HartsRange_AEMdata&modelling.doc

TO: Mick Billing

CC:

FROM: David McInnes

DATE: 19 April 2010

SUBJECT: Harts Range Airborne Electromagnetic data and modelling

In February 2010 Geo-Solutions Pty Ltd, on behalf of Thor Mining PLC flew a heli-borne Electromagnetic Survey (AEM) using the RepTEM system over their Harts Range Exploration License (figure 1). The survey consisted of 49 flight line traverses flown in a north south direction for a total of 314 line kilometres (figure 2).

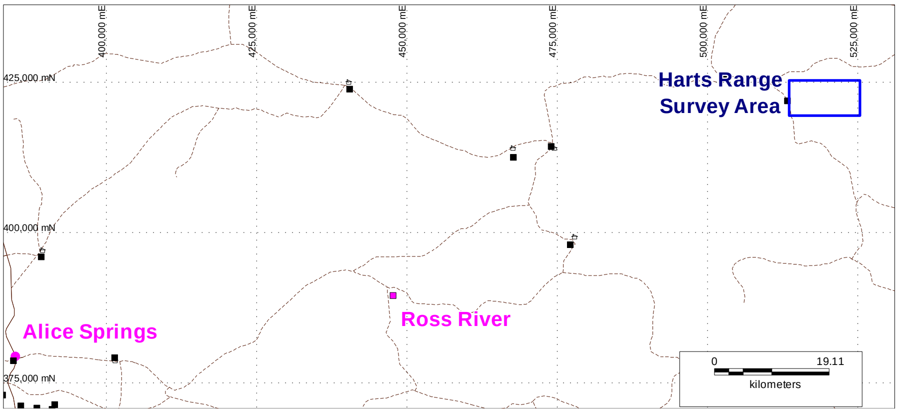

Figure 1: location of RepTEM survey over the Harts Range project area.

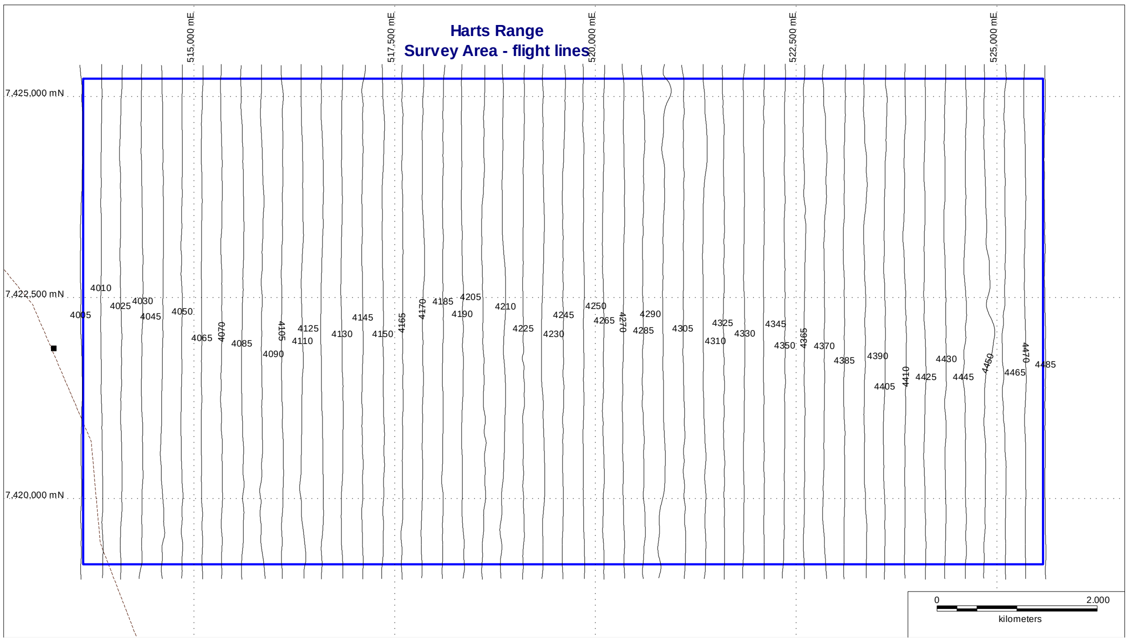

Figure 2: RepTEM survey flight lines

MONTANA GIS,
Geophysical & Geographical Information Services
88 Long Point Street, Potato Point NSW 2545
ph +61 2 4473 5972 D mobile +61 419 863 303 R mobile +61 419 863 966
montana@bigpond.com
ABN 61 073 425 724

The Electro-Magnetic technique is sensitive to the changes in conductivity and thickness of the underlying geology. By alternating an electric current through a transmitter loop the magnetic field associated with that current varies (right hand rule). This varying magnetic field induces currents within the earth. These currents flow down through the earth's geological units directly dependent on the conductivity and thickness of the geological units. When the signal is passing through resistive material it passes through unimpeded. But as it encounters conductive material (i.e. massive sulphides) the induced electrical field slows up. This results in the recording of an increased signal from the time the electric field encounters the conductive material until it has passed through.

The **REPTEM** system is a heli-borne, time domain electromagnetic system incorporating a high speed EM receiver in an inloop configuration (figure 3). The primary electromagnetic pulses are created by a series of discontinuous current pulses fed into a single turn transmitting loop hanging approximately 40m below the helicopter. The pulse repetition rate is 25 Hz (50 bipolar pulses per second), with a 5msec on time and 15msec off time. The receiver orientation is such that the "Z" component of the induced secondary electromagnetic field is recorded.

Figure 3: photo of the RepTEM system.

Thor Mining's Harts Range RepTEM survey comprised the collection of 314 line kilometres of data along 49 north south orientate flight lines. The data collection details are:

<u>Survey Equipment</u>

Helicopter	:	Eurocopter Squirrel BA. VH-HHO.
Transmitter	:	Geosolutions proprietary REPTEM transmitter.

Receiver	:	Geosolutions proprietary REPTEM receiver. 24 bit A-D sampling at 1.25 microseconds.
Transmitter area	:	Single turn of 412 square metres.
Receiver area	:	Single turn of 138 square metres.
Power system	:	24 HP Honda V-twin alternator system (315 Amp peak amplitude).

Survey Specifications

Tx Flying Height	:	120 feet (35 metres) depending upon terrain.
Line Direction	:	North / South
Line Spacing	:	250 metres.
Survey Speed	:	55 Knots - Indicated Air Speed.
Sample Interval	:	50 per Second.
Map Datum	:	GDA 94.

Survey Resolutions

ATDEM data	:	Windowed to 23 channels and resampled to 10m across ground.
Laser Altimeter	:	10 centimetre resolution sampled 80 times per second.

The observed data is transformed from the 138 square metre receiver area to that of 10,000 square metres. Figure 4 (attached) is a stacked observed dB/dt data display for all the flight lines. The "Z" component data has then been transformed into Conductivity Depth Image Sections (CDIs) using EMaxAir (figure 5 - attached). The Conductivity Depth data has been 3 dimensionally gridded to enable the construction of conductivity depth slices (figure 6 - attached) as well as 3 dimensional iso-shells (figure 7).

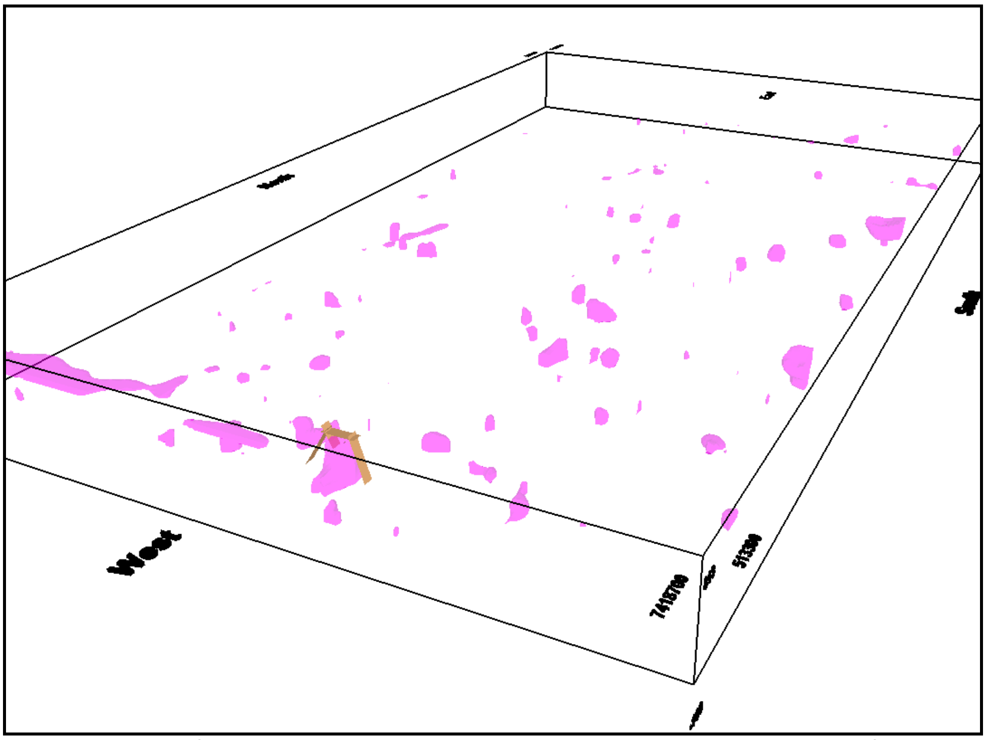

Figure 7: Screen snap shot of 3D model, looking east, showing 3D conductive shells derived fromt eh 3D gridding of the CDI models

Potential basement conductors have then been selected by reviewing the profile data and CDI models for every flight line (figure 8). From this review 24 potential basement conductors have been identified (figure 9), with one of these rating as a high priority 1 anomaly (figure 10) and a further six rating as priority 2 anomalies (table 1).

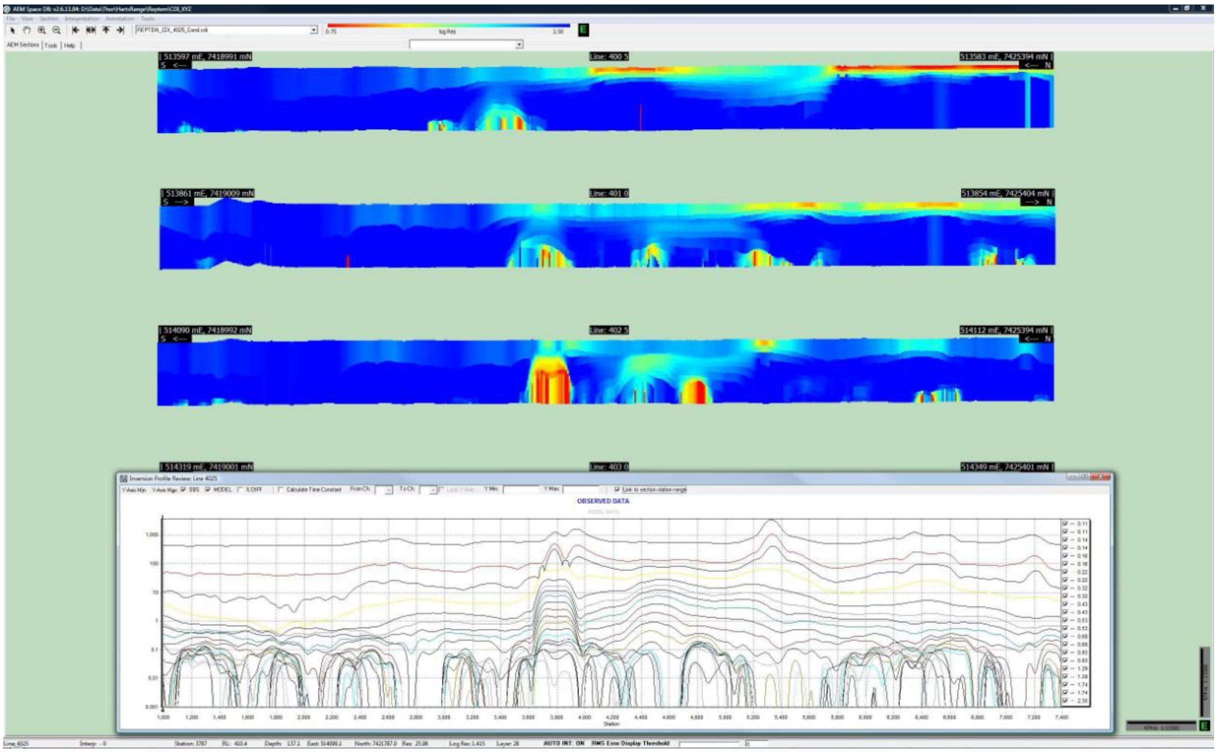

Figure 8: Screen snap shot of interpretation software displaying the CDI models for lines 4005, 4010 and 4025 along with the observed data profile for 4025.

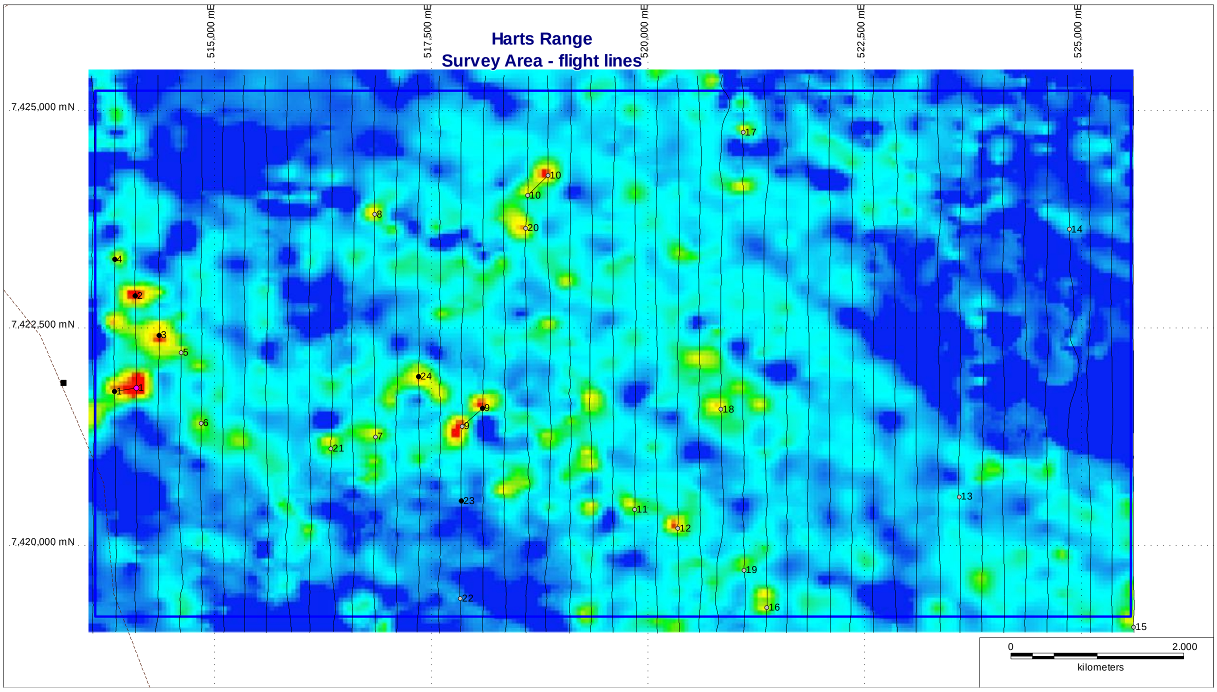

Figure 9: Potential Bedrock conductors overlain on conductivity depth slice (-250m). The Priority 1 anomaly is represented as the magenta markers (index 1) with the priority two anomalies as black markers and the priority three anomalies as grey markers.

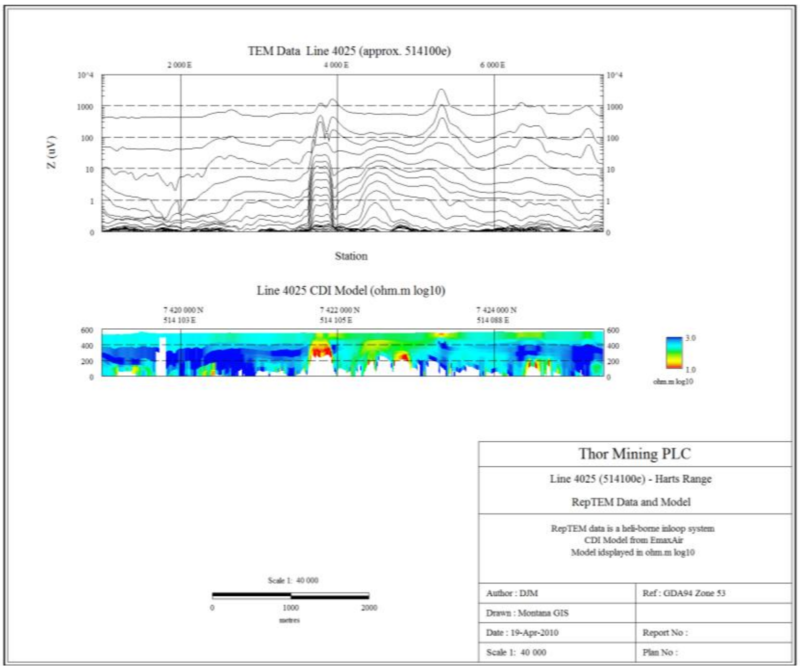

Figure 10: Observed data along with the CDI model displaying the priority 1 anomaly on line 4025.

The complex nature of the observed data and the CDI model indicate that the priority 1 anomaly is sourced by multiple bodies. This complexity results in the modelling solution being non-unique. The data has been modelled using conductive plates in the Maxwell Software. The two viable solutions for modelling the data are presented in figure 11. The first of these models is the most likely, which is, two inward-dipping conductive bodies with a depth to top of approximately 80m. However the data can also be adequately modelled using outwardly dipping plate conductors capped by a flat lying conductor at 60m.

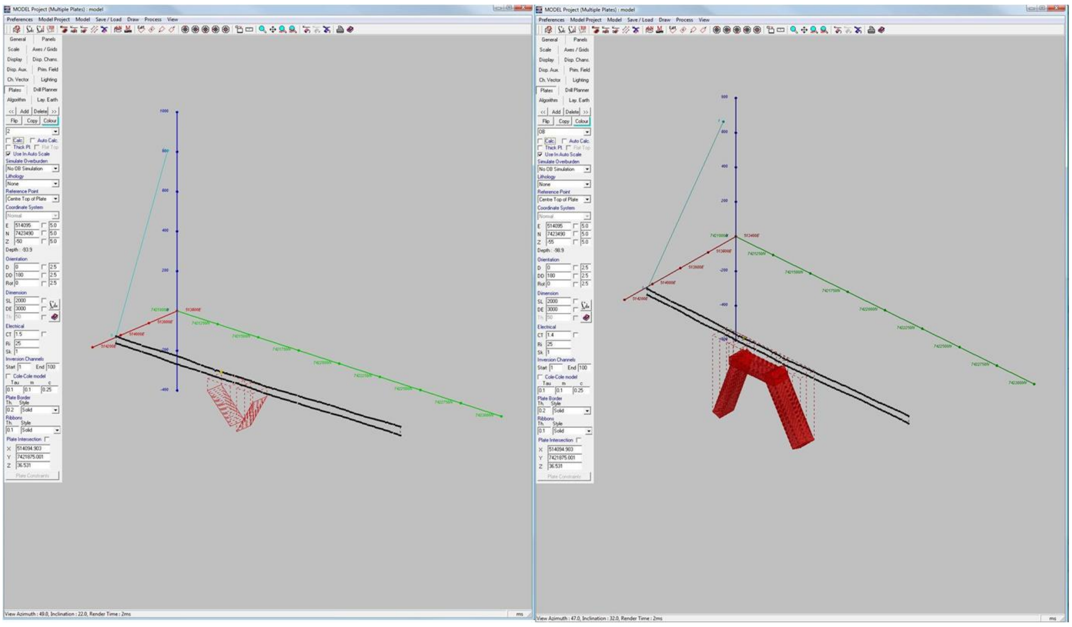

Figure 11: alternative plate models for the source of the priority 1 anomaly on line 4025. The left model with in dipping plates is considered the better option, however the alternative outwardly dipping plates with a conductive cap is also a suitable fit to the data.

Line	Priority	Index	East	North
4025	1	1	514098	7421808
4010	2	1	513844	7421767
4025	2	2	514087	7422867
4030	2	3	514362	7422413
4010	2	4	513850	7423285
4185	2	9	518092	7421575
4170	2	23	517847	7420511
4150	2	24	517353	7421938
4045	3	5	514614	7422215
4050	3	6	514846	7421405
4130	3	7	516857	7421247
4130	3	8	516848	7423803
4170	3	9	517855	7421368
4205	3	10	518614	7424020
4210	3	10	518846	7424250
4250	3	11	519847	7420411
4270	3	12	520344	7420196
4405	3	13	523588	7420558
4450	3	14	524860	7423633
4485	3	15	525602	7419062
4310	3	16	521372	7419288
4305	3	17	521099	7424746
4290	3	18	520842	7421565
4305	3	19	521109	7419715
4205	3	20	518589	7423644
4110	3	21	516344	7421111
4170	3	22	517832	7419389

Table 1: list of potential bedrock conductors identified from the Harts Range RepTEM (AEM) survey.