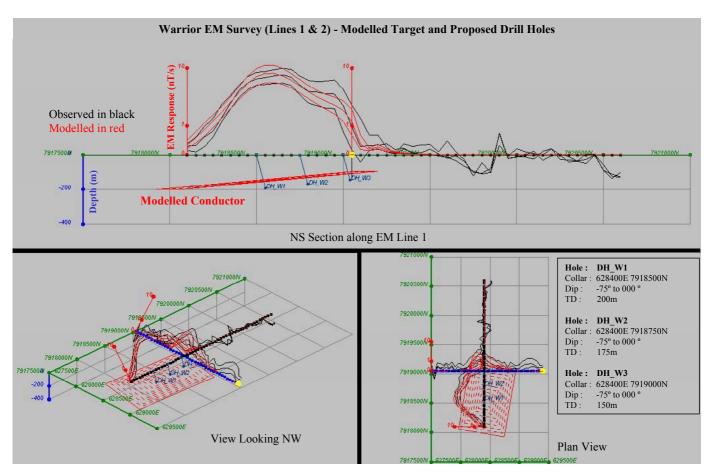


Figure 1. Warrior EM Target – Modelled target and proposed drill holes.

#### 2.2. Hidden One

The Hidden One AEM target is a strong anomaly on the southern most line of the AEM survey (Angus, 2006). Initially only one EW line of TEM (Line 3) was completed over this target, but following some initial modelling work a second NS line (Line 5) was surveyed to assist in determining the orientation of the target.

An excellent late-time anomaly was observed on both these lines with the strongest response on the NS Line 5 having a time constant of about 8ms. The CDI sections indicate conductive cover of about 50m thickness with the buried conductive target from about 100m below the surface.

Modelling of the Hidden One TEM target proved more difficult than for Warrior. A number of different orientations for the target plate proved to be possible. In general the modelled plates were flat lying at a depth of about 100m, or dipping to the south, with dimensions of 300-400m long and 200-300m wide. Two of the final models are presented in Figure 2 which again has variously oriented views of the model. The pink plate is almost flat lying, while the blue plate dips at about  $30^{\circ}$  to the SW.

The two drill holes proposed are designed to test the majority of the possible EM plates that were modelled for the Hidden One target. Note that DH\_HO1 is directed towards the east, while DH\_HO2 drills towards the north. Again, casing of these holes with PVC and subsequent completion of DHEM surveys is highly recommended.

Full drill hole specifications are included in Section 3.

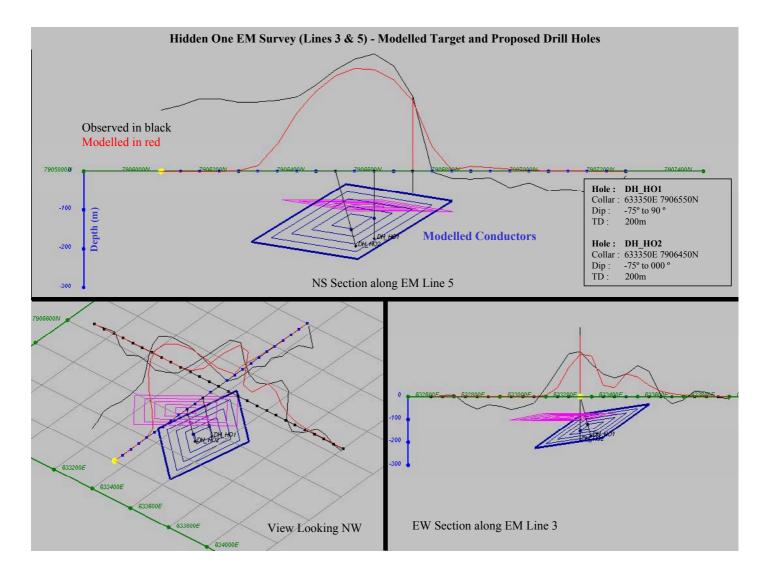


Figure 2. Hidden One EM Target – Modelled target and proposed drill holes.

#### 2.3. Prospect Bore

A single line of TEM (Line 4) was completed across the Prospect Bore AEM anomaly which was originally selected by Wolfgram & Sykes (2005) as an "anomalous response but probably just overburden variation".

This ground TEM survey results shows conductive overburden about 50-60m thick over the western half of the line that thickens to 60-80m over the eastern half of the line. This confirms that the AEM feature seen at Prospect Bore is related to the variations in the overburden thickness (ie an edge effect).

Prospect Bore can thus be discounted as an EM target.

#### **3. Proposed Drill Hole Specifications**

The following table lists the specifications for the proposed drill holes at the Warrior and Hidden One targets. Note that all coordinates use the WGS84/SUTM54 coordinate system.

It is highly recommended that all holes are lined with PVC casing to enable subsequent DHEM surveying.

Hole ID	Prospect	East	North	Dip	Azim	Depth
DH_W1	Warrior	628400E	7918500N	-75°	000°	200m
DH_W2	Warrior	628400E	7918750N	-75°	000°	175m
DH_W3	Warrior	628400E	7919000N	-75°	000°	150m
DH_HO1	Hidden One	633350E	7906550N	-75°	090°	200m
DH_HO2	Hidden One	633350E	7906450N	-75°	000°	200m

#### 4. References

Angus, R. J., 2006, Review of Metallica Minerals Geotem Surveys from the Burdekin (Norninco South), Greenvale South, and Prospect Projects. Rama Geoscience Report RG\_MM01 for Metallica Minerals.

Fullagar, P., 2005, Emax User Guide.

Wolfgram, P. & Sykes, S., 2005, Job 1746: GEOTEM Survey for Metallica Minerals Ltd. Anomaly Picking Notes.

#### 5. Appendix : Prospect TEM Survey Specifications

TEM Surveys completed by Outer Rim Exploration, August 2006

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Survey Coverage (WGS84/SUTM54) :
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Line 1	628400E	7918100N to 7920600N	Warrior
Line 2	7919050N	627500E to 629400E	Warrior
Line 3	7906650N	632700E to 634000E	Hidden One
Line 4	7910250N	630500E to 631800E	Prospect Bore
Line 5	633350E	7906000N to 7907200N	Hidden One

Contractor : Outer Rim Exploration Equipment : Crone Pulse EM Survey Config : Moving In-Loop Tx Loop Size : 100m x 100m Station Spacing : 50m Time Base : 150 msec Tx Frequency : 1.67 Hz Rx Equiv Area : 4100 m<sup>2</sup>

Data Formats :	*.PEM : Raw Crone PEM dump file
	*.TEM : Amira format TEM file
	*.CHN : Channel Times file

- \*.PDF : Plots of TEM Profile and CDI (PDF Format)
- \*.JPG : Plots of TEM Profile and CDI (JPG Format)

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## Volume 1 of 1

Loop TX4	:300 x 300m
	306850E, 7944650N; 307150E, 7944650N
	306850E, 7944350N; 307150E, 7944350N.
Current	:20 Amps
Time Base	:50 ms
Ramp Time	:1 ms
Sync	:Cable
Hole No.	:EM-001

:EM-001	307025E, 7944480N	:180m	:36	nts :Z,X,Y
Hole No.		Depth	Channels	Components

\$2000.00 \$ 600.00 1 Survey day 2 Field Assist. day

We had to wait for confirmation of the DHEM data from Metallica before we left from Greenvale. We got there about 11.00am, packed up all the gear and drove to Croydon, arriving about 7.30pm. 04-08-06

500.00  $\circ \circ$ 1/2 Standby day

750.00 <sup>3</sup>/4 Mob. day

7.00am) and drove about two hours to Prospect station. We spoke to the farmer then, had to go back to Esmeralda station to let them know as well, as some of the EM lines are on their property. We We got breakfast and lunch at 7.00am (they didn't open until then drove to the first line, set up and read ten stations. We then packed up and returned to Croydon by 7.00pm. 05-08-06

## SURVEY PARAMETERS

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TT T TTTLTT TATE T T TTTLTT	
Loop Moving :100 x 100	:100 x 100
Current	:20 Amps
Time Base	:150 ms
Ramp Time	:1.5ms
Sync	:Cable

### :L01 (628400E) Line No.

7918700 to 7919150N (500m) :42 :Z

Components Channels

\$ 750.00 \$2375.00 11/4 Survey day 21/2 Field Assist. day

After getting breakfast and lunches, we left for site at 7.30am and arrived at 9.30am. We set up and continued to read line L01. We finished up and returned to Croydon at 5.15pm (a little earlier so we could get some food for breakfast and lunch from the shop for the next few days). 06-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m :20 Amps :150 ms :1.5ms :Cable Ramp Time Time Base Current Sync

7919150 to 7919950N (900m) :L01 (628400E) Line No.

:42 N Components Channels

\$ 600.00 \$1900.00 1 Survey day 2 Field Assist. day

to line L02, set up and read nine stations before packing up and We drove out to site at 6.30am and completed L01. We then moved driving back to Croydon by 7.00pm. 07-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m :20 Amps :150 ms :1.5ms :Cable Ramp Time **Time Base** Current Sync

7919950 to 7920600N (700m) :L01 (628400E) :42 N Components Channels Line No.

627500 to 627900N (450m) :L02 (7919050N) :42 :Z Components Channels Line No.

\$2375.00 \$ 750.00 114 Survey day 21/2 Field Assist. day

We went out to site at 6.30am and pushed to complete line L02. We packed up and drove back to Croydon at 8.30pm. 08-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m :20 Amps :150 ms :Cable :1.5ms Ramp Time **Fime Base** Current Sync :L02 (7919050N) Line No.

627900 to 629400N (1550m)

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Channels :42 Components :Z

11/2 Survey day \$2850.00 3 Field Assist. day \$ 900.00

We drove out to site at 7.00am, picked up the loop and all the gear from the previous line and drove to Prospect station. We spoke to the farmer, then went to line L03, set up and read through until we finished at 4.00pm, then drove back to Croydon by 6.15pm. 00-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m	:100 x 100m
Current	:20 Amps
Time Base	:150 ms
Ramp Time	:1.5ms
Sync	:Cable

ine No.	:L03 (7906650N)
	632700 to 633150N (500m)
Channels	:42
	1

Components :Z

11/4 Survey day \$2375.00 21/5 Field Assist. day \$750.00

We drove out to site at 7.00am, set up and completed line L03. We then packed up and drove the 5km to line L04. We dropped the gear off and laid out the first loop, ready to survey the following day. We drove back to Croydon by 6.00pm. 10-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m	$:100 \times 100m$
Current	:20 Amps
Time Base	:150 ms
Ramp Time	:1.5ms
Sync	:Cable

Line No. :L03 (7906650N) 633150 to 634000N (900m) Channels :42

Channels :42 Components :Z

1 Survey day \$1900.00 2 Field Assist. day \$ 600.00

We drove out to site at 6.50am, set up and completed line L04. We recovered the loop, packed all the gear and dropped it all off at a convenient spot on the way to the next line. We then drove back to Croydon, arriving at 7.30pm. 11-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m	:100 x 100m
Current	:20 Amps
<b>Fime Base</b>	:150 ms
Ramp Time	:1.5ms
Sync	:Cable

#### 630500 to 631800N (1300m) :L04 (7910250N) :42 Z Channels Line No.

Components

\$2375.00 \$ 750.00 21/2 Field Assist. day 114 Survey day

picking up the trailer and gear on the way. We set up and completed We left Croydon at 7.00am, re-fuelled and drove out to line L05, the line, packed up and drove back to Croydon by 6.30pm. 12-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m	:100 x 100m
Current	:20 Amps
Time Base	:150 ms
Ramp Time	:1.5ms
Sync	:Cable

7906000 to 7907200N (1200m) :L05 (633350E) :42 Z Components Channels Line No.

\$1900.00 \$ 600.00 1 Survey day 2 Field Assist. day

We went out to site at 7.00am, stopped at line L02 and repeated the missing station, plus one either side, then moved to line L01 and extended the line a further 600m. We then packed up and returned to Croydon by 6.00pm. 13-08-06

## SURVEY PARAMETERS

Loop Moving :100 x 100m	:20 Amps	:150 ms	:1.5ms	:Cable	
Loop Movi	Current	Time Base	Ramp Time	Sync	

Line No.	<b>:L02 (7919050N)</b> 628300 to 628400N (150m)
Channels	:42
Components	Ζ:

1

s'

**:L01 (628400E)** 7918100 to 7918700N (600m) :36 :Z Channels Line No.

Components

1 Survey day \$1900.00 2 Field Assist. day \$ 600.00

We drove to the next job. (One day but only half day charged).  $$\frac{1}{12}$  Mob. day \$500.0014-08-06

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## Appendix

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Crone Pulse EM System Description 1



## & EXPLORATION I **CRONE GEOPHYSICS**

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## **3-D PULSE EM - SYSTEM DESCRIPTION**

Name of System: Crone Pulse EM (PEM)

Method Employed: TDEM (Time-domain electromagnetics) or TEM (Transient EM).

Survey Types:

- Surface DEEPEM, Large In-Loop, Moving Loop, Moving Coil - 3 components.
- Borehole 3D Borehole PEM 3 components.
- ure measured and oriented.
   Underground 3D Borehole PEM including flat or up-dipping holes.
- Measured Quantity: Rate of change of magnetic field in nanoTesla/second (same as nV/m<sup>2</sup>).
- Receiver: Fully digital (input is digitized before stacking) with 24 bit dynamic range.

Channels (Gates):

- Typically 20 logarithmic channels in off-time and 1 during ramp (PP).
- Operator can select from several built-in tables including:
- 10, 20, or 30 channel system (single, double, triple density)
- 45 channels 4.5 usec wide covering the end of ramp and start of off-time.
  - 42 channels and PP for 150 msec time base.
- full sampling of ramp and off-time (8 on ramp
  - Programmable channel positions in the field.

Stacking: 512 to 65536 stacks with spike rejection.

- Gain Control: Automatic software control (no selection or correction required).
- Rx Operation: Menu-driven software. Large 16x40 character LCD. Full alphanumeric keyboard.
- **Display:** 256 x 128 pixel scrollable graphic LCD for decay curves and profiles in the field.
- Data Handling: Solid state storage; multiple files; all files can be appended at any time. Plot, list, sort, delete data. RS232 transmission of all data or only certain files.
  - Synchronization: Radio, cable, or crystal clock

Current Waveform: Bipolar on-off square waveform with exponential turn-on and ramp off.

Time Base: Off-time plus ramp time.

- 8.33, 16.66, 50, 100 and 150 msec for 60 Hz noise rejection (equivalent base frequencies of 30, 15, 5, 2.5, 1.67 Hz.)
   10.0, 20.0, 50.0, 100.0 and 150 msec for 50 Hz
  - 10.0, 20.0, 50.0, 100.0 and 150 msec for 50 Hz noise rejection (equivalent base frequencies of 25, 12.5, 5, 2.5, 1.67 Hz.)

Ramp Time: The time required for the current to turn off.

- 500, 1000, or 1500 usec selections for precisely controlled linear turn-off ramps.
  - "fast ramp" option turns current off as quickly as possible for a given loop size and current (2 usec or less to a few hundred usec).

#### Transmit Loop:

- Single turn loop of any dimension (less than 100m x 100m to greater than 2km x 2km).
  - Multi-turn 14m diameter loop for near-surface Moving Coil surveys.

## Tx Output Current:

- 30 Amps maximum at 160 Volts for 4.8 kWatt system.
- 20 Amps maximum at 120 Volts for 2.4 kWatt system.

## Tx Output Voltage:

- 48 to 240 Volts continuously adjustable for 4.8 kWatt system.
  - 24 to 120 Volts continuously adjustable for 2.4 kWatt system.
- Tx Safety features: Transmitter automatically shuts off when loop is opened. Also shuts off with high instrument temperature and overload. Fuse and circuit breaker overload protection.

Borehole Probes: 32 mm diameter.

Pressure-tested for depths of 2500m or more.

Operating Temperature: -40°C to 50°C

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# RONE GEOPHYSICS & EXPLORATION I

www.cronegeophysics.com 3607 WOLFEDALE ROAD, MISSISSAUGA, ONTARIO, CANADA, L5C 1V8 ne: (905) 270-0096 Fax: (905) 270-3472 www.cronegeophysics.c Phone: (905) 270-0096

## 3-D PULSE EM - SPECIAL FEATURES

- High Power: A new 4.8 kWatt transmitter allows very large loops to be used while maintaining a high current.
- Precise Current Ramps: Precisely- controlled linear ramps of fixed duration allow for proper comparisons to be made between data from different loop sizes, and also allows for the step response transformation.
- Long Time Base (Low Frequency): A new long time base of 150 msec (1.67 Hz) ensures that very long time constant conductors can be seen in complicated environments.
- Step Response: A new step response transformation allows even longer time-constant conductors to be seen by reproducing the response that would be seen in a direct measurement of the step response. Our controlled linear ramps and our standard Primary Pulse (PP) measurement on the ramp are necessary for this calculation.
- Fast Ramp Option: A new "fast ramp" option duplicates the response seen from other pulse-type systems, but this does not allow for the step response calculation. We do not recommend fast ramps because they are not as linear as our controlled ramps, they drift in duration as the loop warms up, and there is no advantage in terms of power put into the ground since the <u>area</u> under the dB/dt pulse produced by the ramp is the same.
- Calculation of Impulse Response: The "fast ramp" response can be calculated (as well as the true impulse response) from our standard linear ramp data.
- **True Digital Receiver:** The Crone receiver is a true digital receiver in that the input is immediately digitized before stacking and binning. This produces the following feature (programmable gate positions) .
- Programmable Gate Positions: There is complete freedom of channel (or gate) positions and widths,

which can be programmed in the field. There are also numerous built-in tables.

- Full Sampling: The entire ramp and off-time can be sampled with contiguous channels if desired.
- Current Ramp always Sampled: A Primary Pulse (PP) measurement is always made on the current ramp, which is of great help to ensure proper polarities, and also is crucial for the step response transformation.
- High Quality LCD Display: The 256 x 128 pixel LCD on the receiver allows for accurate plots of decay curves and line or borehole profiles on the receiver, and is of great assistance to the operator to monitor noise and anomaly build-up.
- No Data Reduction: There is no data reduction for surface surveys and Z-component borehole surveys, so that what is seen on the receiver is what will be seen in the final plots. For 3-D borehole surveys, there is only the correction applied to the direction of the X and Y components to aid interpretation. Gain controls are automatic, so that the output is always in nanoTeslas/sec (= nV/m<sup>2</sup>).
- Slim-line Probes: A 32 mm probe diameter ensures that virtually all holes can be surveyed with 3- component measurements.
- **Oriented X and Y Components:** X-Y orientation tools accurately orient the X and Y components. This helps tremendously with giving direction to offhole conductors and to the centre of in-hole conductors.
- Reliable, Durable and Portable Equipment: The PEM system has been in use since the early 1970's under temperature extremes of -40°C to +50°C, in desert, jungle, arctic, mountainous, and underground mining conditions.



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#### APPLICATIONS I **3-D PULSE EM**

- ⇒ direct detection of: Base metals .
- volcanogenic massive sulphide (VMS) deposits
  - O magmatic sulphide deposits
- Sedex massive sulphide deposits
- In the state of the state of
  - $\Rightarrow$  indirect detection of
- Sphalerite and other non-conductors
- ◊ galena and other poorly connected minerals through detection of associated well-connected conductors.
  - detection of conductive marker zones related to deposits î
- Gold .

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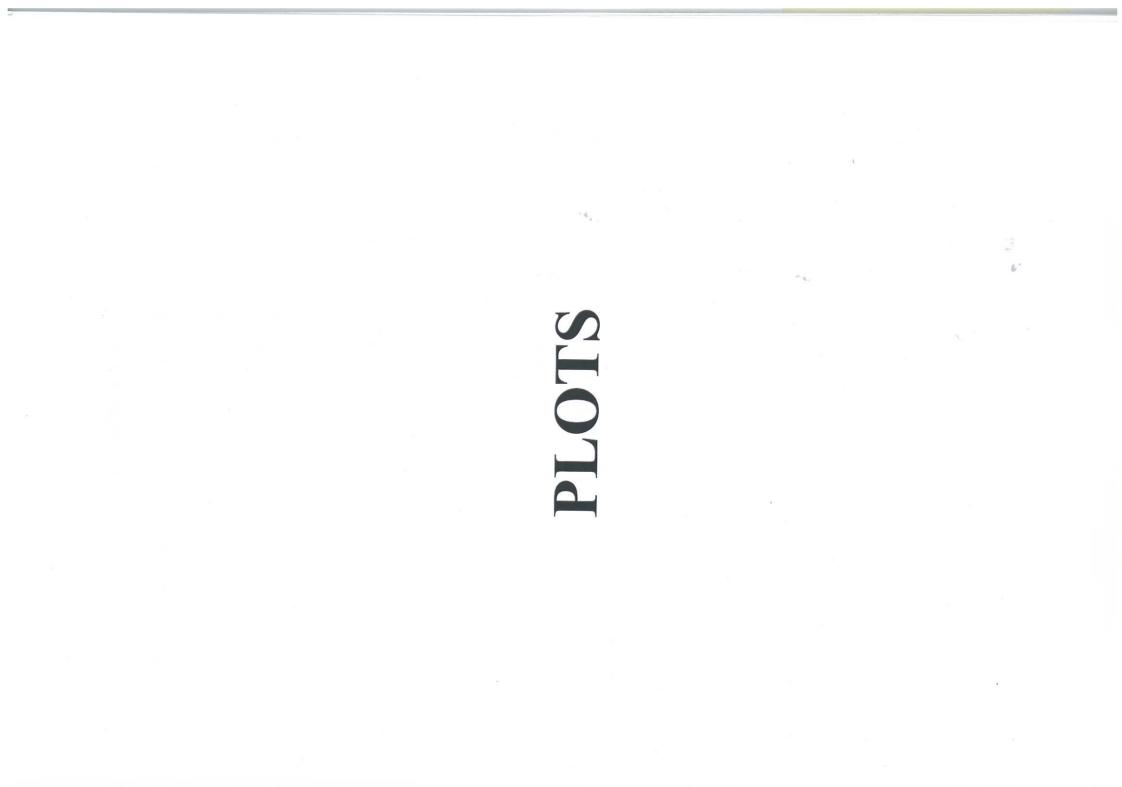
- detection of associated conductors e.g. pyrite/pyrrhotite ⇒ detection of the host - e.g. banded iron formations €
  - Uranium
- detection of associated graphitic basement conductors ⇒ detection of associated conductive alteration zones
  - Diamonds
- $\Rightarrow$  detection and definition of clay-rich layer overlying kimberlites  $\Rightarrow$  locating kimberlites under locally thinned conductive cover

In the ore definition, delineation and production stages of a mining operation, Pulse EM can still be highly effective to:

- Define the boundaries of conductive ore
- Determine the size of intersected conductors and thereby determine whether they are connected to main ore zones.
- Reduce the number of necessary drillholes by exploring between holes.
  - Survey underground drillholes even flat or inclined holes.

## Pulse EM can also be used for:

- General geological mapping of conductive structures .
- ⇒ shears, fractures, lineaments
  - ⇒ hydrothermal alteration
- $\Rightarrow$  graphite-rich rocks, including graphitic schist, shale, slate, and argillite
  - ⇒ clay alteration and zeolites
- ⇒ differential and clay weathering
- conductive weathered layer at surface
  - Groundwater exploration
- Mapping groundwater contamination plumes and freshwater-saltwater interface Geothermal exploration
  - .
- Mapping depth and thickness of horizontal strata
  - Mapping permafrost thickness



## CONTENTS

Plan No.	Plan Type	ID.	Description	Scale
1	Plan	EM-001	Drillhole Location plan	1:2500
2	Section		Primary Field plot	1:2500
С	Header	EM-001	Header information	N/A
4	Profile	(TX4)	Z - Log plot	1:1000
5			- Linear, Ch1-20, 1:7500	1:1000
9			- Linear, Ch20-30, 1:1500	1:1000
7			- Linear, Ch30-36, 1:15	1:1000
8			X - Log plot	1:1000
6			- Linear, Ch1-20, 1:2000	1:1000
10			- Linear, Ch20-30, 1:500	1:1000
11			- Linear, Ch30-36, 1:5	1:1000
12			Y - Log plot	1:1000
13			- Linear, Ch1-20, 1:2000	1:1000
14			- Linear, Ch20-30, 1:500	1:1000
15			- Linear, Ch30-36, 1:5	1:1000
16			Total Field plot	1:1000
17	Header	628400E	Header information	N/A
18	Profile	(Moving)	Z - Log plot	1:15000
19			- Linear, Ch1-20, 1:15000	1:15000
20			- Linear, Ch20-30, 1:150	1:15000
21			- Linear, Ch30-42, 1:10	1:15000
22	Header	7919050N	eader	N/A
23	Profile	(Moving)	Z - Log plot	1:10000
24			- Linear, Ch1-20, 1:12000	1:10000
25			- Linear, Ch20-30, 1:120	1:10000
26			- Linear, Ch30-42, 1:10	1:10000
27	Header	7906650N	Header information	N/A
28	Profile	(Moving)	Z - Log plot	1:7500
29			- Linear, Ch1-20, 1:12000	1:7500
30			- Linear, Ch20-30, 1:120	1:7500
31			- Linear, Ch30-42, 1:5	1:7500
32	Header	7910250N	Header information	N/A
33	Profile	(Moving)	Z - Log plot	1:7500
34			- Linear, Ch1-20, 1:12000	1:7500
35			- Linear, Ch20-30, 1:25	1:7500
36			- Linear, Ch30-42, 1:2	1:7500
37	Header	633350E	Header information	N/A
38	Profile	(Moving)	Z - Log plot	1:7500
39			- Linear, Ch1-20, 1:12000	1:7500
40			- Linear, Ch20-30, 1:100	1:7500
41			- Linear, Ch30-42, 1:10	1:7500
42	Header	7947500N	eader	N/A
43	Profile	(Moving)	Z - Log plot	1:5000
44			- Linear, Ch1-20, 1:12000	1:5000
45			- Linear, Ch20-30, I:400	1:5000

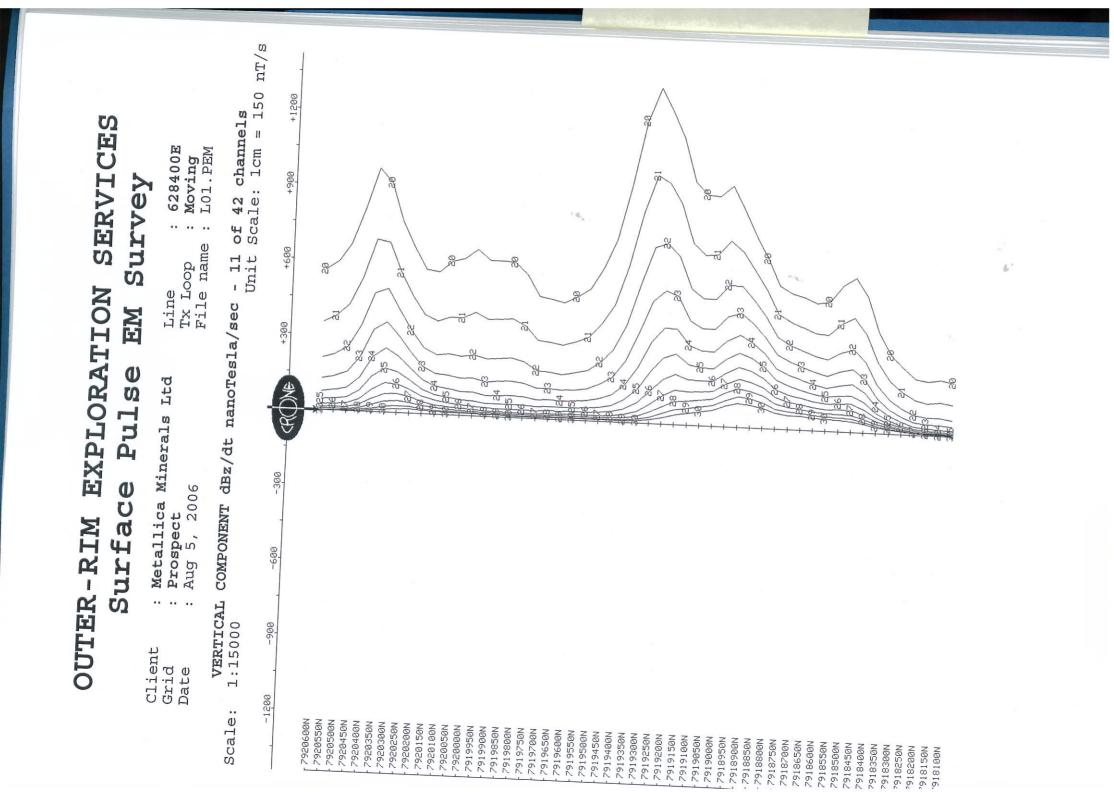
## CONTENTS

Sralo	1.5000	N/A	1:7500	1:7500	1:7500	1:7500
Description	Y - Linear Ch30-47 1.5	Header information	Z - Log plot	- Linear, Ch1-20, 1:6000	- Linear, Ch20-30, 1:50	- Linear, Ch30-42, 1:2
ID.	7947500N	7944500N	(Moving)			
Plan Type	Profile	Header	Profile			
Plan No.	46	47	48	49	00	10

XPLORATION SERVICES	Pulse EM Survey	<pre>inerals Ltd Line : 628400E Tx Loop : Moving File name : L01.PEM # Readings: 51 Stn Units : Metric Coil Area : 4100 sq m Polarity : +</pre>	) 06m, 0m 2. 628350m, 7.91805e+06m, 0m 06m, 0m 4. 628450m, 7.91815e+06m, 0m	) or (Azimuth,Dip,Length) 6m, 0m 2. 360deg, 0.1deg, 2500m	Ch Start End Center Ch Start End Center 1 50 58 54 2 58 72 65 72 65 72 58 54 5 104 126 115 7 153 185 169 8 185 225 205 113 482 531 149 132 396 362 113 482 580 531 14 580 702 641 13 482 580 531 14 580 702 641 14 580 702 641 14 580 702 641 14 9 1498 1813 1656 20 1813 2187 2000 22 2646 3195 2920 23 3195 3861 3528 25 4666 5634 5150 23 3195 3861 3528 25 4666 5634 5150 23 3195 3861 3528 25 4666 5634 5150 23 3195 3861 3528 25 4666 5634 5150 23 3195 3861 3528 321 9936 9078 29 9936 12000 10968 31 14490 17510 16000 32 17510 21150 19330 37 45040 54410 49725 38 54410 65730 60070 37 7930 95910 87650 41 95910115800105855	
Z	ulse EM S	Ltd ORPCS##Tixii	linates (X,Y,Z) 60m, 7.91815e+06m, 0m 2. 62835 60m, 7.91805e+06m, 0m 4. 62845	(Azimuth,I Om 2.	Start End Cente 50 58 5 86 104 9 153 185 16 270 328 29 482 580 53 482 1813 165 2646 5634 515 2646 5634 515 2646 5634 515 8221 9936 907 14490 17510 1600 25550 30870 2821 45040 54410 4972 79390 95910 8765	

ORATION SERVICES lse EM Survey	<pre>s Ltd Line : 628400E Tx Loop : Moving File name : L01.PEM</pre>	nanoTesla/sec - 42 of 42 channels and PP	CRONE 10	38 28 28 24 24 23 21 19 18 19 18 19 28 28 28 28 28 28 28 28 28 28 28 28 28		$\begin{array}{c c c c c c c c c c c c c c c c c c c $			ae 21   16   22   22   22   22   22   22		And [130]     Zo     Zo <th>23   19  </th> <th></th> <th></th> <th>a                                      </th> <th>N</th> <th>5 29 24 29 20</th> <th><math display="block"> \begin{array}{c} 41\\ 43\\ 43\\ 48\\ 48\\ 73\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72</math></th> <th>34 7 299 7 299 7 247 1970 1970 141</th> <th></th> <th>+    38/ / 33/ / 28/ / 28/ / 23/ / 18 / 18 / 14   21/ 24   24   24   24   24   24   24   24</th> <th>+ #4() / 35() / 36() / 35() / 36() / 31() / 36() / 16   10   10   10   10   10   10   10  </th> <th></th> <th></th> <th><math>\frac{44}{26} \left( \frac{1}{26} \right) \left( \frac{1}{26} \frac{1}{16} \right) = \frac{1}{16} \left( \frac{1}{16} \right) \left( \frac</math></th> <th>1118//// 2/2 1 1 1 1/8 7 1 1 1/8 7 1 1 1/8 17 1 1 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 1</th> <th></th>	23   19			a	N	5 29 24 29 20	$ \begin{array}{c} 41\\ 43\\ 43\\ 48\\ 48\\ 73\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72\\ 72$	34 7 299 7 299 7 247 1970 1970 141		+    38/ / 33/ / 28/ / 28/ / 23/ / 18 / 18 / 14   21/ 24   24   24   24   24   24   24   24	+ #4() / 35() / 36() / 35() / 36() / 31() / 36() / 16   10   10   10   10   10   10   10			$\frac{44}{26} \left( \frac{1}{26} \right) \left( \frac{1}{26} \frac{1}{16} \right) = \frac{1}{16} \left( \frac{1}{16} \right) \left( \frac$	1118//// 2/2 1 1 1 1/8 7 1 1 1/8 7 1 1 1/8 17 1 1 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 11 1/8 1	
OUTER-RIM EXPL( Surface Pu]	Client : Metallica Minerals Grid : Prospect Date : Aug 5, 2006	VERTICAL COMPONENT dBz/dt nanoT Scale: 1:15000	$-10^5$ , $-10^4$ , $-10^4$ , $-10^3$ , $-10^2$ , $-10^2$ , $-10^4$	- 7920600N - 7920550N	- 7920450N - 7920400N - 7920350N	- 7920300N - 7920250N - 7920201N	- 7920150N	- 7920050N - 7920000N	- 7919950N - 7919908N	- 7919856N - 7919820N	N9626167	- 7919600N - 7919550N	- 7919500N - 7919450N	- 7919480N - 7919350N - 7919380N	- 7919250N - 7919280N	- 7919180N - 7919180N	- 7919080N - 7919080N	- 7918950N - 7918900N - 7918850N	- 7918800N - 7918750N	- 7918700N - 7918650N	- 7918600N - 7918550N	- 7918500N - 7918450N	- 7918480N	N0000167 - 79182501	- 7918200N - 7918150N	L 7918100N	

SER	l Line : <b>628400E</b> Tx Loop : <b>Moving</b> File name : L01.PEM	l <b>/sec - 20 of 42 channels and PP</b> Unit Scale: 1cm = 12000 nT/s	+24000 +48000 +72000 +96000	
-RIM EXPLOR urface Puls	Critent : Metallica Minerals Ltd Grid : Prospect Date : Aug 5, 2006	VERTICAL COMPONENT dBz/dt nanoTesla/sec Scale: 1:15000	-96900 -72900 -48000 -24000 (RONE	



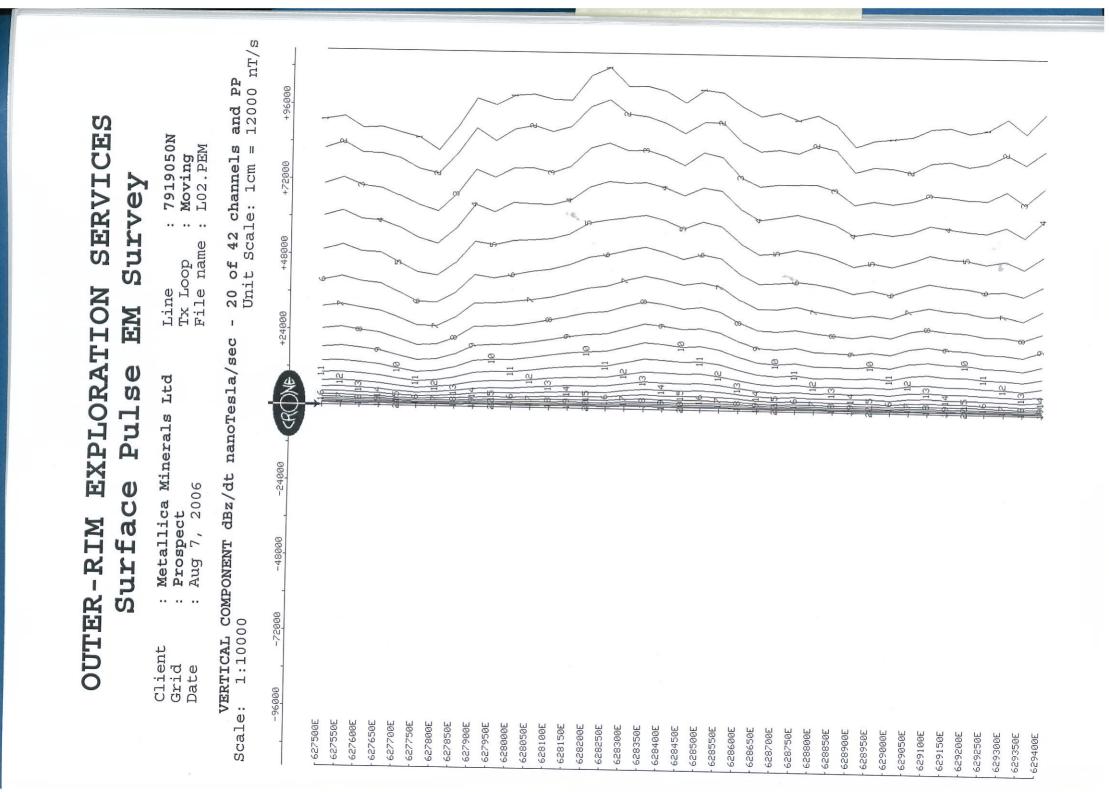
TER-RIM EXPLORATION SERVICES Surface Pulse EM Survey	: <b>Metallica Minerals Ltd</b> Line : <b>Prospect</b> : Aug 5, 2006 File	AL COMPONENT dBz/dt nanoTesla/sec - 13 of Unit Sc	-60 -40 -20 -80 -80 +30 +40 +60 +80		
OUTER-R. Sur:		VERTICAL COMP Scale: 1:15000	-	<ul> <li>79205000</li> <li>79205500</li> <li>79205500</li> <li>79201500</li> <li>79200500</li> <li>7910500</li> <li>7910500<th></th></li></ul>	

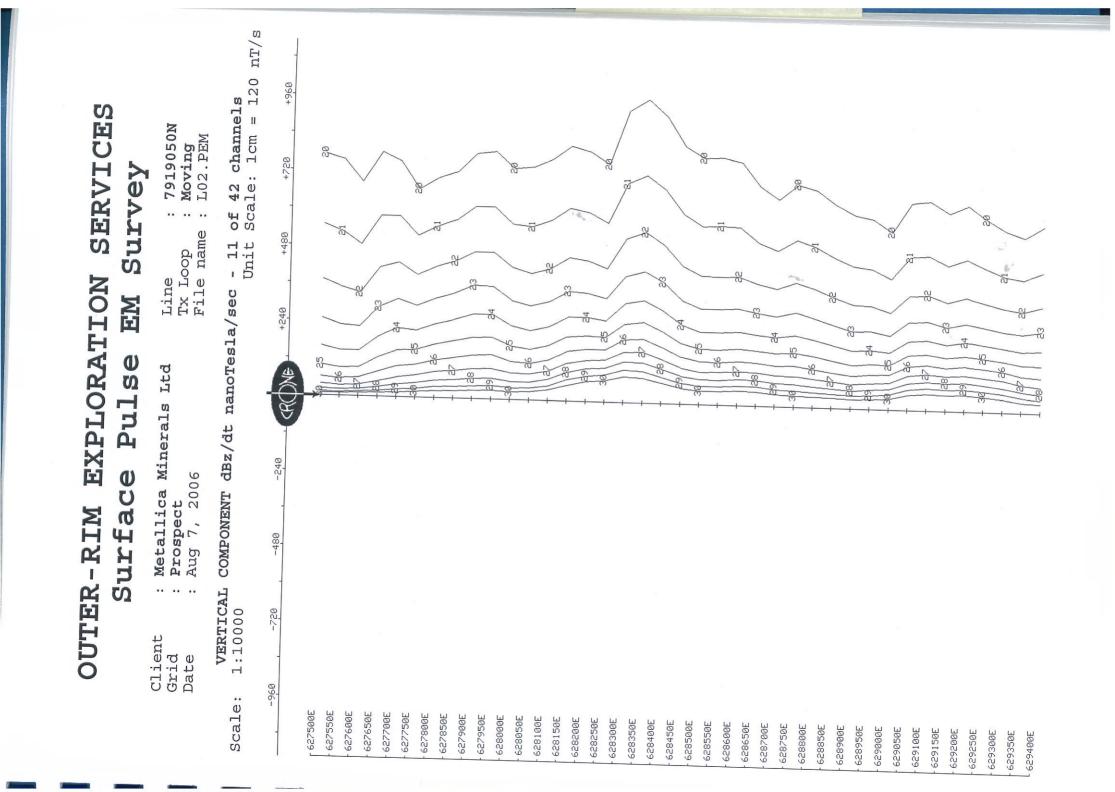
SERVICES EXPLORATION EM 20 PC U Surfac OUTER-RIM

`enter 65 115 205 362 641 1134 2000 3528 6221 10968 19330 34080 60070 60070 0 Ö Om #1( шO E 72 126 225 396 702 702 702 702 702 1242 2187 3861 6808 12000 21150 21150 21150 37290 65730 7919050N 919e+06m, ( 9191e+06m, L02.PEM 39 gg End Digital M Humam Moving 1900m Metric 4100 Survey + 0.ldeg, .. ... ... Tx Loop : File name : # Readings: Stn Units : ... .. . . HMMG Units Area Polarity Receiver 50 문 Length) Operator 627450m, 627550m, Coil .p, Lenç )0deg, Line 6 R Cente (Azimuth,Dip Om 2.90 1000000 1040 End C 58 104 185 185 328 328 580 1813 3295 5634 9936 9936 9936 9936 5634 25634 34410 . . 04 Ltd 1 m Li n Minerals Om шO H04840904500 Om L. 10404550 OR :+06m, in Coordinates (X,Y,Z) 627450m, 7.9191e+06m, 627550m, 7.919e+06m, エンキト 0.0 m CP , Ζ) 2006 **Prospect** Aug 7, 200 150.00 ms H Metallica (X,Y, 1905e-(usec) Center -149 79 140 248 439 776 1370 2416 4264 7514 13245 7514 13245 23350 41165 72560 Amps ms Ð Aug 7 150.0 1.50 42 Cabl€ 100m 20 Am 5 Ø . Ū 5 Coordinate 627500m, 7 -99 153 270 482 482 850 1498 2646 4666 4666 45040 25550 25550 79390 500m, Times End .. .. ... .. ... .. Channels ase Type Size Time -198 126 126 225 396 702 1242 2187 3861 6808 6808 6808 6808 6808 55730 55730 art Current ient ́р Channe] Grid Date Time Ramp Sync Loop Loop 4 Line . . Ś ЧM H HOWDH び Ch ЪЪ #

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LORATION SERVICES ulse EM Survey	als Ltd Line : 7919050N Tx Loop : Moving File name : 1.02 DFM	2 of 42 c	-10 CR 1 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			4     1     4     4						27 / 22 / 17	Le CE		26 21 21 16					17	8 1 23 18 13	6		2	e e	30 24 19		-8				-4			40511136111251112611112611113511113611113611113
OUTER-RIM EXP Surface P	Client : <b>Metallica Mineral</b> Grid : <b>Prospect</b> Date : Aug 7, 2006	VERTICAL COMPONENT dBz/dt na Scale: 1:10000	-1.051.041.031.02	r 627500E	- 627550E - 627500E	- 627650E	- 627700E - 627750F	- 627800E	- 627850E	- 627950E - 622950E	- 628000E	- 628050E	- 628100E	- 628150E	- 628200E - 62825ar	- 628300E	- 628350E	- 628400E	- 628450E	- 628300E - 62055ac	- 628600E	- 628650E	- 628700E	628750E 628800E	628530E	628900E	628950E	62900E Apartar	629100E	629150E	629200E	629250E	629350F 629350F	629400E	





EXPLORATION SERVICES e Pulse EM Survey Minerals Ltd Line : 7919050N TX Loop : Moving File name : L02.PEM dBz/dt nanoTesla/sec - 13 of 42 channels	Scale
OUTER-RIM EXPLO OUTER-RIM EXPLO Surface Pul Surface Pul Client : Metallica Minerals Grid : Prospect Date : Aug 7, 2006 VERTICAL COMPONENT dBz/dt na	

SERVICES Survey EXPLORATION EM S C C Pul U Surfac OUTER - RIM

Center 65 115 205 362 205 3641 1134 2000 3528 10968 19330 34080 60070 105855 5 #105 Сш mo ш 72 126 225 396 702 702 702 71242 2187 6808 6808 6808 6808 6808 7290 55730 7906650N 9066e+06m, 9067e+06m, End **Moving** L03.PEM sq Digital M Humam 1300m Humam Metric HOMDH 4100 27 + 0.1deg .. .. .. . Ø HMUD . . Tx Loop File name # Readings Stn Units Coil Area 5 Ch Polarity Receiver (Azimuth,Dip,Length) 0m 2. 90deg, 0.1 Operator 332650m, 332750m, Line Center 1000000 00 1040 40. End 1100010010040 Ltd 110000040 HMUD Minerals Om шo H04040004000 St 10404000 ЮК s (X,Y,Z) or .90665e+06m, es (X,Y,Z) 7.9067e+06m, 7.9066e+06m, エンキト 100m Ch H .00 ms Metallica **Prospect** Aug 9, 20 150.00 ms 1.50 ms 42 (usec) Center Center 79 149 796 439 439 776 439 776 7514 13245 23350 41165 72560 41165 72560  $\Join$ Amps Cable 100m 20 Am Coordinates 632700m, 7. Ü 5 Coordinate 632650m, 7 632750m, 7 - 99 - 99 - 270 270 270 270 270 266 6 8550 2646 8221 55550 9390 9390 93900 Times End ... ... Channels: Sync Type Loop Size Current Base Time 1045M Start - 198 72 126 225 396 702 1242 2187 3861 6808 12800 337290 65730 158001 Client Grid Channe1 Ramp Sync Date Time Loop Line . . . HOWDH L M H Ch 400000440000004 2000044000000 РР #

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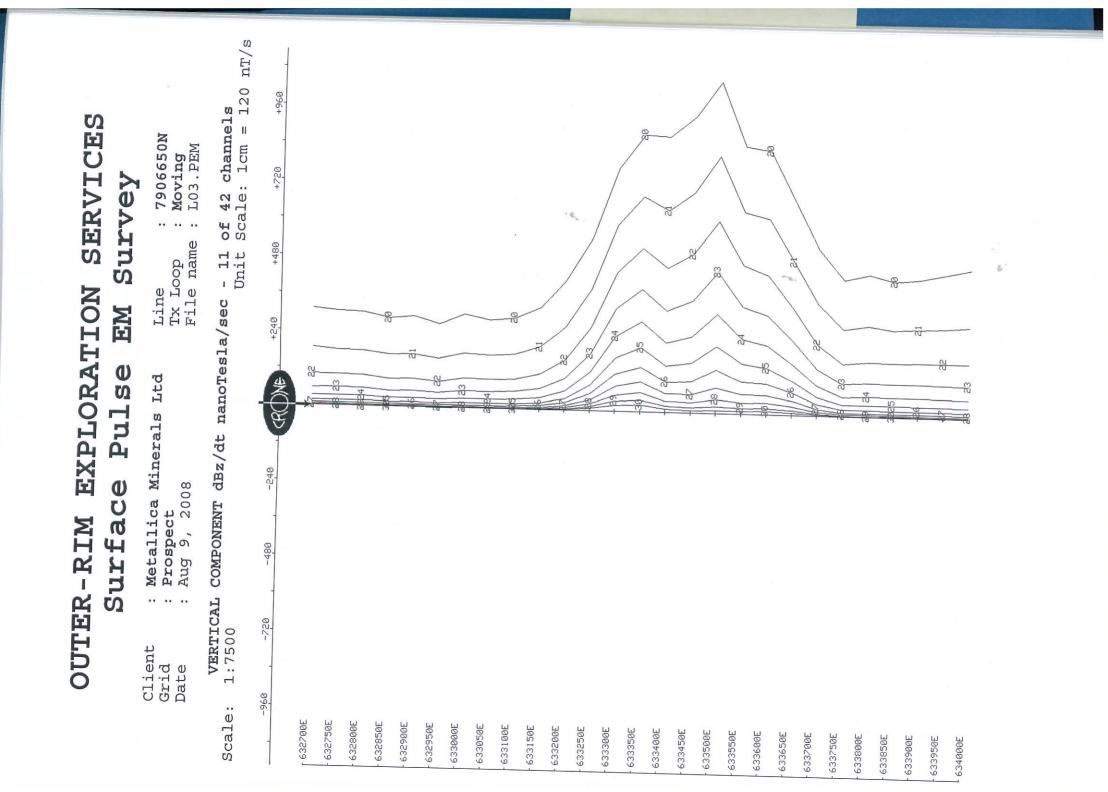
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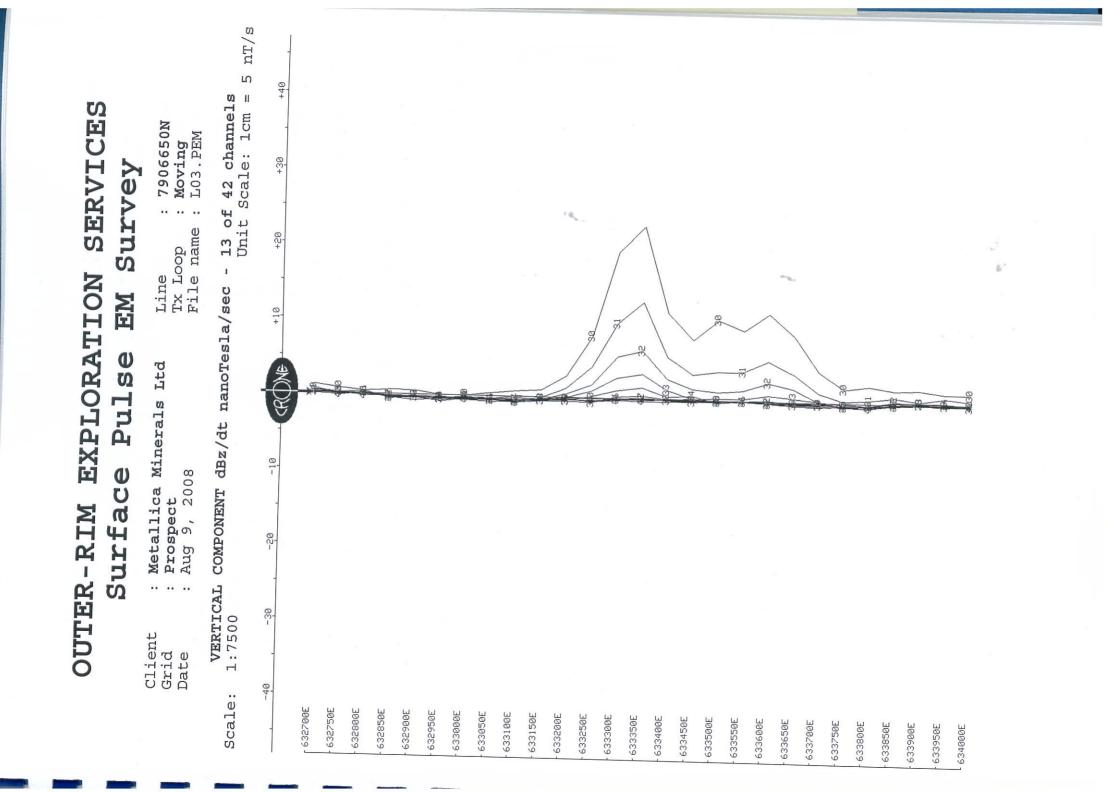
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+105 channels and PP SERVICES 7906650N **Moving** L03.PEM +104 Q Survey m +103 \*\* \*\* • • of 42 Line Tx Loop File name 5 읪 m EXPLORATION 42 +102 EM 3 I. nanoTesla/sec Pulse 0 Metallica Minerals Ltd Prospect (B) COMPONENT dBz/dt Surface 2008 -102 OUTER-RIM 10 Aug -103 •• •• .. **VERTICAL C** 2: 1:7500 -104 Client Grid Date Scale: -105 632800E 632700E 632750E 632850E 632950E 632900E 633100E 633000E 633050E 633150E 633250E 633350E 633400E 633200E 633300E 633450E 633600E 633650E 633500E 633550E 633700E 633750E 633800E 633900E 633850E 633950E 634000E

TION SERVICES EM Survey	Line : <b>7906650N</b> Tx Loop : <b>Moving</b> File name : L03.PEM	- 20 of 42 c Unit Scale	+24000 +48000 +72000 +96000	10												8							10 4							6	
OUTER-RIM EXPLORATION Surface Pulse EM	Client : <b>Metallica Minerals Ltd</b> Grid : <b>Prospect</b> Date : Aug 9, 2008	VERTICAL COMPONENT dBz/dt nanoTesla/sec Scale: 1:7500	-96,00072,000 -48,000 -24,000 - AONE -	632700E	-632750E	- 632800E	- 632850E	- 632950E	- 633000E	- 633050E	- 633100E	- 63315ØE	- 633200E	- 633250E	- 633300E	- 633350E	633400E	633450E	633500E	633550E	633600E	633650E	633700E	633750E	633800E	633850E	633900E	633950E	634000E		



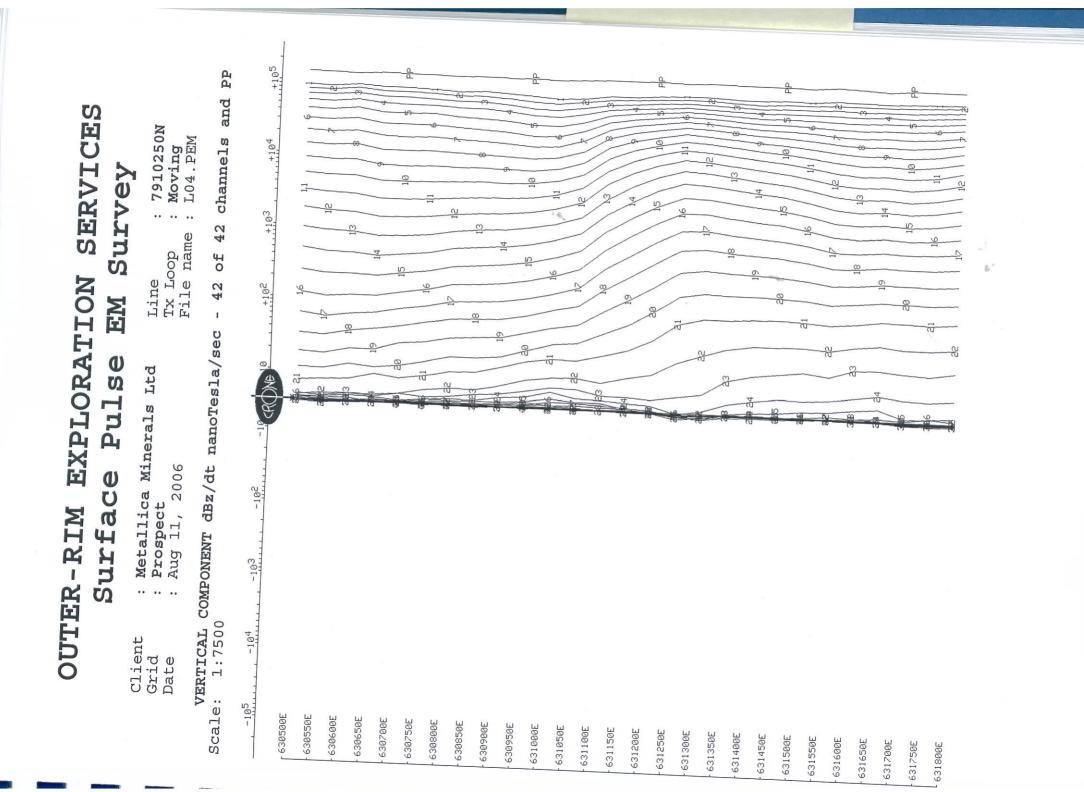


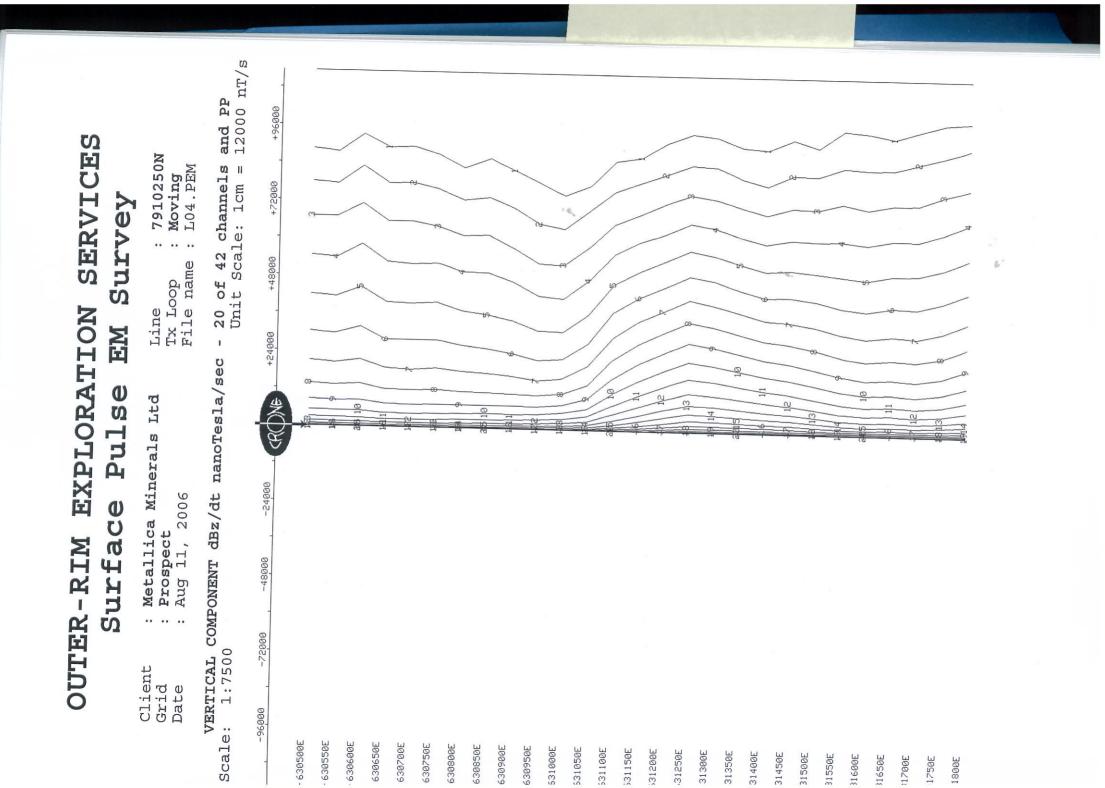
#### SERVICES 11011 2112 EXPLORATION MH U V. Pul Surface OUTER-RIM

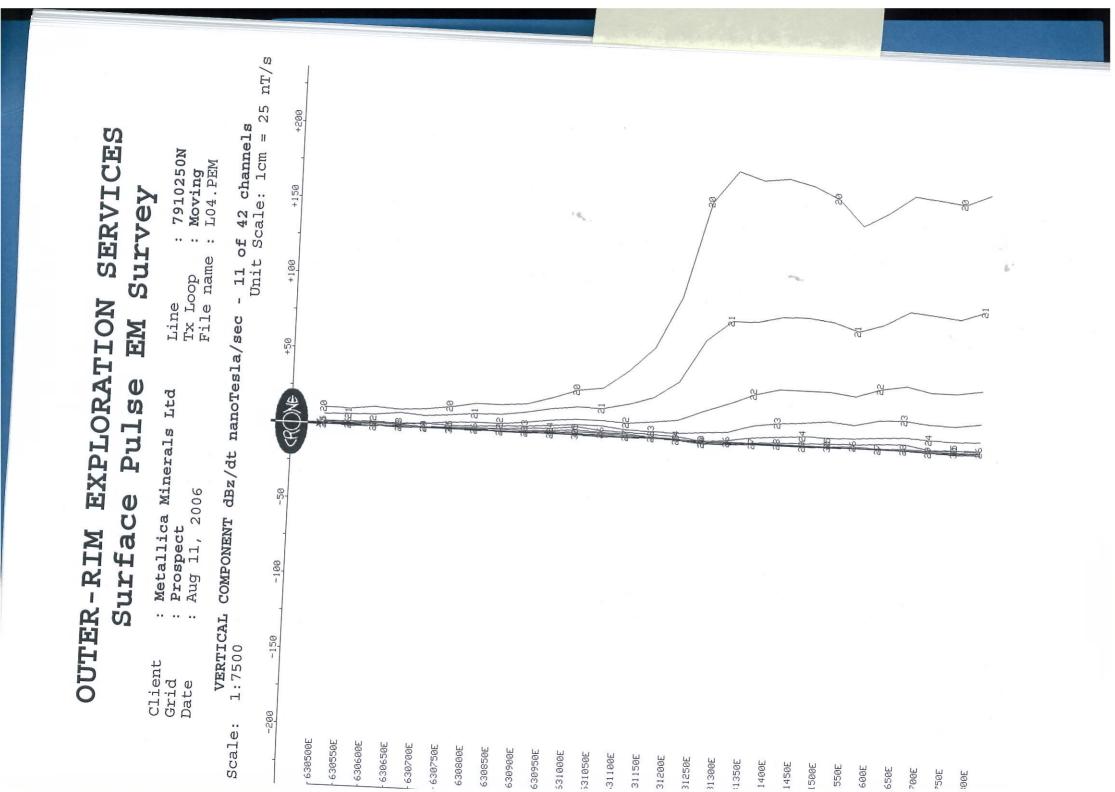
EM SULVEY	Line : <b>7910250N</b> Tx Loop : <b>Moving</b> File name : L04.PEM # Readings: 27 Stn Units : Metric Coil Area : 4100 sq m Polarity : + Receiver : Digital #109 Operator : M Human	7.9102 7.9103	90deg, 0.1deg, 1300m         Center       Ch Start       End Center         94       5       104       126       115         169       8       185       225       505         169       8       185       225       205         169       8       185       225       205         169       8       185       225       205         169       11       328       396       362         531       14       580       702       641         938       17       1026       1242       1134         1656       20       1813       2187       2000         531       14       580       702       641         938       17       1026       1242       1134         1656       20       1813       2187       2000         2928       1078       2361       3528       5528         5150       26       5634       6808       6221         9078       293       17510       21150       19330         28210       353       37290       34080       87650         28210       35
	Current : Metallica Minerals Ltd Grid : Prospect Date : Aug 11, 2006 Time Base : 150.00 ms Ramp Time : 1.50 ms # Channels: 42 Sync Type : Cable Loop Size : 100m X 100m Current : 20 Amps	s (X,Y,Z) 9103e+06m, 0m 2 9102e+06m, 0m 4 2 (X,Y,Z) or (Azimuth	nnel Times (usec)      910256+06m, 0m       2         nnel Times (usec)       start End       -198       -99       -149       1       50       58         -198       -99       -149       1       50       58       104         72       86       79       4       86       106         126       153       140       7       153       189         225       270       248       10       270       328         326       482       439       13       482       580         702       850       776       16       850       1026         702       850       776       16       850       1026         702       850       776       16       850       1026         702       850       776       16       820       1026         71242       1498       1370       19       1498       1813         3861       4666       4264       22       2646       5634         6808       8221       7514       28       8221       9936         7290       4564       21645       31       14490       17510

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R-RIM EXPLORATION SERVICES Surface Pulse EM Survey	: Metallica Minerals Ltd Line : 7910250N : Prospect Tx Loop : Moving : Aug 11, 2006 File name : L04.PEM	L COMPONENT dBz/dt nanoTesla/sec - 13 of 42 channels Unit Scale: 1cm = 2 nT/s		All Rec																						Refer 1	all the second se			
OUTER-RIM Surfac		<b>VERTICAL COMPONENT</b> Scale: 1:7500	-16 -12 -8	[ 630500E	- 630550E	- 630600E	- 630650E	- 630700E - 630750E	- 630800E	- 630850E	- 630900E	- 630950E	- 631000E	- 631050E	- 631100E	- 631150E	- 631200E	- 631250E - 631300F	- 631350E	- 631400E	- 631450E	- 631500E	- 631550E	- 631600E	- 631650E	- 631700E	- 631750E - 631000F	- 631800E		

SERVICES Survey EXPLORATION EM ບ ບ Pul U Surfac OUTER-RIM

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EXPLORATION SERVICES e Pulse EM Survey Minerals Ltd Line : 633350E TX Loop : Moving File name : LO5.PEM dt nanoTesla/sec - 42 of 42 channels and PP	$ \begin{array}{      } \hline & & & & & & & & & & & & & & & & & & $	
<b>OUTER-RIM EXPLO</b> <b>Burface Pul</b> <b>Surface Pul</b> Client : Metallica Minerals I Grid : Prospect Date : Aug 12, 2006 VERTICAL COMPONENT dBz/dt nanoTes		

OUTER-RIM EXPI Surface Pu	EXPLORATION SERVICES e Pulse EM Survey
Client : <b>Metallica Minerals</b> Grid : <b>Prospect</b> Date : Aug 12, 2006	rals Ltd Line : 633350E Tx Loop : Moving File name : L05.PEM
<b>VERTICAL COMPONENT dBz/dt nan</b> Scale: 1:7500	<b>nanoTesla/sec - 20 of 42 channels and PP</b> Unit Scale: lcm = 12000 nT/s
-96900 -72900 -48900 -24900	- CRONE +24000 +48000 +72000 +96000
1 79022000 NG	
- 7907150N	
- 7907100N	
- 7907050N	
- 7927000N	
- 796558N	
- 7965900N	
- 7906850N	
- 7906800N	
- 7906750N	
N0029062 -	
- 7906650N	
- 7906600N	
- 7906558N	
N06500N	
- 7906450N	
- 7906400N	
- 7906350N	
- 7965300N	
- 7906250N	
- 7906200N	
- 7906150N	
- 7906100N	
- 7906050N	
L 7906000N	

EXPLORATION SERVICES e Pulse EM Survey	a Minerals Ltd Line : 633350E Tx Loop : Moving 2006 File name : L05.PEM	11 of Init Sca	-200 - CPONE +200 +400 +600 +800					all d3	ab 24	attas     alo	2 3 3 1			54	30			+ //38////32	+ B9////24///	+34////25/// ) 3e	+///// a/			45 24	00 						
OUTER-RIM ] Surface	Client : <b>Metallica</b> Grid : <b>Prospect</b> Date : Aug 12, 20	<b>VERTICAL COMPONENT</b> Scale: 1:7500	-800 -600 -400	1 7907200N	- 7907150N	- 7907100N	- 7907050N	-790700N	- 7906950N	N9063062 -	- 7906850N	N0089062 -	- 7906750N	N9029062 -	N059962 -	- 790660aN	- 7906550N	- 7906500N	- 7906450N	- 7906400N	- 7906350N	- 7986300N	- 790625øN	- 7906200N	- 7906150N	- 7906100N	. 7906050N	L 7906000N			

