Appendix 3

Interpretation of Mt Read 2001/2002 Tasmanian Geological Survey Helicopter EM data

Interpretation of Mt Read 2001/2002
Tasmanian Geological Survey
Helicopter EM data

EL 47/2003 “Tullah” and EL48/2003 “Mt Block”

for

SARACEN MINERAL HOLDINGS LTD

By

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SUMMARY

Analysis of numerous responses in the Mt Read 2001/2002 helicopter electromagnetic data set has identified 9 targets within EL47/2003 “Tullah” and EL48/2004 “Mt Block” as potentially representing conductors that require further follow up. The choice of these targets was largely controlled by the interpretation of the conductor’s quality and its geometry with emphasis placed on targets that could not be unambiguously identified as being due to broad formational or overburden conductive features. It is nevertheless recommended that a geological evaluation of the responses analysed but not included on the list generated from purely geophysical considerations is carried out before they are discarded as targets of no or little potential value.

INTRODUCTION

A total of 15600 line kilometres of regional helicopter electromagnetic (HEM) data were acquired in four separate areas during 2001 and 2002, as part of the Western Tasmanian Regional minerals Program (Reid 2003). The survey areas are prospective for a wide range of mineralization styles; including Palaeozoic VHMS replacement tin skarns, vein lead-zinc silver, gold, nickel and copper.

The purpose of this report however is to give the results of the analysis of the HEM data from one of the four flown areas, namely the Mt Read survey which encompasses the exploration licences EL 47/2003 and EL 48/2003 currently held by Saracen Metals Pty Limited (Figure 1)

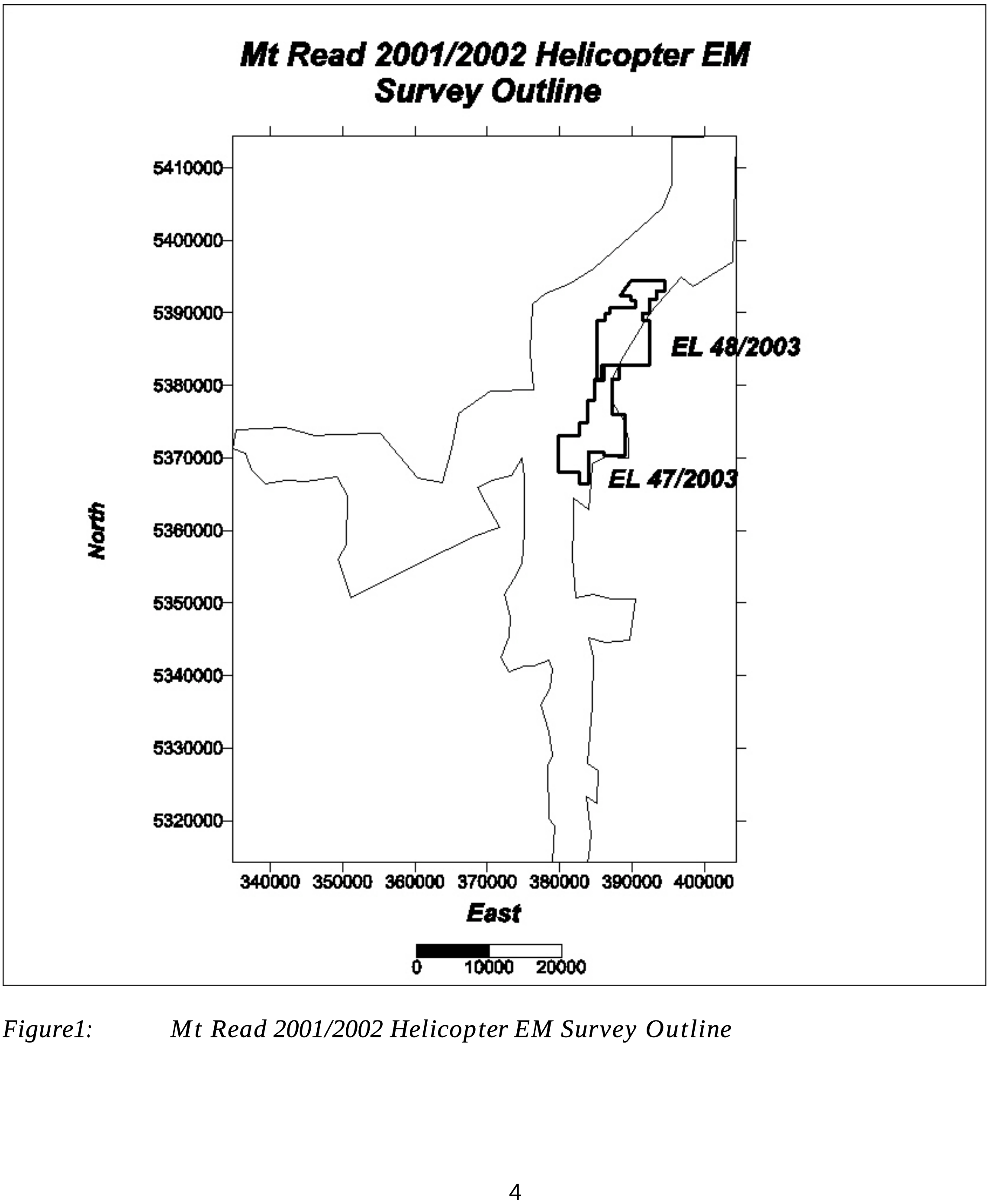


Figure1: Mt Read 2001/2002 Helicopter EM Survey Outline

DATA ACQUISITION

Data were acquired using the Geotech Hummingbird HEM system. The survey contractors were Geo Instruments Ltd (January 2001) and Fugro Airborne Surveys (Late 2001 – 2002).

The Hummingbird HEM system employs both horizontal coplanar (HCP) and vertical coaxial (VCX) transmitter receiver geometries. Typical system parameters are listed in table 1.

Table 1.

Hummingbird System Parameter		
Frequency (Hz)	Coil Separation (In)	Orientation
34111	5.10	HCP
7004	6.29	VCX
6600	6.29	VCP
985	6.03	VCY
880	6.03	VCP

Nominal bird height for the survey was 30 m, although actual heights were often greater than this due to the rugged and heavily forested terrain. Flight lines at 200 meter line spacing were directed east-west in the Mt Read survey area.

HEM RESPONSE OVER CONDUCTIV E TARGETS

To illustrate the nature of HEM responses in particular of the Hummingbird system a number of theoretical models were generated for a 200 x 200 meters plate (thin) like conductor with a conductivity thickness product of 50 siemens and for a variable depth to top and dip. This target was set in a typical resistivity environment for the area, a thin 50 ohm meters layer over a relatively resistive basement of 500 ohm-meters.

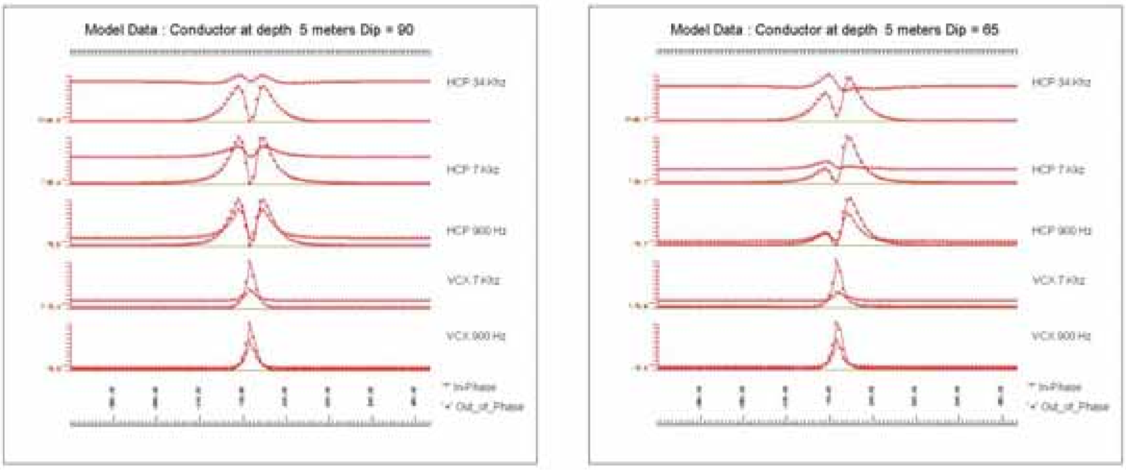


Figure 2 & 2a: Model Data: Conductor at depth 5 meters Dip 90 and 65

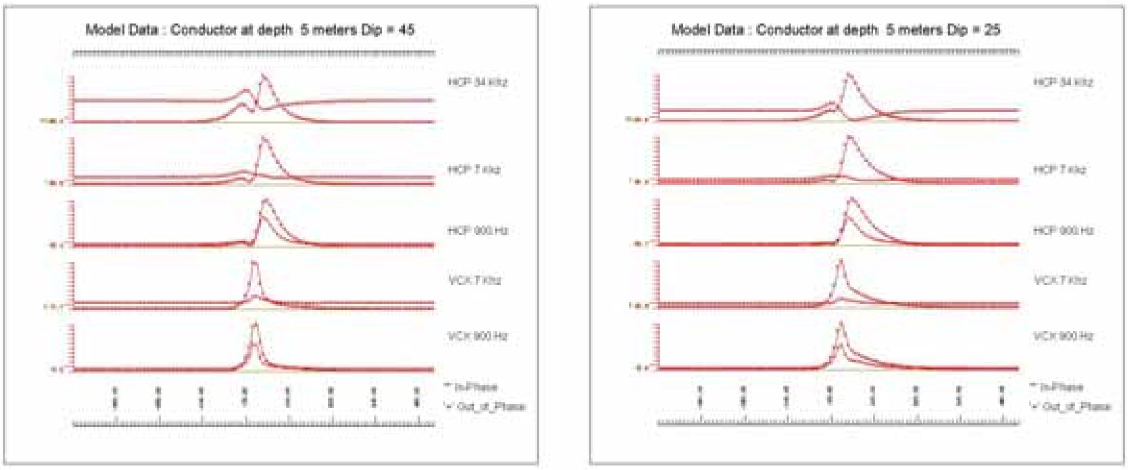


Figure 2b & 2c: *Model Data: Conductor at depth 5 meters Dip 45 and 25*

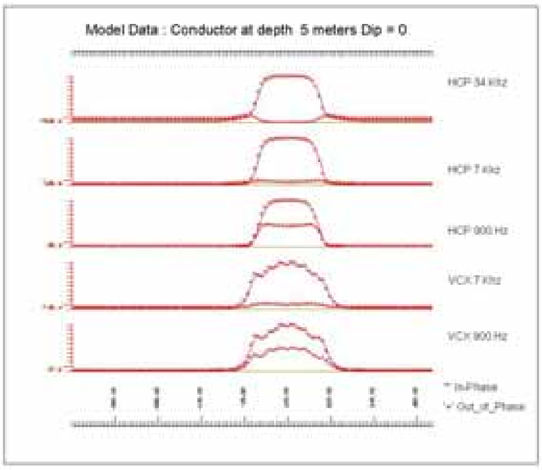
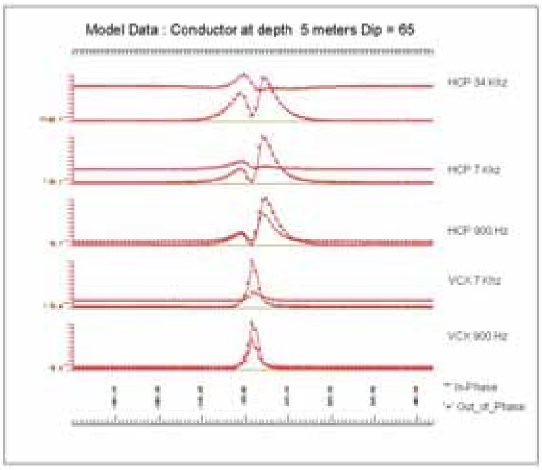


Figure 2d: *Model Data: Conductor at depth 5 meters Dip 0*

As is evident from profiles in the Figure 2 to 2d, the response over plate like targets are invariable characterised by a localised minimum in the coplanar (HCP) response over the top of the target and a peak in the coaxial (VCX) anomaly at the target location. The peak in the coplanar anomaly generally does not correspond or coincide to the maximum in the coaxial response. This offset between the coplanar and coaxial anomaly peak is related to the dip of the target (Figures 2 – 2c). These is true for all the conductors with dips significantly greater than zero (or flat) and as is evident in Figure 2d, over the relatively flat laying targets the profile shapes of the coaxial and coplanar anomalies are indeed similar. These modelling results than essentially illustrate that the analysis of the relationship between the coaxial and coplanar responses can be used to determine or at least estimate the geometry of the conductor causing the response.



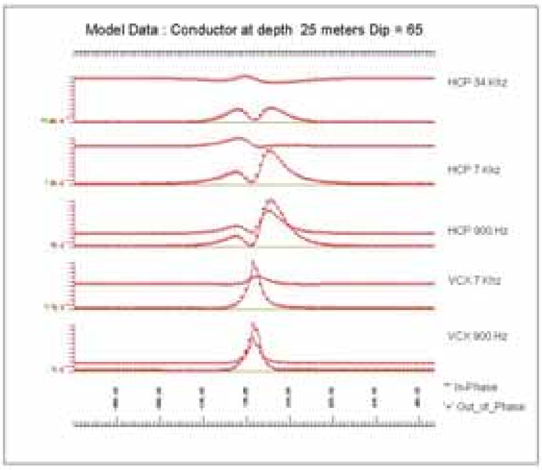
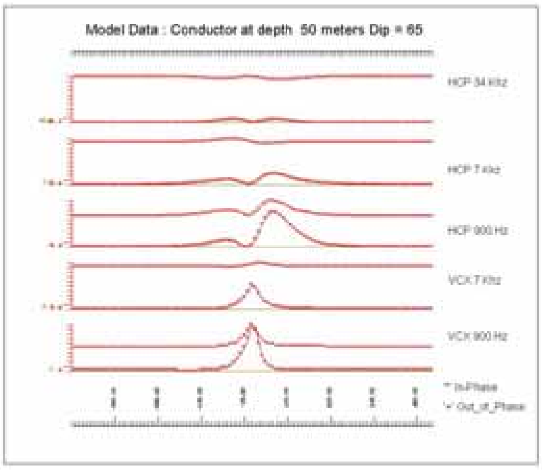


Figure 3 & 3a: *Model Data: Conductor at depth 5 and 25 meters Dip 65*



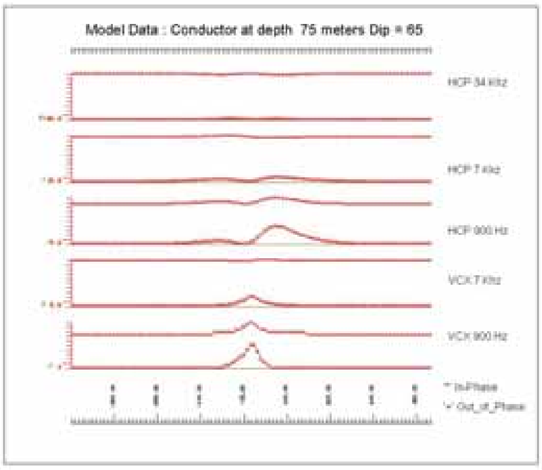


Figure 3b & 3c: *Model Data: Conductor at depth 50 and 75 meters Dip 65*

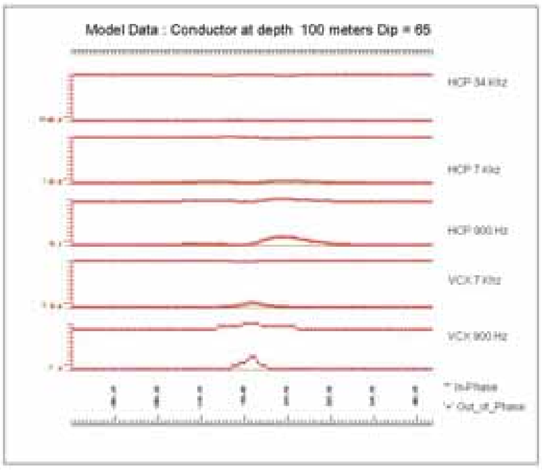


Figure 3d: *Model Data: Conductor at depth 100 meters Dip 65*

Profiles of modelled data as shown in Figures 3 to 3c, however illustrate the "dramatic" decrease in the target response with target depth. In fact considering the noise levels for the Mt Read survey and using these results it can be estimated that the penetration of the Hummingbird HEM system for isolated 3D conductive targets was not more than 75 meters, and in some cases not more than 50 meters.

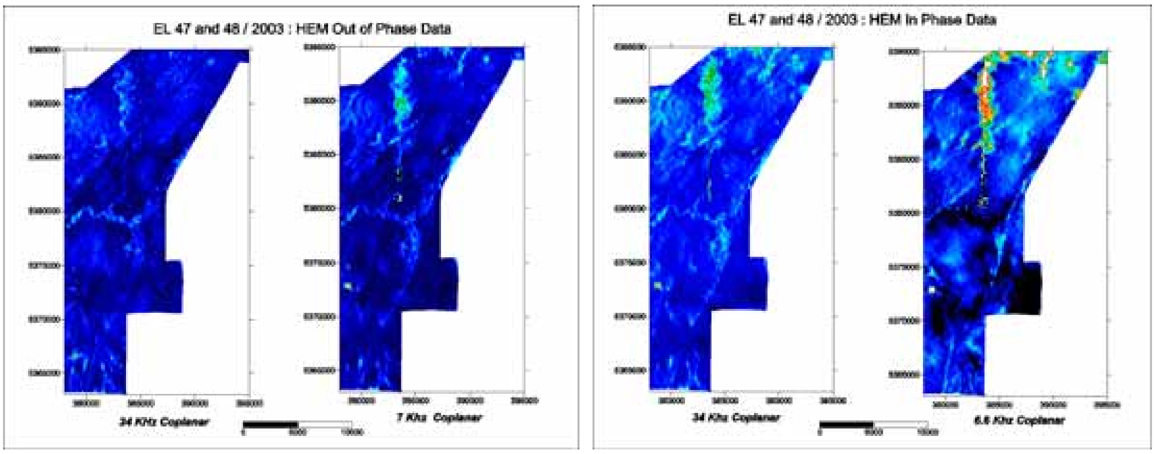


Figure 4 & 4a: *EL 47 and 48/2003: HEM In and Out of Phase Data*

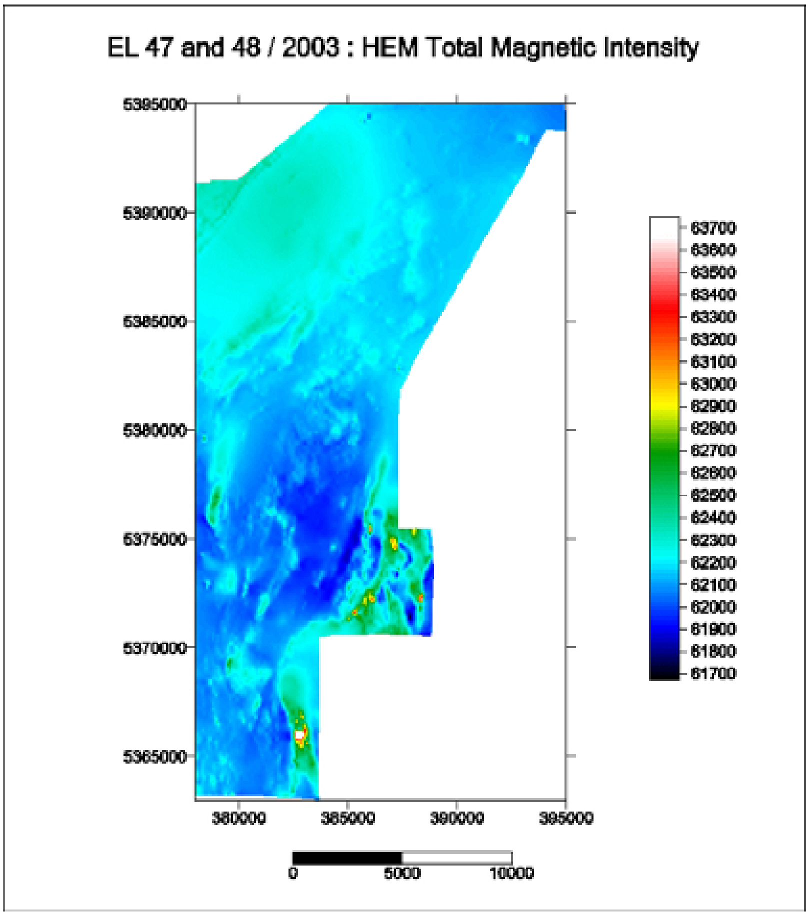


Figure 4c: *EL 47 and 48/2003: HEM Total Magnetic Intensity*

INTERPRETATION OF MT READ HEM

Interpretation of Mt Read data essentially consisted of carefull analysis of some 9 responses and listed Appendix I.These locations were essentially chosen on the basis of analysing the imaged data and decomposition of the HEM responses into its anomalous constituents as for example described in Silic 2004 (Appendix IV).

Of the many responses analysed most of these were rejected on the bases that they most likely represent overburden, transported cover or broad litho logical units. Analysis of the relationship between the coplanar and coaxial anomalies as briefly discussed in the previous section was an important factor in this decision or elimination process. The targets kept using this selection criteria are listed in Table 2.

Table 2 however lists the nine targets within EL 47 and 48/2003 which are recommended for follow up.

Table 2: EL 47 and 48 / 2003 HEM targets

Target No	East	North
11	391580	5393750
18	387500	5385050
38	387290	5382805
39	384250	5374575
40	384500	5374250
43	384250	5373400
62	379900	5370400
86	386350	5380755
91	385360	5377850

Discussion of these targets is then given in Appendix I and II.

CONCLUSION

Analysis of numerous responses in the Mt Read 2001/2002 helicopter electromagnetic data set has identified 9 targets within EL47/2003 “Tullah” and EL48/2004 “Mt Block” as potentially representing conductors that require further follow up. The choice of these targets was largely controlled by the interpretation of the conductor’s quality and its geometry with emphasis placed on targets that could not be unambiguously identified as being due to broad formational or overburden conductive features. It is nevertheless recommended that a geological evaluation of the responses analysed but not included on the list generated from purely geophysical considerations is carried out before they are discarded as targets of no or little potential value.

APPENDIX I

EL 47 and 48/2003 Targets

MT READ 11

Target 11 is set within a brad conductive unit .The lack of correspondence or coincidence between the peaks in the coaxial and coplanar anomalies suggests that the conductor is a dipping isolated target rather than a part of a broad conductive unit. There is no clear or unambiguous association between this conductor response and the magnetic data.

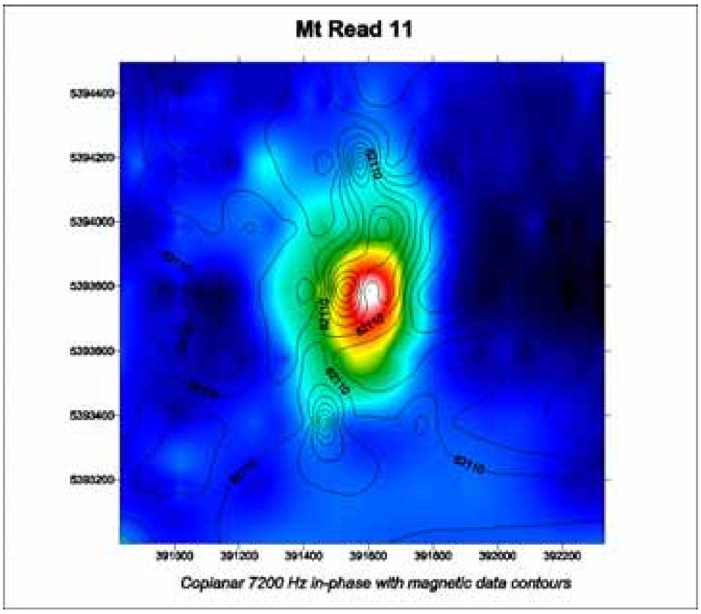


Figure 11_1: Mt Read 11

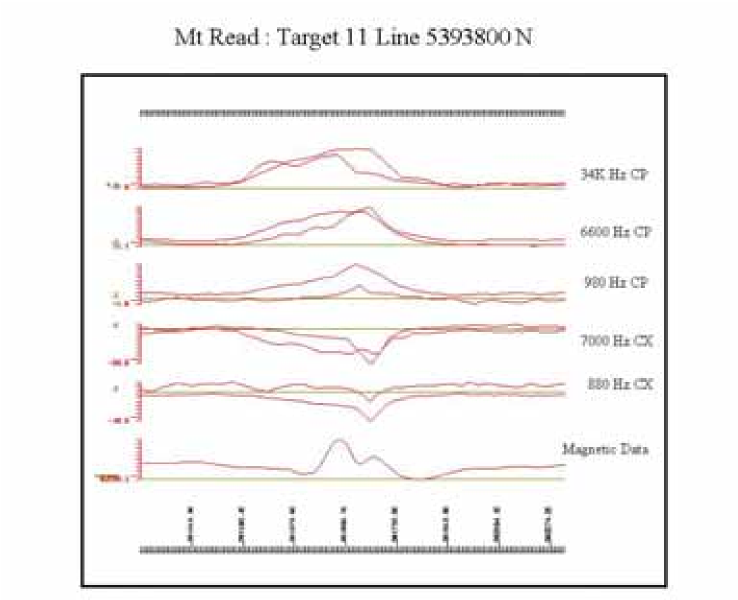


Figure 11_2: Mt Read: Target 11 Line 5393800 N

MT READ 18

Target 18 is an isolated EM response that seems to strike a NW direction. Relationship between the coaxial and coplanar anomalies however suggests a relatively flat dip.

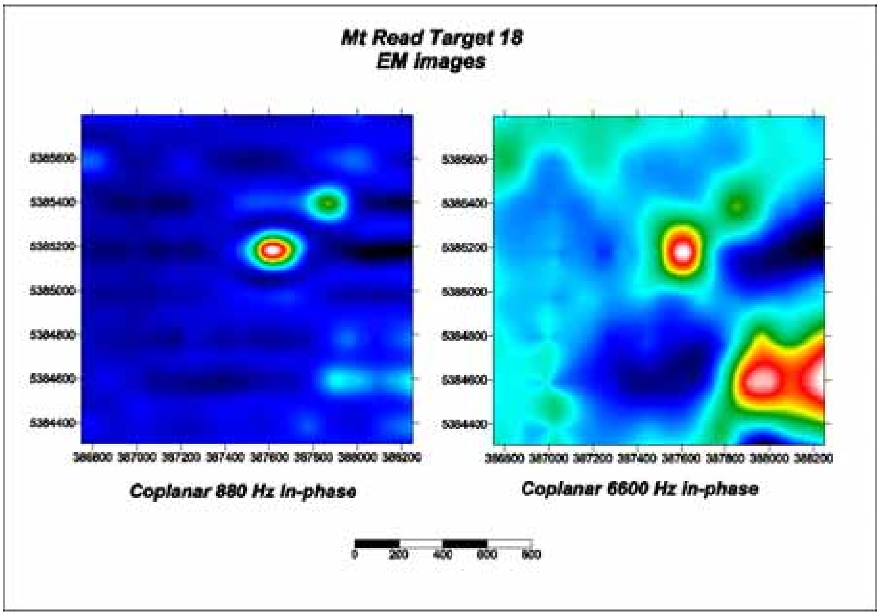


Figure 18_1:   Mt Read Target 18 EM Images

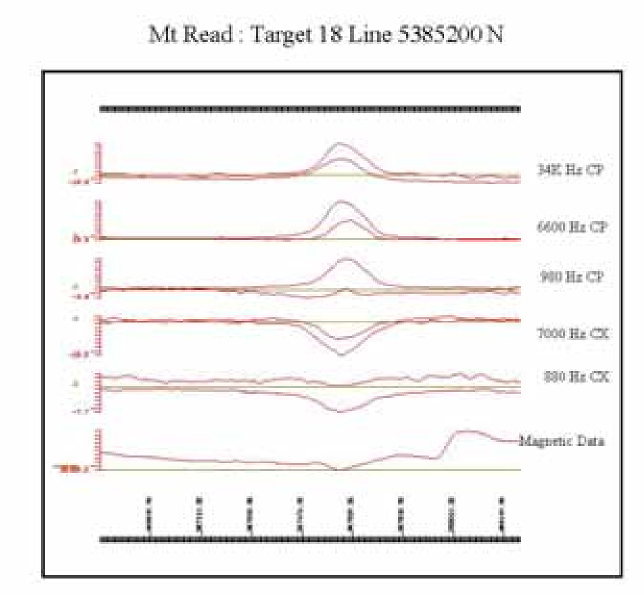


Figure 18_2:   Mt Read: Target 18 Line 5385200 N

MT READ 38

Target 38 response is characterised by a high in phase to out of phase ratio indicative of quality conductor, and coaxial anomaly peeks which are closely aligned in a local coplanar anomaly minimum. The latter may be indicative of a dipping target. As well this response can be unambiguously associated with a magnetic anomaly. Considering that this response is close to the edge of the Macintosh dam it is not clear if indeed this EM anomaly is not due to culture.

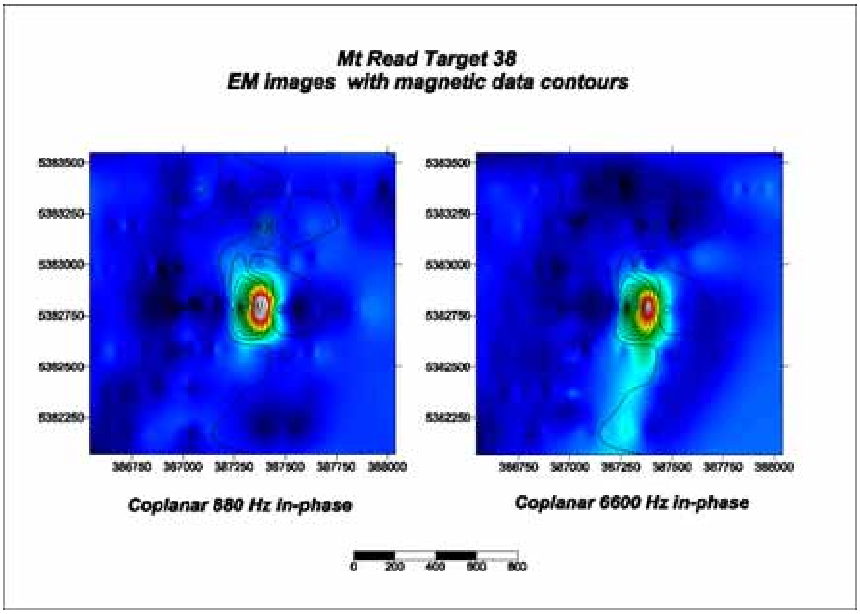


Figure 38_1: Mt Read Target 38 EM Images with magnetic data contours

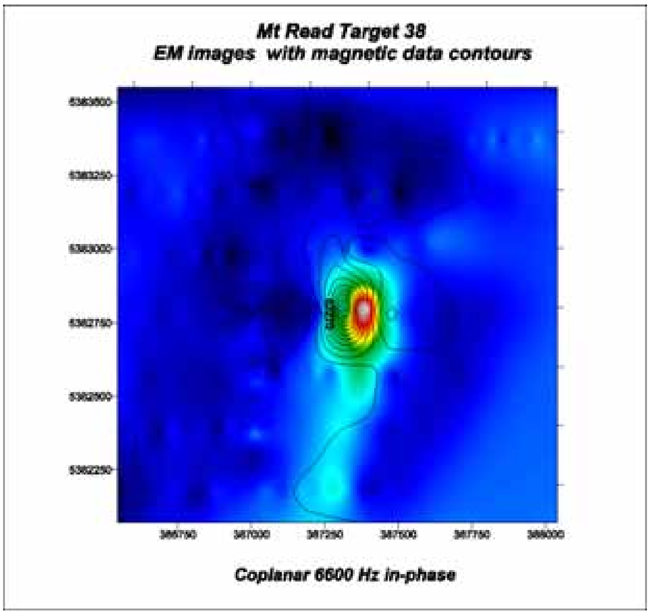


Figure 38_1a: Mt Read Target 38 EM Images with magnetic data contours

Mt Read : Target 38 Line 5382800 N

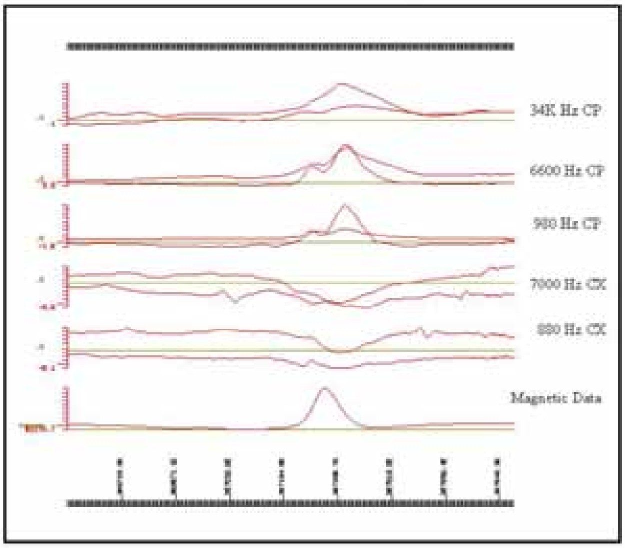


Figure 38_2:   Mt Read: Target 38 Line 5382600 N

MT READ 39/40

Target 39/40 response is complex and appears to be closely correlated with a separate magnetic unit. It is definition is mainly evident as separate responses or peaks at the lower frequencies but contained within a much broader priority conductive unit.

The complexity of the response and data noise levels however precludes a precise definition for the geometry of this target.

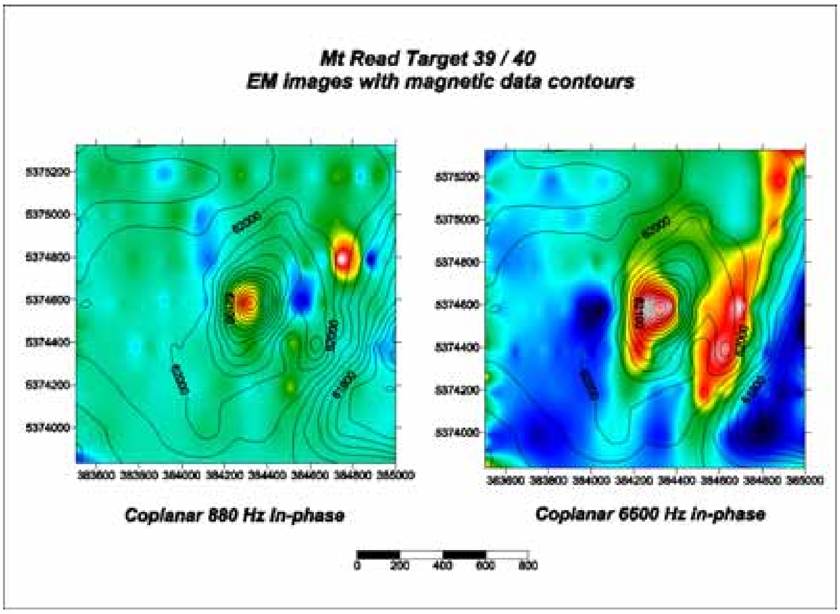


Figure 39_40_1: Mt Read Target 39/40 EM Images with magnetic data contours

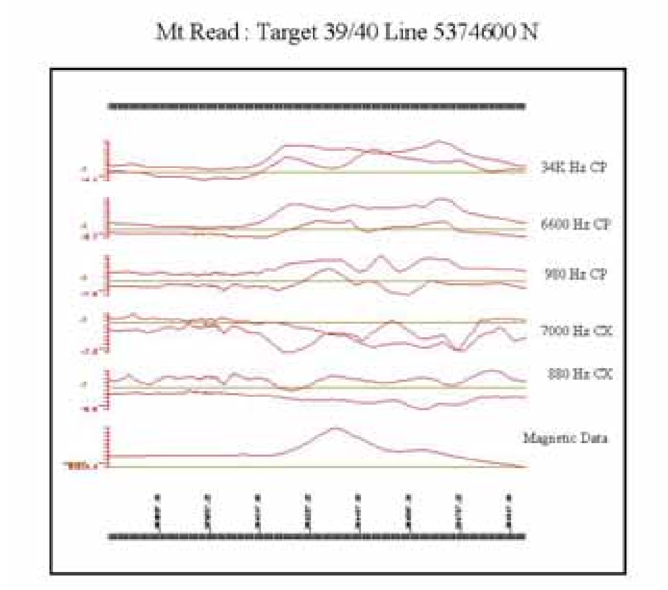


Figure 39_40_2: Mt Read: Target 39/40 Line 5374600 N

MT READ 43

Target 43 is associated with significant in phase response at all he frequencies although on some line the lowest frequency response because of the data noise levels is not so readily apparent in the imaged data .Peaks in the coaxial anomaly which correspond with a local minimum in the coplanar response suggest a dipping target.

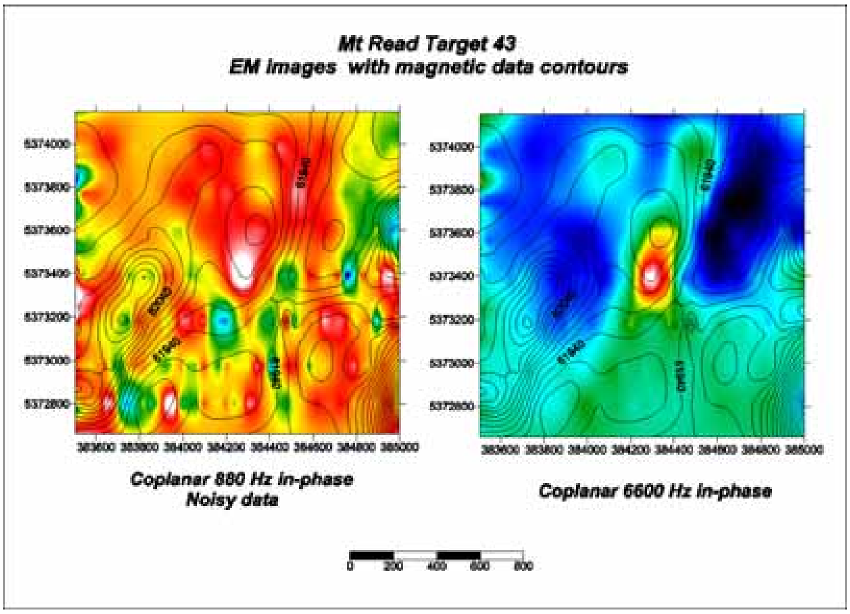


Figure 43_1: Mt Read Target 43 EM Images with magnetic data contours

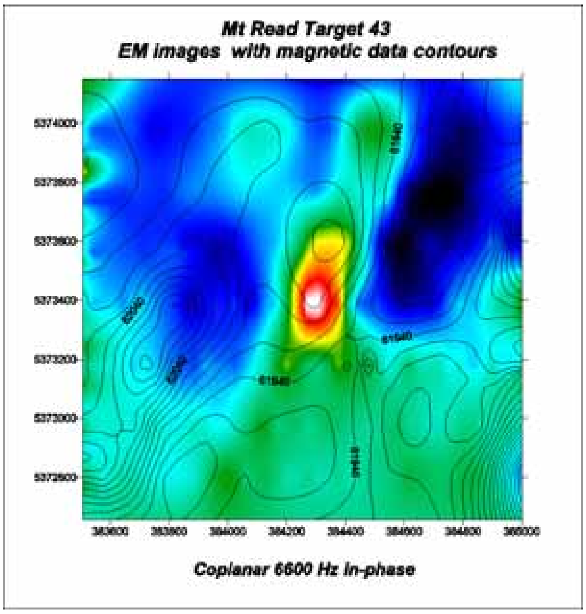


Figure 43_1a: Mt Read Target 43 EM Images with magnetic data contours

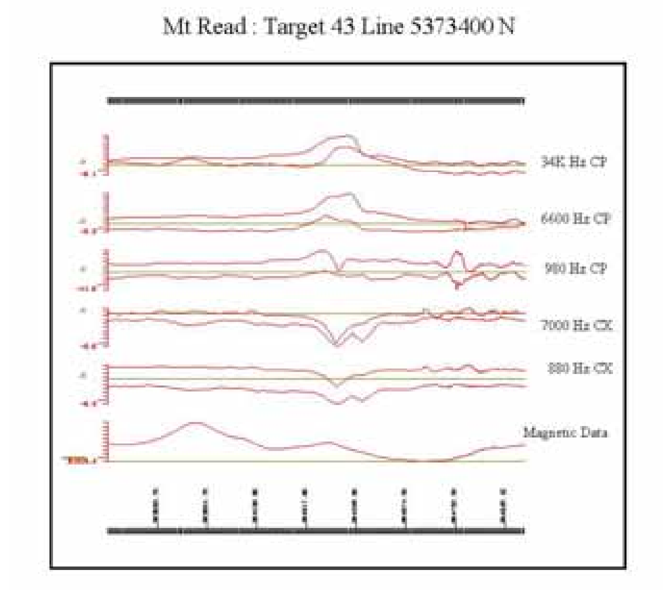


Figure 43_2:   Mt Read: Target 43 Line 5373400 N

MT READ 62

Target 62 is a law priority target which is set within a much broader poorly conductive unit. Data on the adjoining lines within the survey area shown in Figure 2, is complex and noisy and as such the definition of this target is not precise.

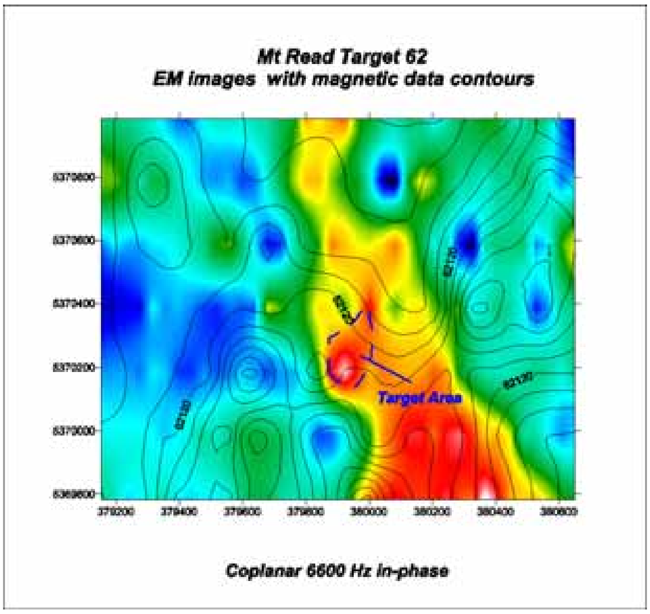


Figure 62_1: Mt Read Target 62 EM Images with magnetic data contours

Mt Read : Target 62 Line 53701200 N

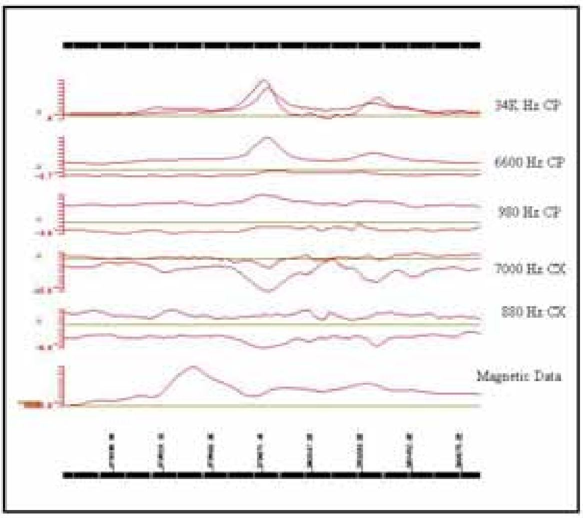


Figure 62_2: Mt Read: Target 62 Line 53701200 N

MT READ 86

Definition target 86 is hampered by either the complexity of its setting or more likely the data noise levels are this part of the survey area. Its definition mainly relies on the observation that on some line coaxial anomaly peaks correspond to local minima in the coplanar response.

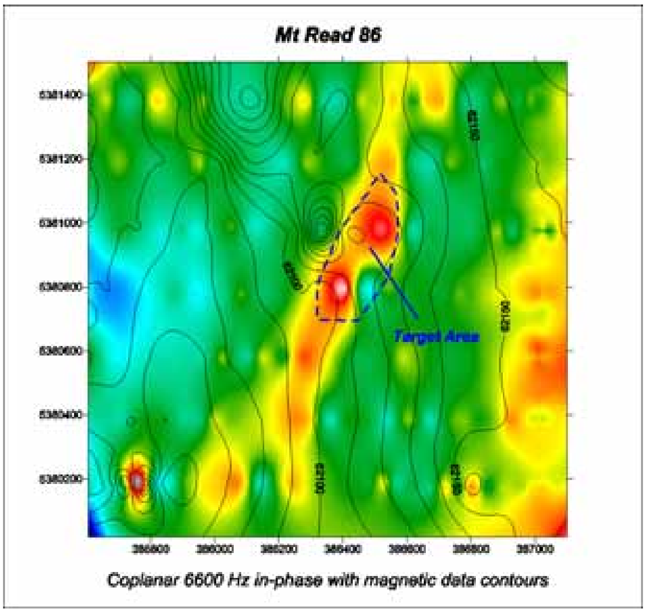


Figure 86_1: Mt Read 86

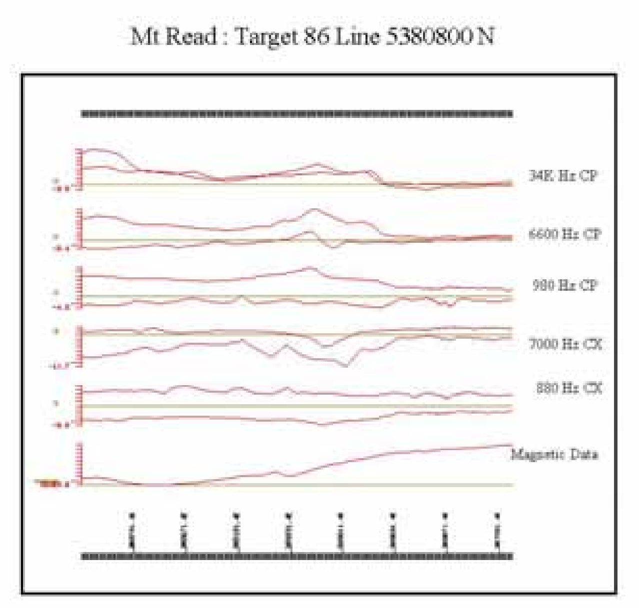


Figure 86_2: Mt Read: Target 86 Line 5380800 N

MT READ 91

Target 91 is defined a subtle low frequency response mostly evident on the coaxial frequencies. It is located a major geological contact, where the peaks in the coaxial response corresponds to the local minimum in the coplanar anomaly.

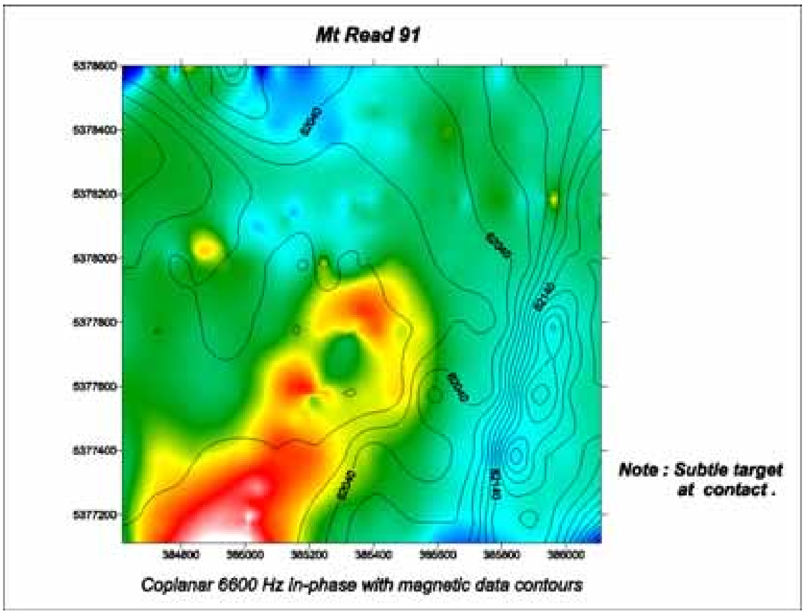


Figure 91_1: Mt Read 91

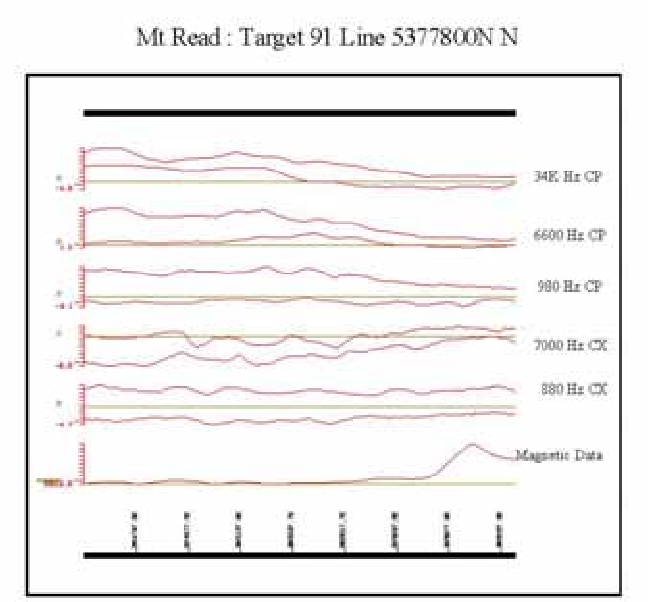


Figure 91_2: Mt Read: Target 91 Line 5377800 N

APPENDIX II

List of targets analysed

Target No	East	North
11	391580	5393750
18	387500	5385050
38	387290	5382805
39	384250	5374575
40	384500	5374250
43	384250	5373400
62	379900	5370400
86	386350	5380755
91	385360	5377850