INTERPRETATION OF DHEM SURVEY DOWN 15BA001DD, BALFOUR PROSPECT, EL10/2014 WEST TASMANIA

Report for:

ZEBS MINERALS PTY LTD

by

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Summary

DDH 15BA001DD was drilled to a total length of 863.4m, targeted on an interpreted subtle gravity high at the Balfour Prospect in EL10/2014, West Tasmania (GHD, 2015). The hole intersected predominately metasediments for its entire length. Specific Gravity measurements were taken at ~4m intervals for the entirety of the hole and no significant differences in density were observed. The hole was on target and is regarded as having adequately tested the interpreted gravity high.

A DHEM survey was carried out down 15BA001DD in January 2017 to look for any potential ore-grade copper mineralisation within, say, a ~100m radius of the drill hole. No prospective responses have been identified.

This report contains the details of the DHEM survey. No recommendations for further work are given here; however, it is anticipated that these will be specified in a compilation and review of the legacy geophysical data for Balfour, which will be completed later this year.

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1. Introduction

Mining of copper and tin at Balfour date back to the early 1900s. There have been several exploration campaigns since then, including some this century. Callaghan (2011) provides a good summary of the previous work and notes that whilst there is little probability of a near surface (<200m deep) orebody, there has been little if any exploration at depth.

Zebs Minerals Pty Ltd (Zebs, the Company) holds EL10/2014 (Figure 1) which together with other Zebs' licences (EL13/2015, EL12/2015 and EL14/2015) covers the approximately 35 km long mineralised trend of the Balfour Shear. The 863.4m long DDH, 15BA001DD, is the first hole to test this zone at any significant depth.

This report presents the results and interpretation of a downhole electromagnetic (DHEM) survey down 15BA001DD.

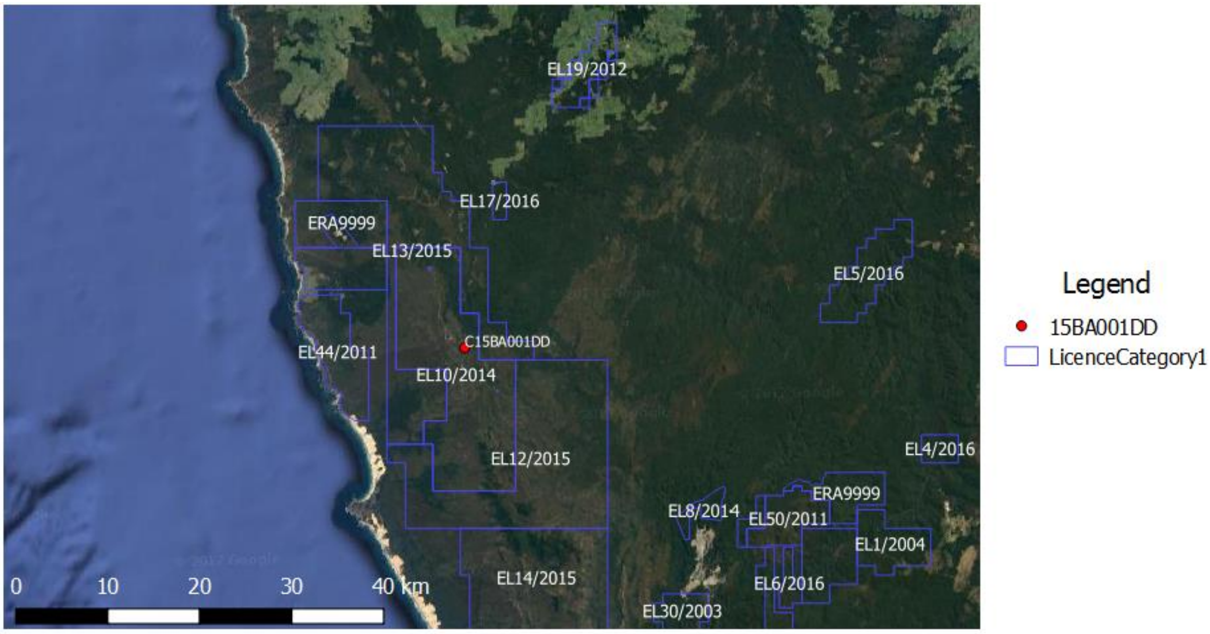

Figure 1. EL 10/2014 covers a long NW trending shear zone which can be seen in the surface topography. The zone is host to a number of base metal (primarily copper) mineral occurrences. The collar location of 15BA001DD (indicated) lies just outside the old mining township of Balfour, close to Murrays Reward open cut.

2. Survey Methodology

Zebs Minerals' EMIT DigiAtlantis acquisition system was used for the survey. Three overlapping transmitter loops (Figure 2) were employed to minimise the possibility of missing a conductor due to poor coupling.

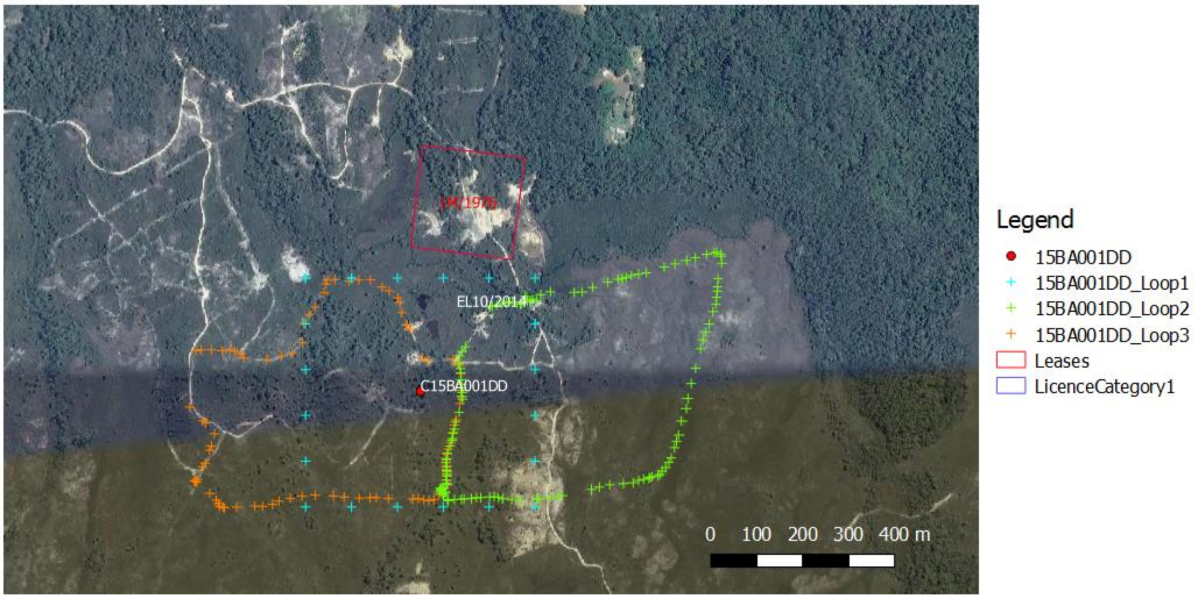

Figure 2. Three different loops were used for the DHEM survey. The 'collar loop', loop 1 position is idealised, since the GPS coordinates are missing at the time of writing this report (the implications of which are discussed in section 3)

The acquisition parameters are summarised in Table 1 and Figure 3 below: -

Table 1

Receiver Specification	
Instrument Type	DigiAtlantis System (Panasonic Toughbook and DigiAtlantis Controller)
Sensor	DigiAtlantis 3D Probe (triaxial fluxgate magnetometer)
Measured Components	A (axial); U (orthogonal to A in the (local) plane of the hole trace; V (orthogonal to A and U, such that **U x V = A**)
Measurement Units (B-Field)	pT/A (pico Teslas per Amp)
Transmitter Specification	
Transmitter	EMIT SMARTx4

Current Source	6 kVa Diesel Generator
Nominal Output	20 - 40 Amps / 120 - 180 Volts
Loop size	500 x 500m
Waveform	Square Wave 50% Duty Cycle
Base Frequency	8Hz (and varied for training purposes)

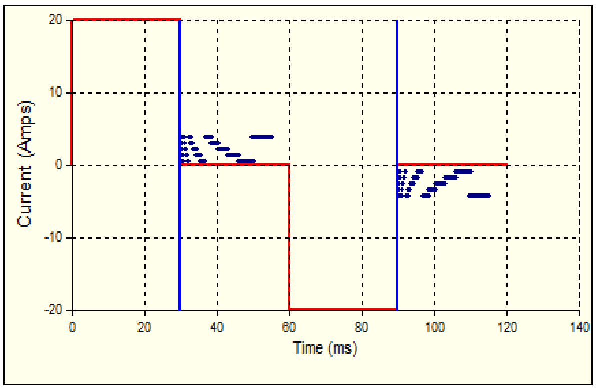

Figure 3. Transmitter waveform (50% duty cycle square wave) - Turn off (i.e. Ramp) time: 12 usecs. Current amplitude 20amps.

3. Results and Interpretation

No prospective responses were identified and the observed profiles can be adequately explained as being largely due to a weakly conducting (5 S) overburden.

Figure 5 and Figure 5 give plan and perspective views (respectively) of the near-vertical 15BA001DD, the three transmitter loop positions (with Loop 1 idealised), .dxfs of the Balfour Fault and old workings at Murrays Reward and (more northern) Central Mount Balfour, and the gravity highs (red) based on interpretations of unconstrained inverse modelling and structural enhancement processing by GHD in 2015.

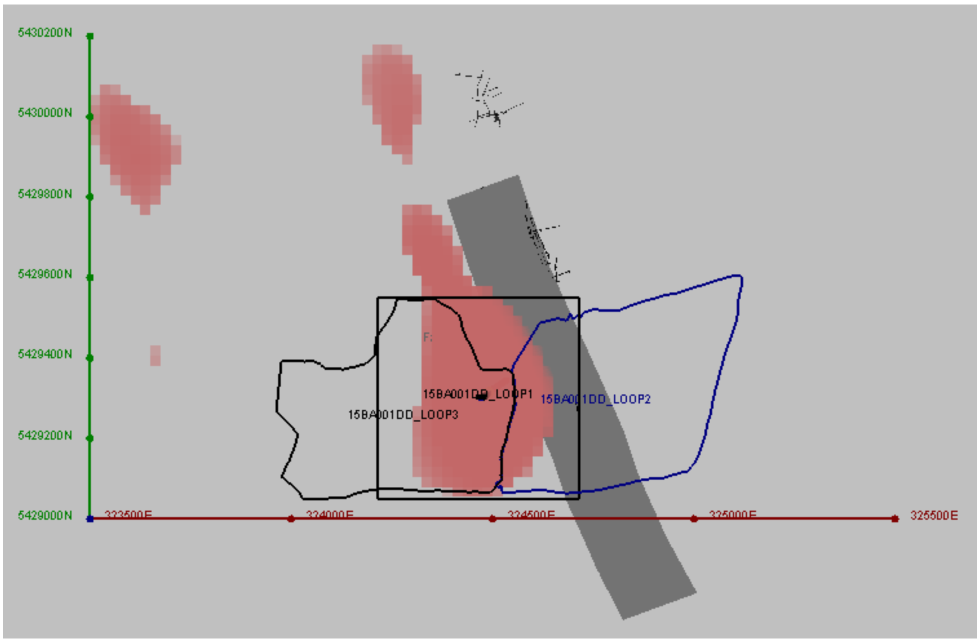

Figure 5. Plan view of the hole collar and the three transmitter loops (Loop 1 idealised,) plus. dxf's representing the Balfour Fault (grey), interpreted gravity anomalies (red) and Murray's Reward and (more northern) Central Mount Balfour mine workings (black)

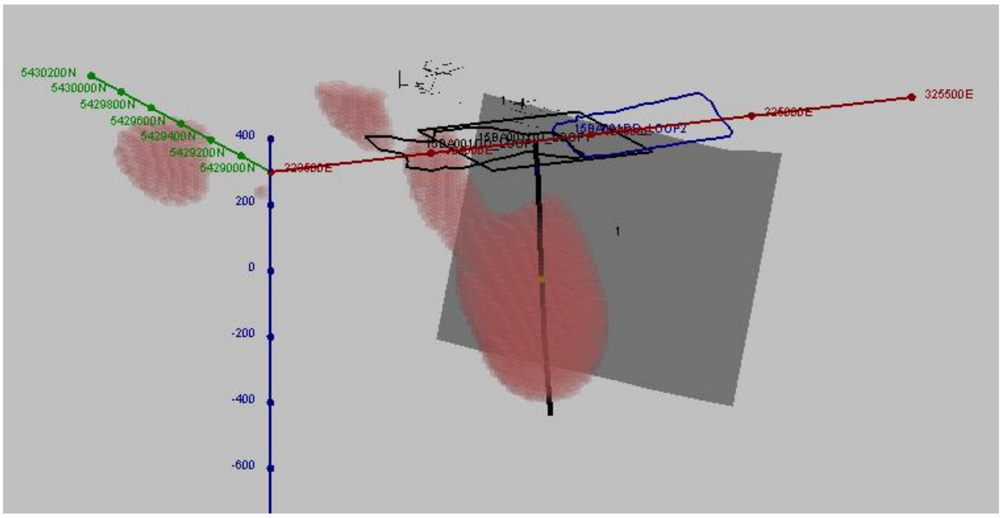

Figure 5. Perspective view shows that 15BA001DD intersected the interpreted gravity anomaly

Figure 7 compares the observed AUV data (in black) with the calculated response from the modelled overburden response (in red) for Loop 1. The overall match indicates that the gross features of the observed data can be attributed to overburden.

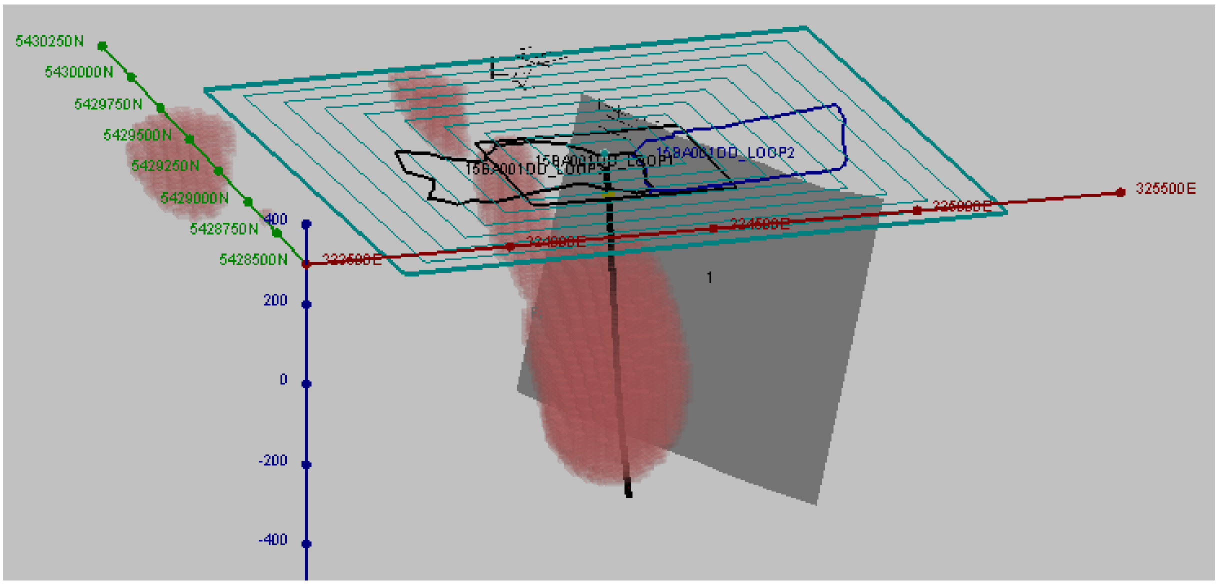

Figure 7. Perspective view of 15BA001DD displaying the overburden plate which providesa a satisfactory fit to the observed data

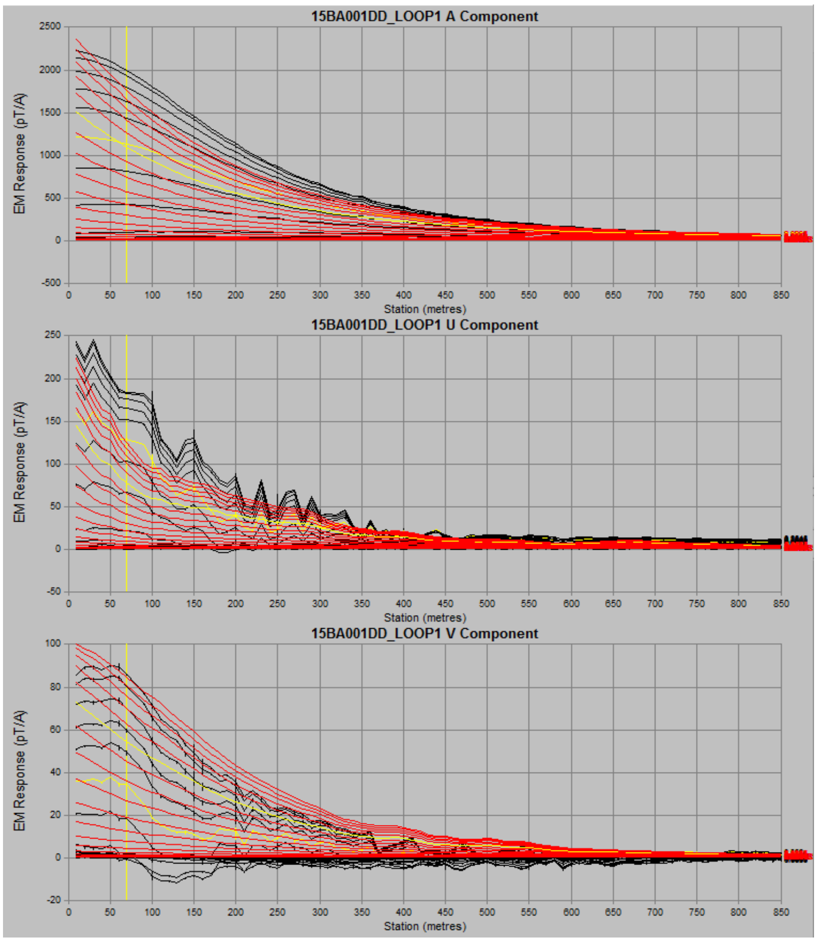

Figure 7. Loop 1 modelled overburden response (red) and observed data (black) for each of the three components A,U and V.

However, the overburden does not fit the intermediate to late-time observed data, especially for the axial component which decays relatively slowly (Figure 8). One possibility for such behaviour might be a distant conductor: i.e., the axial data could be exhibiting a ‘temporal response’ but not a ‘spatial response’ since the conductor is too far away from the hole. However, a target conductor, even a large one, will exhibit an exponential decay, whereas a conductive earth (modelled as a uniform conductive half space) will have a power law decay: $t^{-1.5}$ for B field measurements (or $t^{-2.5}$ for dB/dt.)

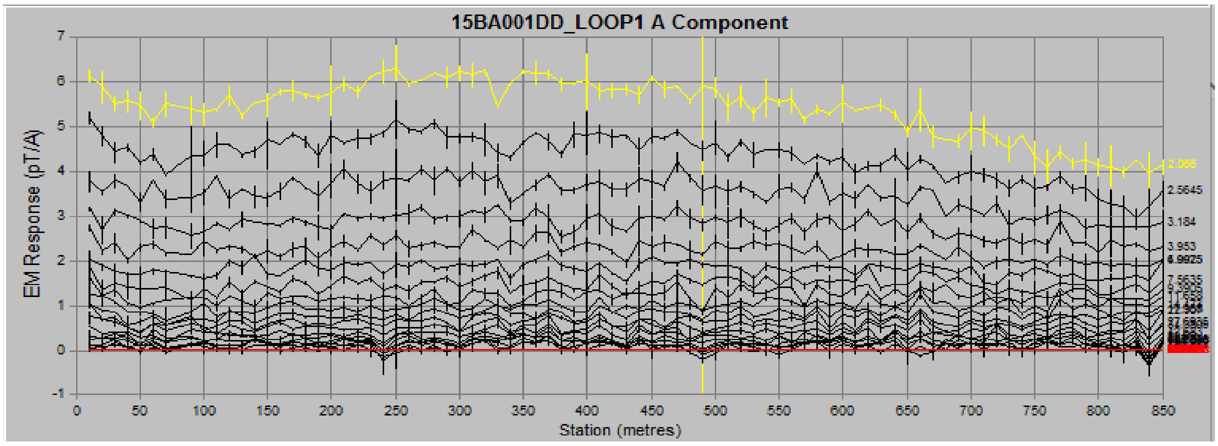

Figure 8. Channels 15-29 (ie, time interval 2.07ms to 42.68ms) for A component, loop 1 data, showing a relatively slow decay. A decay analysis (Fig. 3-6) shows this is due to an unconfined conductor (half space/fault).

Analysis of some representative observed decays from the loop 1 axial data indicates that they fit a power law rather than an exponential decay (Figure 9); i.e., the observed response is due to an unconfined conductor(s) such as a half space or shear zone and not to a prospective target.

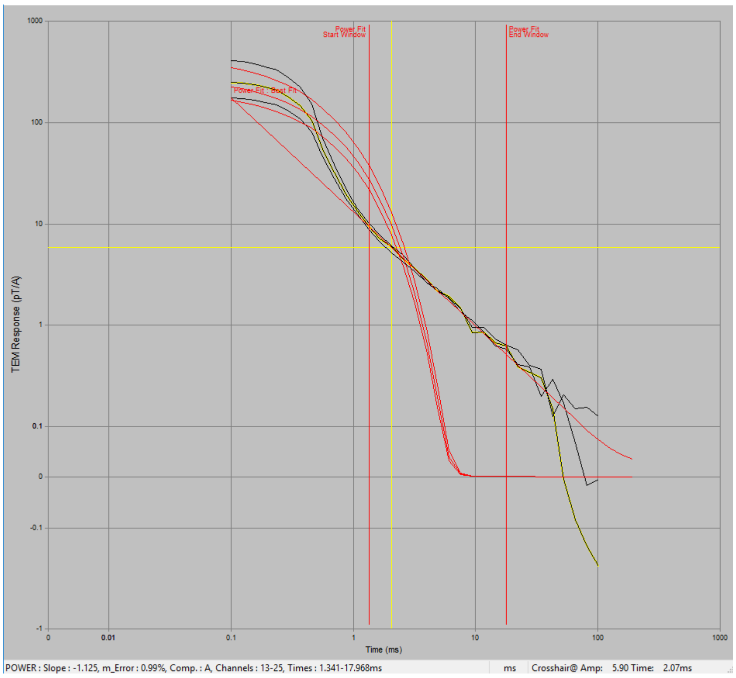

Figure 9. The exponential decay from the model overburden (in red) is compared with the observed decays for selected A component data, loop 1 (in black). A decay analysis shows a good fit to a power law, $t^{-1.13}$, which is acceptably close to the $t^{-1.5}$ decay from a uniform half space to conclude that the observed response is not due to a target conductor.

It was noted above that for this modelling, the GPS coordinates for Loop 1 had not been retrieved from the hand-held GPS unit used to collect the data and an idealised loop of just the four proposed vertices was used for the modelling. This was later compared with an ‘inferred loop’ which more closely matched the likely actual loop. Inferred loop 1 took its northern and southern sides from loops 2 and 3, with the eastern and western sides remaining idealised. Comparison shows an observable but not significant difference in the model responses from these two loops since the topography is reasonably flat in this area.

Little was known about the potential orientation of mineralisation in 15BA001DD since no other holes had penetrated so deeply and any mineralisation in the vicinity might or might not be conformable. As a result, three overlapping loops were designed to couple well with mineralisation in any orientation. The observed responses from Loops 2 and 3 (Figure 10 and Figure 13 respectively) were, as with Loop 1, largely attributed to overburden.

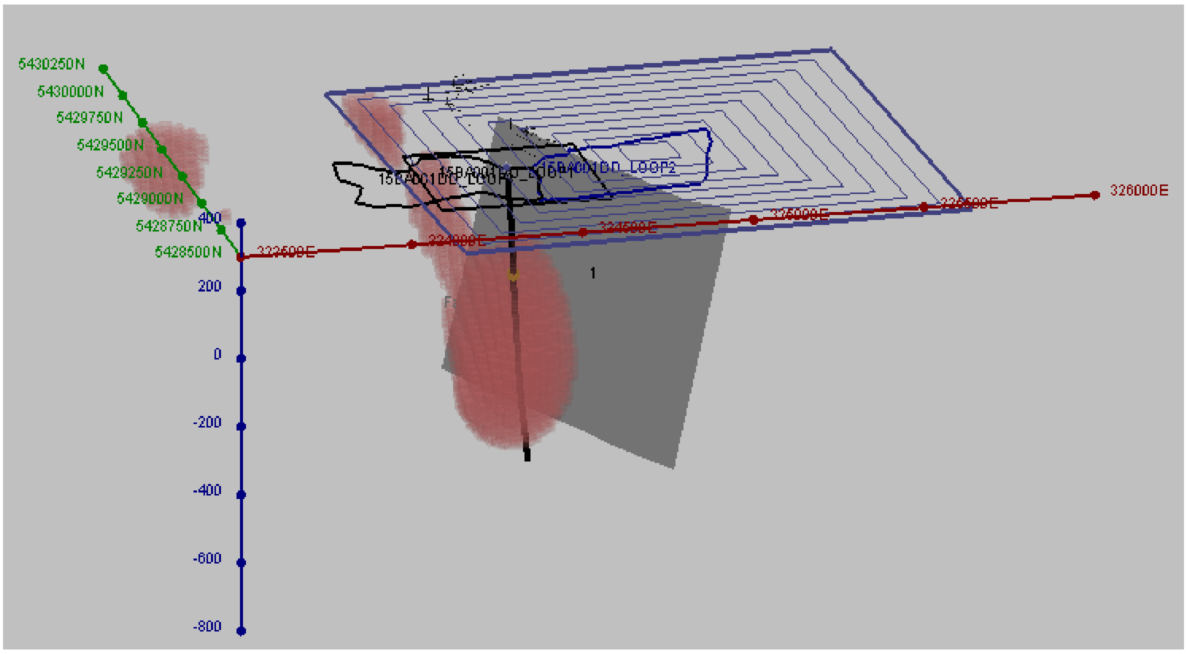

Figure 10. Perspective view of 15BA001DD showing modelled overburden corresponding to Loop 2

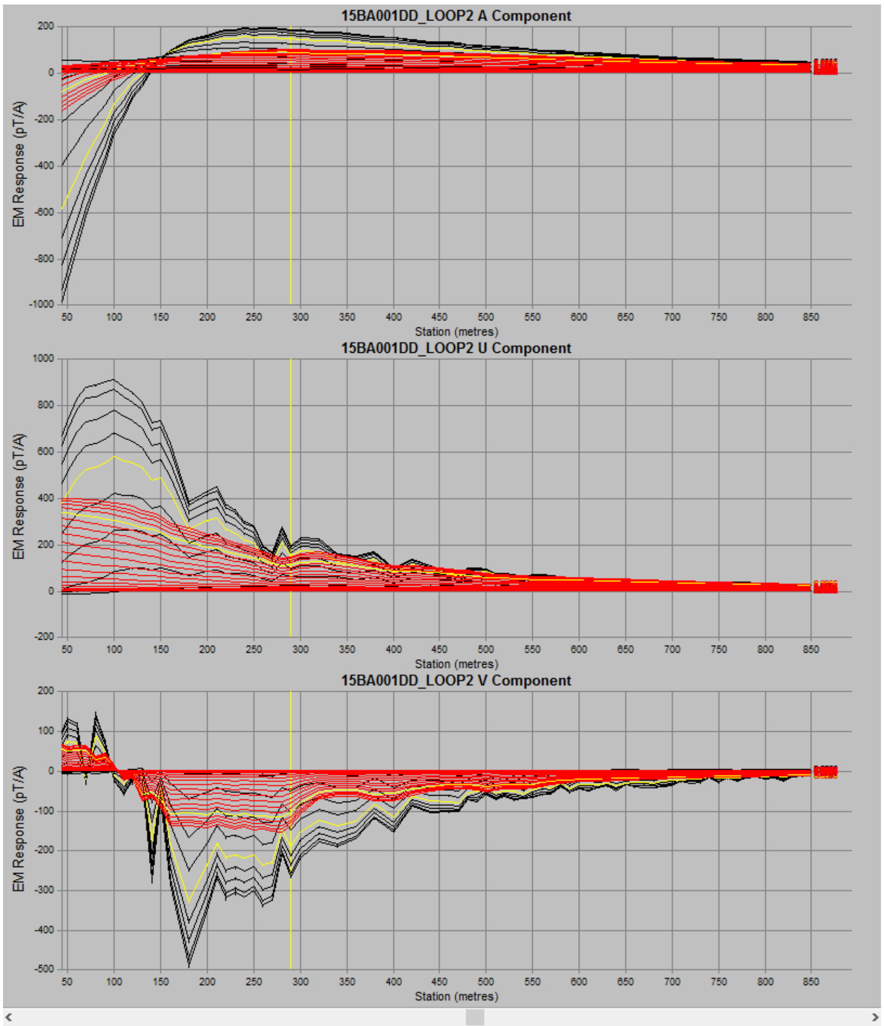

Figure 11. Loop 2 modelled overburden response (red) and observed data (black) for each of the three components (A,U and V)

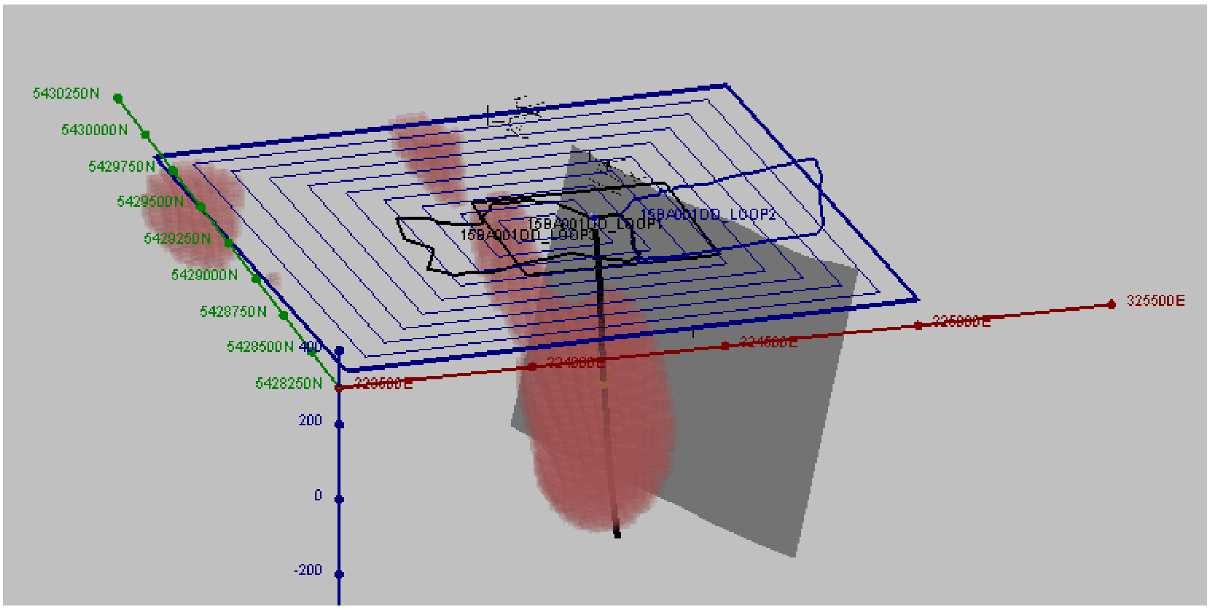

Figure 13. Perspective view of 15BA001DD showing modelled overburden corresponding to Loop 3)

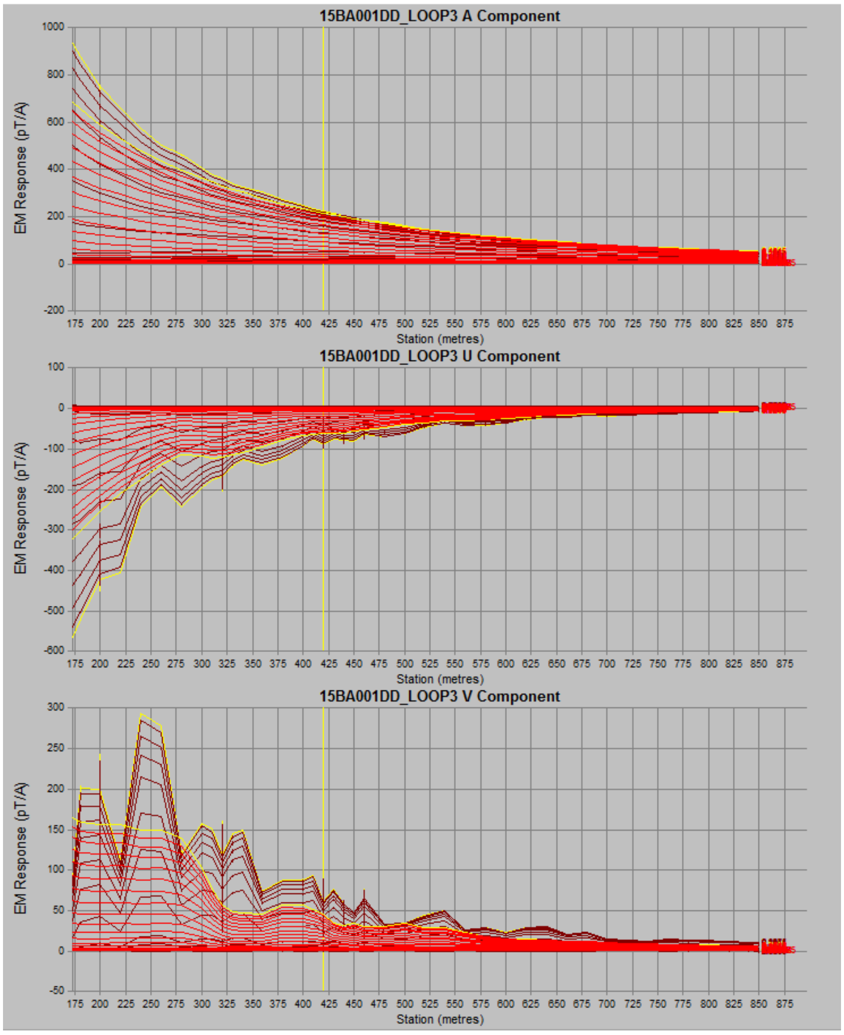

Figure 12. Loop 3 modelled overburden response (red) and observed data (black) for each of the three components (A,U and V

4. Conclusions and Recommendations

The target of ore-grade copper mineralisation (ranging from 1-3% up to ~35% Cu as occurs at Murray's Reward) would be expected to be moderately to very conductive. The DHEM results suggest there is no such target within say 100m of 15BA001DD.

This is only the first deep drill hole into the Balfour Shear Zone and the area must still be regarded as highly prospective. It is anticipated that specific recommendations will arise from a thorough review of the legacy geophysical data, and it is likely that these would include deep-seeking geophysical surveys such as, for example, AMT.

It is however, worth commenting here on the targeting of 15BA001DD. The *Interview Granite* which outcrops on the west coast has been interpreted to top out at less than 2km below surface at Balfour. This granite (along with Tasmania's other Carboniferous-Devonian granites) is significantly less dense than the country rocks and produces a marked gravity low where outcropping or sub cropping. Callaghan (2011) comments on both a regional gravity low and a local gravity low in the vicinity of Balfour.

The 'unconstrained (inverse) modelling' reported in GHD's 62721 report (GHD, 2015b) has presumably not used any previous knowledge; specifically, the depths to the underlying granite as shown, eg, in Bottrill and Taferi (2003). And the later 2D forward modelling, (GHD, 2015c), which extends below 2kms, does not include any granite in the model suite.

Effective gravity modelling requires determination (and subtraction) of a background regional level. This is usually done subjectively and we suggest that the gravity 'high' interpreted by GHD (2015b & c) is the result of an incorrectly determined regional; i.e., rather than a gravity high along the shear zone, there is actually a gravity low on its western flank. Hence the reason for the lack of any significant variation in SG down 15BA001DD.

It is also worth noting that mineralisation buried at depths of below, say, 200m would be unlikely to produce a recognisable gravity response. As an example, it is arguable whether Tasmania's >16Mt Hellyer massive sulphide deposit, which topped out at ~90m, had a recognisable gravity response. Thus, the lack of a gravity response should not be taken as an indication of lack of prospectivity; rather a confirmation that any target here is likely to be deep.

5. References

Bottrill, R.S. and Taheri, J., 2003. Ground truthing of Western Tasmanian Regional Minerals Program geophysical data in the Balfour-Temma area. MRT Geological Survey Record 2003/18.

Callaghan, T., 2011. El27/2007 and EL40/2007 Prospectivity Review, 2011 Balfour District. Report for Balfour Management Pty Ltd.

GHD, 2015a. Balfour area prospectivity review: Structural enhancement setting.

GHD, 2015b. Balfour area prospectivity review: Potential field unconstrained modelling.

GHD, 2015c. Balfour area prospectivity review: 2D forward modelling.