MEMORANDUM

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| TO | Costica Vieru - Thunderlarra Exploration Limited |
| FROM | Greg Maude / Russell Mortimer - Southern Geoscience Consultants |
| DATE | 7/1/2014 |
| Report No. | **SGC2895** |
| RE | Allamber Project - Borehole Magnetic Survey Documentation/Modelling |

Down-hole magnetic data, including three component fluxgate readings and magnetic susceptibility logs, have been acquired at Thundelarra’s Allamber Project in the Northern Territory. The data have been processed and modelled by SGC to locate off-hole magnetic bodies.

This memo discusses the results of the borehole logs / surveys, and documents that data processing and modelling efforts that have been completed.

# Data Acquisition

Downhole orientation surveys along with magnetic susceptibility and conductivity logging were completed by Direct Systems Australia at the Allamber Project. The drill-hole details are summarised in the table below;

Table 1. Drill-hole details for downhole surveys at the Allamber Project.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **HOLE\_ID** | **PROSPECT** | **MGA52east** | **MGA52north** | **RL(m)** | **EOH(m)** | **DIPᵒ** | **AZIᵒ** |
| TAL136RC | Ox-Eyed | 822774 | 8497937 | 130 | 282 | -80 | 180 |

Three component fluxgate magnetometer and accelerometer readings from a magnetic orientation tool have been supplied for all drill holes at a station spacing of 0.5m.

Inductive conductivity, magnetic susceptibility and gamma radioactivity measurements are supplied for all holes at a station spacing of 0.1 m.

# Data processing

The Potent software used for down-hole magnetic modelling requires the three components of the magnetic field to be resolved for the geographical (East, North and Up) coordinates. Typically, downhole magnetic measurements are provided relative to the drill-hole direction, i.e. the Z, X and Y components as described in **Figure 1**. After some background checking, it was determined that the fluxgate tool used by Direct Systems (National Oilwell SR0027-R8) uses the same coordinate convention as described in **Figure 1**.

The first processing step is to calculate the 3 geographic components of the magnetic field from the raw data, there are two important caveats that must be considered during this processing step;

1. The azimuth of the drill-hole is calculated from the magnetic readings, assuming that the east component of the magnetic field is zero (i.e. the magnetic field direction is north-south). This is only true in the absence of magnetic material in and around the-drill hole. The presence of magnetic materials will distort the local magnetic field, resulting in the incorrect calculation of the azimuth. Survey points affected by magnetic material near the drill hole either need to be removed from the calculation (often a subjective process), or control points can be added to the drill-hole path from other surveys (such as a gyro survey), if available.
2. For very steep drill holes, accurate rotation readings required to calculate the X and Y component directions cannot be recorded. This means that the East and North magnetic field components cannot be resolved; however, modelling can still be completed using the Total Magnetic Intensity (i.e. (Bz2 + Bx2 + By2)1/2). This issue specifically affects drill-holes TALRC102, 116 and 117.

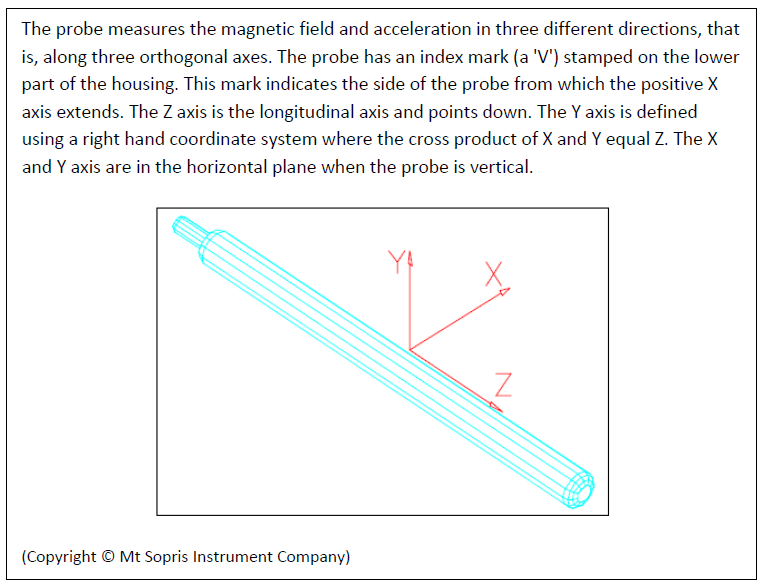


Figure . This diagram shows how the component directions are defined for the raw magnetic (Bx, By, Bz) and gravity (Gx, Gy, Gz) vectors.

Taking into account these factors, the data has been processed to resolve the geographical components of the magnetic field using the Raw2XYZ software. This programme is supplied with Potent software specifically for processing down-hole magnetic data.

An example of the processing is shown below (**Figure 2**). The raw magnetic and gravity components are processed to calculate the drill-hole azimuth and inclination, which are in turn used to resolve the three geographical components of the magnetic field. The EAST magnetic field is extracted by smoothing or straightening the azimuth by adding control points along the drill-hole path (i.e. where the azimuth is affected by local magnetic field variations).

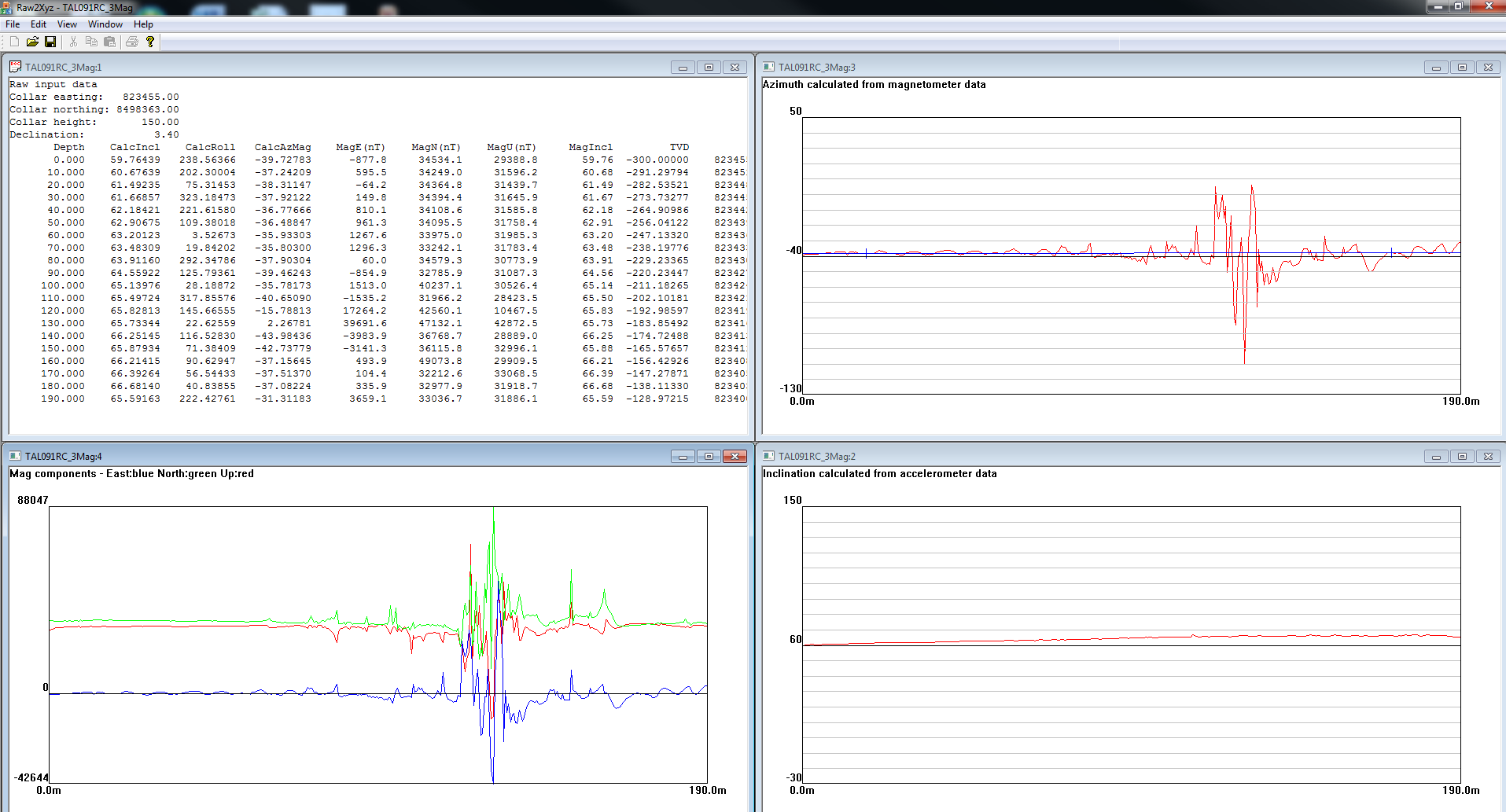


Figure . Processing down-hole magnetic data using the RAW2XYZ software. The calculated hole azimuth (RH top), hole inclination (RH bottom) and magnetic field traces (LH bottom – green is NORTH and red is UP and blue is east). In the calculated azimuth panel, control points have been added to straighten the azimuth (blue line in the azimuth panel) which then results in an EAST magnetic field trace that is not zero.

# Down-hole Magnetic Modelling

## TAL136RC

The down-hole magnetic susceptibility log for TAL136RC is shown in **Figure 22** and the magnetic profile in **Figure 23**.

Strongly magnetic mineralisation was intersected from 115 to 117 m DH with susceptibility values up to 0.35 SI. This intersection correlates with a strong TMI anomaly between 100 and 150m DH; the anomaly includes some high gradient readings at the intersection, and a broader anomaly from an off-hole source.

Figure 22. TAL126RC, magnetic susceptibility log.

Figure 23. TAL136RC, TMI log.

The off-hole anomaly has been modelled; the Potent model profiles are shown below in **Figure 24**.

The source of the anomaly appears to be located above and to the southwest of the hole, plunging north towards the hole. The magnetic susceptibility of the elliptical model shown below is 0.3 SI using dimensions of 20m x 30m x 60m.

Based on the modelling results, it appears as though TAL136RC has possibly just scraped the bottom edge of the magnetic body; the modelling indicates that the magnetic body is thicker to the south of the existing drill-hole.

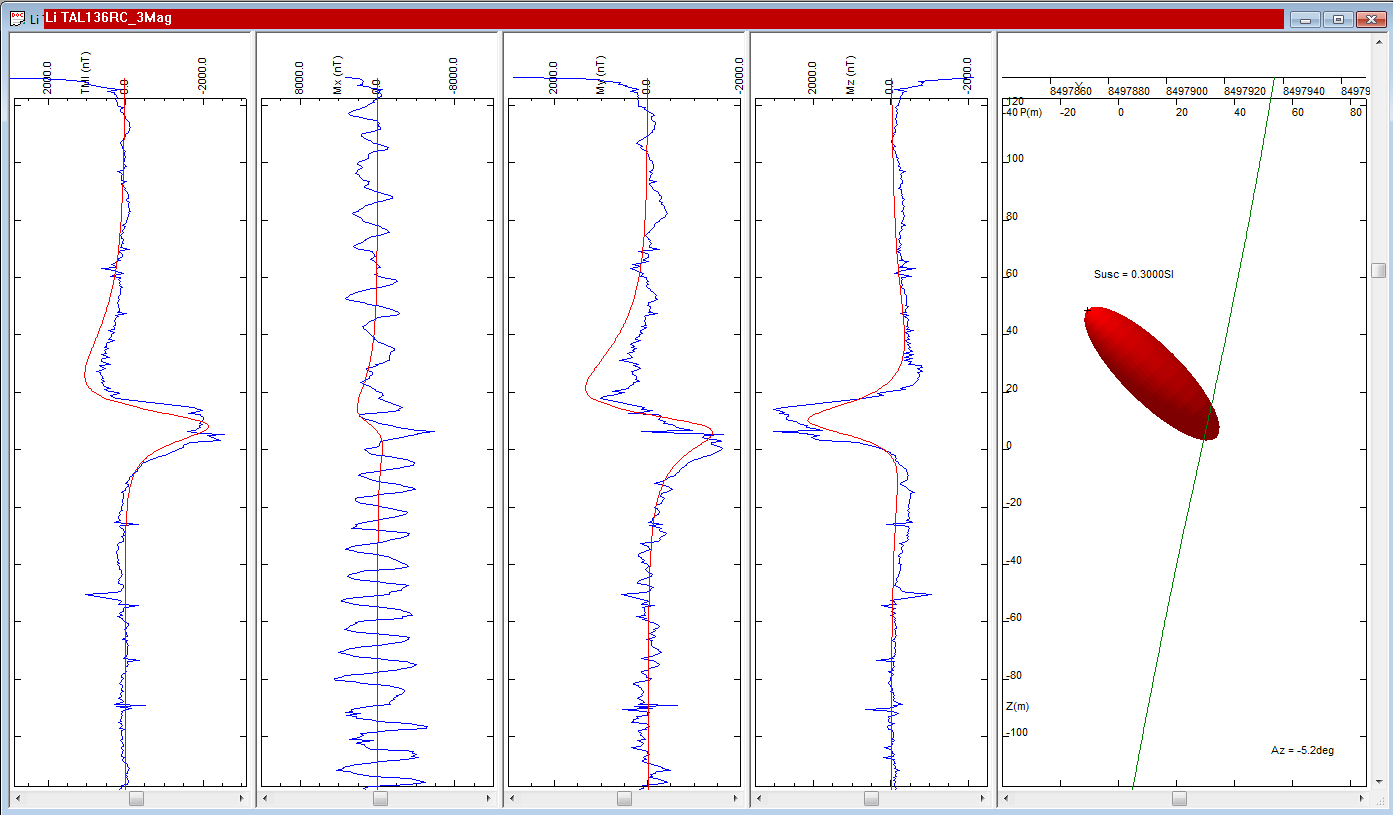


Figure 24. TAL136RC, downhole magnetic modelling. The four profiles on the left show the TMI, Mag-East, Mag-North and Mag-up components (blue is observed data and red is modelled data). The RH panel shows the drill-hole position (green trace) and the magnetic model body (red).