Chalice Gold

Parakeet
Northern Territory

Induced Polarisation, Double Offset Pole-Dipole survey

2017

SPINIFEX
GEOPHYSICS

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DATE: August 2017

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SUMMARY

In July 2017 a double offset pole dipole induced polarisation survey was completed at Parakeet prospect, Warrego North in the Northern Territory for Chalice Gold. Eight receiver lines covered 12 line km and 3600 plot points.

Three chargeability anomalies were identified within the 3D inversion model. Anomaly PKT6 has the highest chargeability and best definition by the inversion, however previous drilling showed uneconomic mineralisation in this position not considered worthwhile pursuing.

Two category 2 anomalies were also identified in the chargeability data. PKT4 has low chargeability, correlates with a magnetic anomaly, but is not resolved well at depth by the inversion model. PKT5 is a broad anomaly of low chargeability and should be treated with some caution due to its lack of resolution both vertically and horizontally. This may be a deeper extension of anomaly PKT6.

No anomalies have been defined in the resistivity data.

1. INTRODUCTION

In July 2017 a time domain double offset pole – dipole induced polarisation (IP) survey was completed at Parakeet, a prospect within the Warrego North Project, for Chalice Gold. Parakeet is located approximately 60km northwest of Tennant Creek, Northern Territory (Figure 1). The survey aimed to identify chargeable anomalies with potential to host Tennant Creek style Au or Cu-Au mineralisation.

The survey was completed by Zonge Engineering and Research Organisation (Zonge) under the supervision of Spinifex-GPX PTY LTD.

This report describes the survey parameters and details the chargeability anomalies identified in the data.

Figure 1: Location of the Parakeet survey.

2. HISTORICAL WORK

2.1 Potential Fields 2004

The Parakeet prospect was initially identified as three magnetic and gravity anomalies in 2004 (**Figure 2**), interpreted to be related to deep ironstone bodies. Downhole magnetic data in shallow drilling was incorporated with the ground potential field data to produce 3D inversion models. Further information on the potential field data, modelling and inversion can be found in *"Massey. S., 2014. Parakeet Prospect – Modelling of Ground and drillhole geophysical data"*.

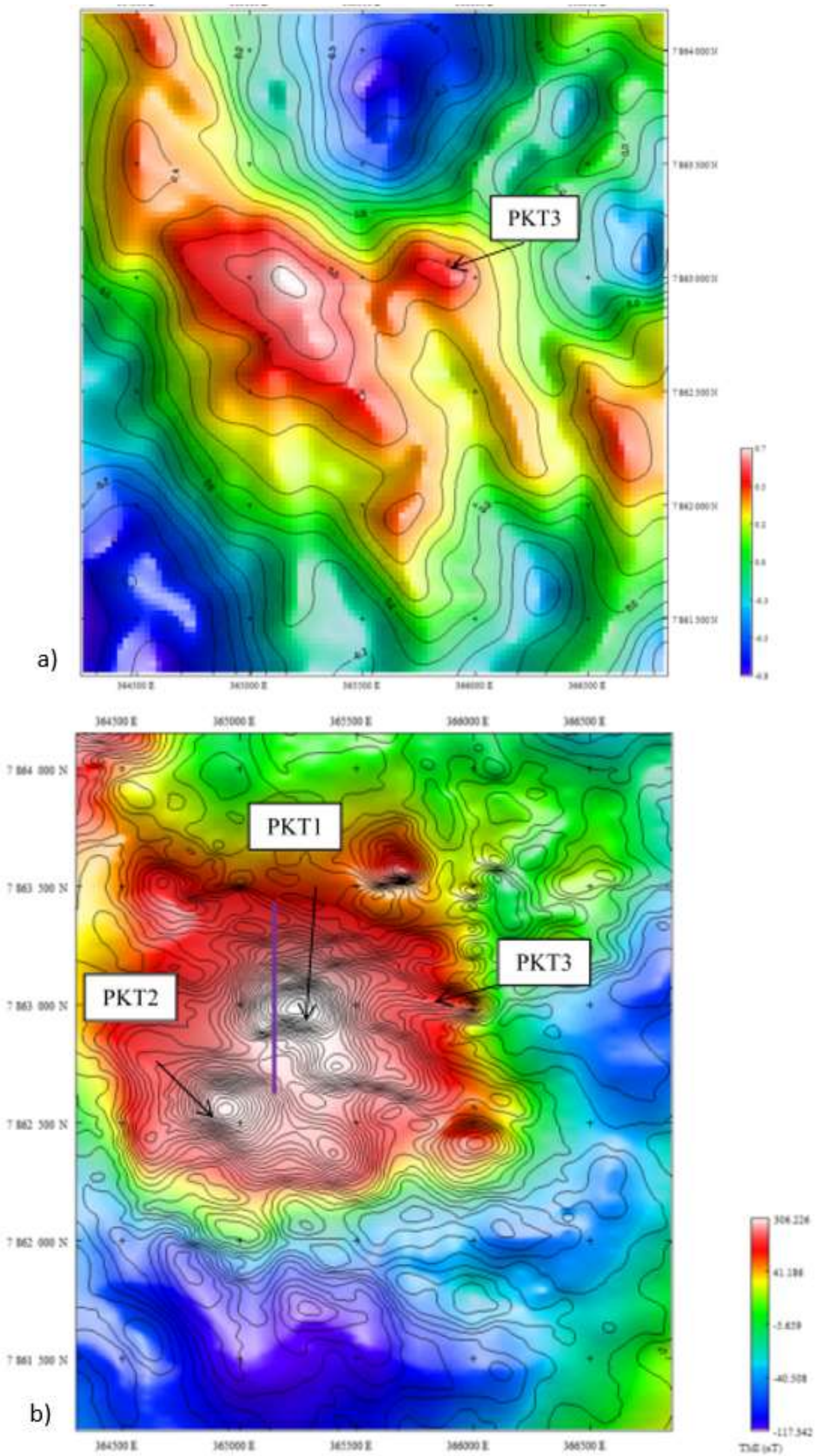

Figure 2: Parakeet potential field ground survey data. Residual gravity (a) shows one of the anomalies PKT1, while the residual total magnetic intensity (b) defines three peak anomalous zones.

2.2 IP 2005

Two dipole-dipole lines were planned to further test the magnetic anomaly for possible sulphides related to Au mineralisation. The frequency domain data produced two very low amplitude chargeability anomalies within the inversion model of line 365200E (Figure 3). Both of these IP anomalies are located approximately 80m west of the main magnetic anomaly.

Further information on interpretation of the 2005 IP can be found in *“ Massey. S., 2014. Parakeet Prospect – Modelling of Ground and drillhole geophysical data”*.

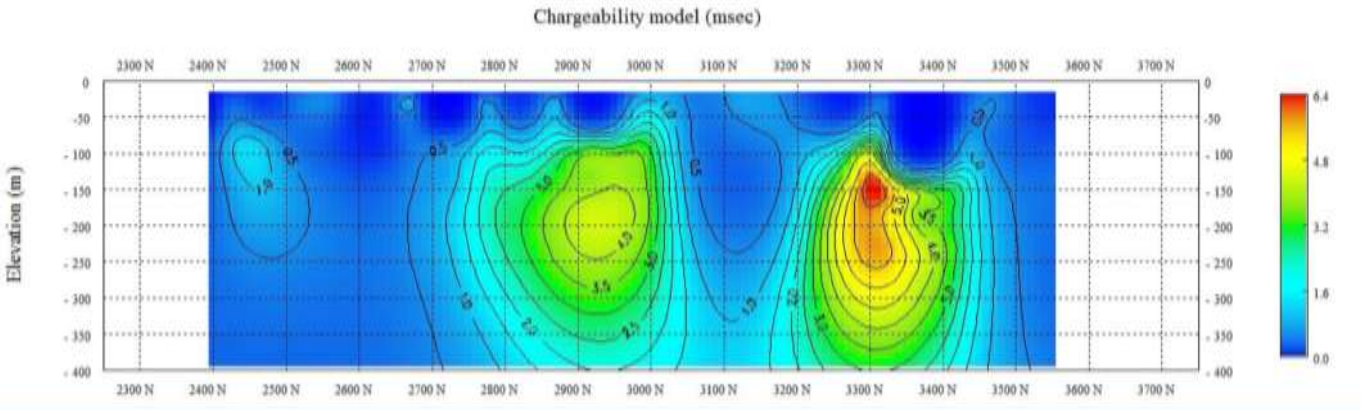

Figure 3: Parakeet chargeability inversion model for DDIP line 365200E.

3. 2017 SURVEY DETAILS

3.1 Personnel

Supervising Geologist:	Graham Kubale
Supervising Geophysicist:	Brett Adams
Contractor:	Zonge
Contractor Supervisor:	Simon Mann
Crew Chief:	Trevor Shephard

3.2 Equipment

Transmitter:	GGT-30
Receiver:	GDD
Sample Rate:	1 200
Tx Frequency:	0.125Hz / 8 seconds
Power Source:	Motor Generator

3.3 Survey Specifications

Line spacing:	150m
Remote Electrode	Local: 5200E/8100N; GDA94: 365215E / 7858096N
Array:	Double Offset Pole – Dipole
A-Spacing:	100m
N-Level:	22
Base Frequency:	0.125 Hz
Typical Current:	1 – 8.7 amps
Coordinate System:	GDA94 / MGA zone 53 / Parakeet Local Grid

3.4 Coverage

Four (4) transmitter lines and eight (8) receiver lines of double offset pole-dipole IP have been completed at Parakeet covering 12 line kilometres reading 3600 plot points to a maximum of n=22 (

Figure **4**). The survey was performed on the Parakeet Local Grid then converted to GDA94 / MGA zone 53 grid. Grid conversion details are located in Appendix 3. The local grid was designed by Spinifex-GPX.

Table 1: Parakeet Receiver Line coverage summary (for maximum n=22)

Line E	North min	North max	# of Plot Points	Dist(m)
364750	7862200	7863600	450	1500
364900	7862200	7863600	450	1500
365050	7862200	7863600	450	1500
365200	7862200	7863600	450	1500
365350	7862200	7863600	450	1500
365500	7862200	7863600	450	1500
365650	7862200	7863600	450	1500
365800	7862200	7863600	450	1500
		Total	**3600**	**12000**

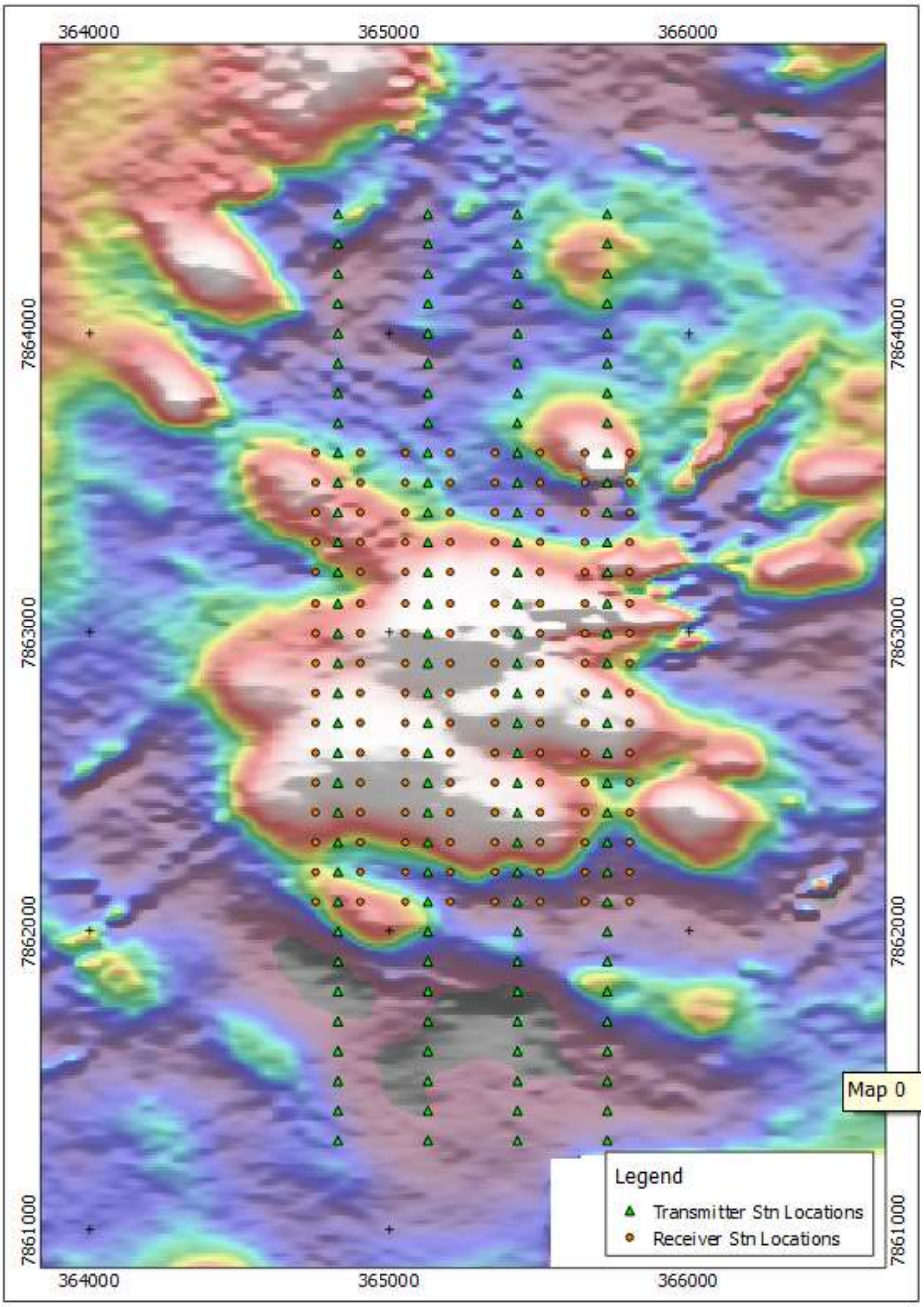

Figure 4: Parakeet Double Offset Pole-Dipole IP survey coverage over TMI1VD image.

4. DATA PRESENTATION AND PROCESSING

Digital data was supplied by Zonge. Survey data is located in Appendix 1. Pseudosection profiles (1:10,000) are located in Appendix 2. Depth slices were generated through the chargeability model every ~100m from 50m and are located in Appendix 6 (1:5000).

Time domain IP data is presented in two parts; chargeability and resistivity. Chargeability is a measure of the grounds ability to hold a charge, much like a capacitor. Resistivity measures the grounds resistance (or conductivity) which affects the grounds ability to conduct a current.

Initial inversion processing was undertaken using the industry standard IP channel times of 590-1450ms (Scintrex 8 seconds) and the Loke algorithm. Due to the low amplitude chargeability responses in these data, it was reprocessed using early time channels 150-500ms providing increased sensitivity to any anomalism. The early time reprocessed data was used for inversion and presentation of 3D data throughout this report.

5. INTERPRETATION CRITERION

Interpretation aimed to identify anomalies that may be sourced by high grade gold deposits associated with ironstones and/or sulphides located within the fresh bedrock.

Recommendations for follow up work are based upon anomaly quality and implied geological setting.

Primary criteria used for anomaly selection and prioritisation was:

1. Good spatial definition. Coherent response over several stations along a line.
2. Distinct chargeability anomalies defined via inversion modelling. The amplitude of these anomalies is dependent upon the amount of Sulphides (hopefully) present. It is not an indication of mineralisation.
3. Supporting evidence from neighbouring lines where appropriate line spacing was recorded.

Anomalies are ranked as follows.

Category 1: Highest priority. A well-defined anomaly demonstrating all of the primary criteria. Anomalies ranked as Category-1 warrant immediate consideration as a drill target.

Category 2*:* Moderate priority. Displays good IP characteristics overall but has some detractive quality, possibly 2 of the 3 primary criteria or, geological knowledge such as a proximity to sediment or several drill holes in the area. Category-2 anomalies may warrant drill testing where supported by encouraging additional information such as geochemical anomalism, or geological favourable position.

Category 3*:* Low priority. A poorly defined anomaly displaying just one of the three primary criteria. Category-3 anomalies do not warrant drill testing without additional (better quality) data to confirm the response, regardless of other encouraging information.

6. DATA QUALITY

Data were generally excellent across all N-levels requiring minimal editing and exhibiting consistent repeatability across multiple readings. Highly resistive ground conditions produced very low currents (1-9A) and would normally result in very noisy data. In this instance the data quality has remained high and small changes in chargeability have been detected at depth.

Appendix 2 contains pseudosections demonstrating both raw field data and the edited final and modelled data. Field data is presented as delivered however the worst readings will have been removed by the contractor before delivery.

A minimum of two readings was taken at each station to ensure repeatability. Where the two readings did not repeat, additional readings were taken. Generally readings produced repeatable decays.

Under ideal circumstances the estimated depth of investigation for a double offset Pole-Dipole array using an a-spacing of 100m to n = 22 is approximately 600m. In this instance the maximum depth of investigation is estimated to be 400m.

7. INTERPRETATION

Chargeability amplitude values were low in the 2017 IP data, similar to the previous 2005 survey. Three main zones of elevated chargeability were identified in the 2017 data, shown in Figure 5 as anomalies PKT4, PKT5 and PKT6.

Discrete anomaly PKT6 exhibits the highest chargeability (8msec) on the eastern side of the survey area and is considered the most prospective zone in the IP data. Unfortunately previous drilling in this location shows zones of uneconomic elevated copper and minimal gold, which is interpreted to explain the chargeability anomaly. No further testing of this anomaly is warranted.

Western anomaly PKT4 exhibits a broad, low chargeability (~3msec) inversion response over two lines, 364750E and 364900E. This anomaly is identified at station ~3350N on both lines at approximately 60m depth to top (Figure 6), however the base of the anomaly is not constrained well by the inversion. A NW trending magnetic zone correlates with IP anomaly PKT4. This anomaly is considered category 3 due to its low amplitude and should be interrogated with geology and structure, and further investigation in the field if considered a prospective area.

A deeper, broad zone of low chargeability (~2.5msec) within the inversion response was interpreted as anomaly PKT5 over two lines, 365200E and 365250E. This anomaly is identified at a depth of approximately 100m at station ~3000N on both lines (Figure 6). The inversion has not constrained the lateral or depth extent of this anomaly well, therefore it should be treated with some caution and is considered category 3. It may be interpreted as a deeper, western extension of anomaly PKT6.

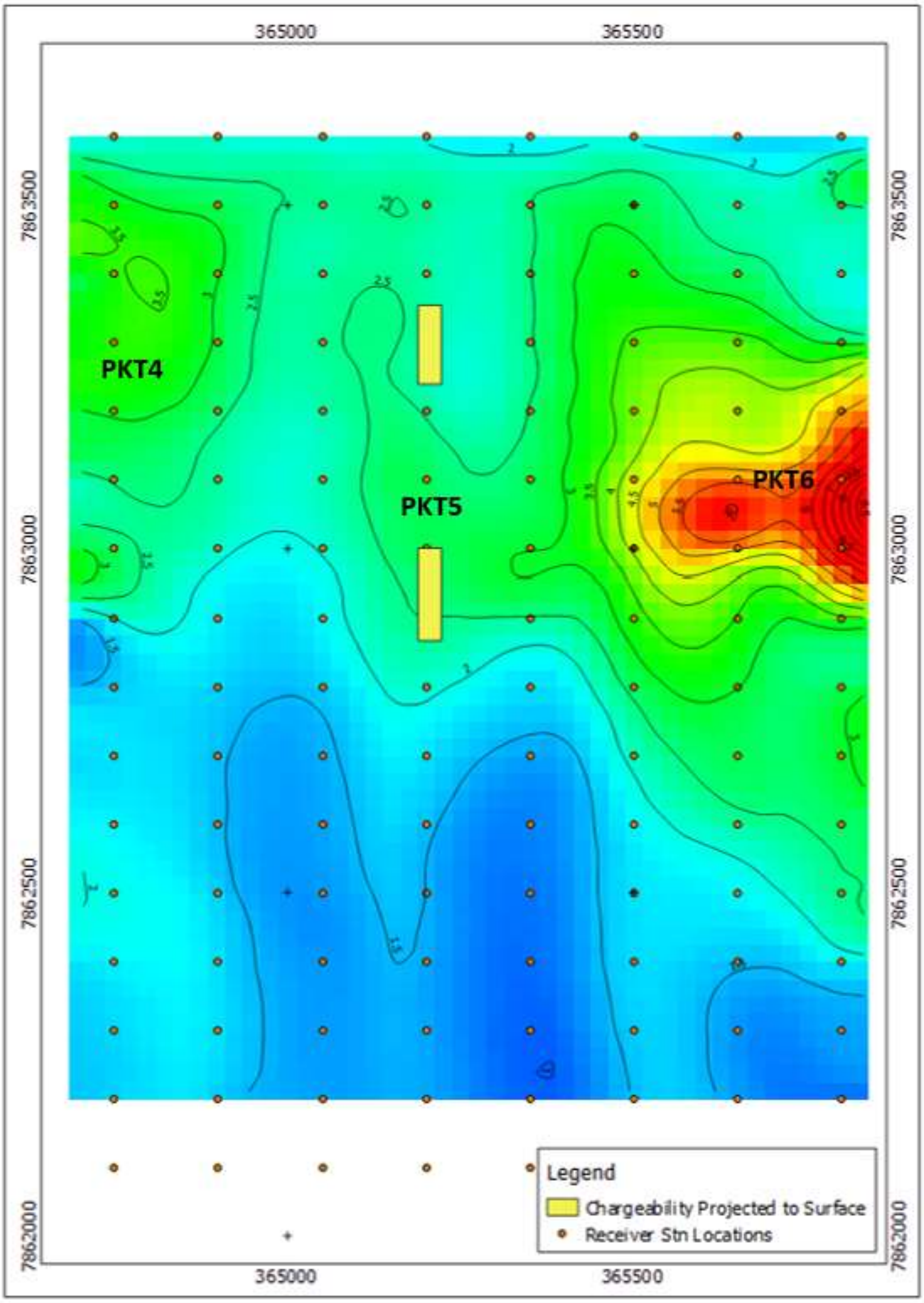

Figure 5: Parakeet chargeability inversion. Depth slice image through the 2017 3D chargeability model at 51m depth with contours (mSec) and previous DDIP anomaly locations projected to surface.

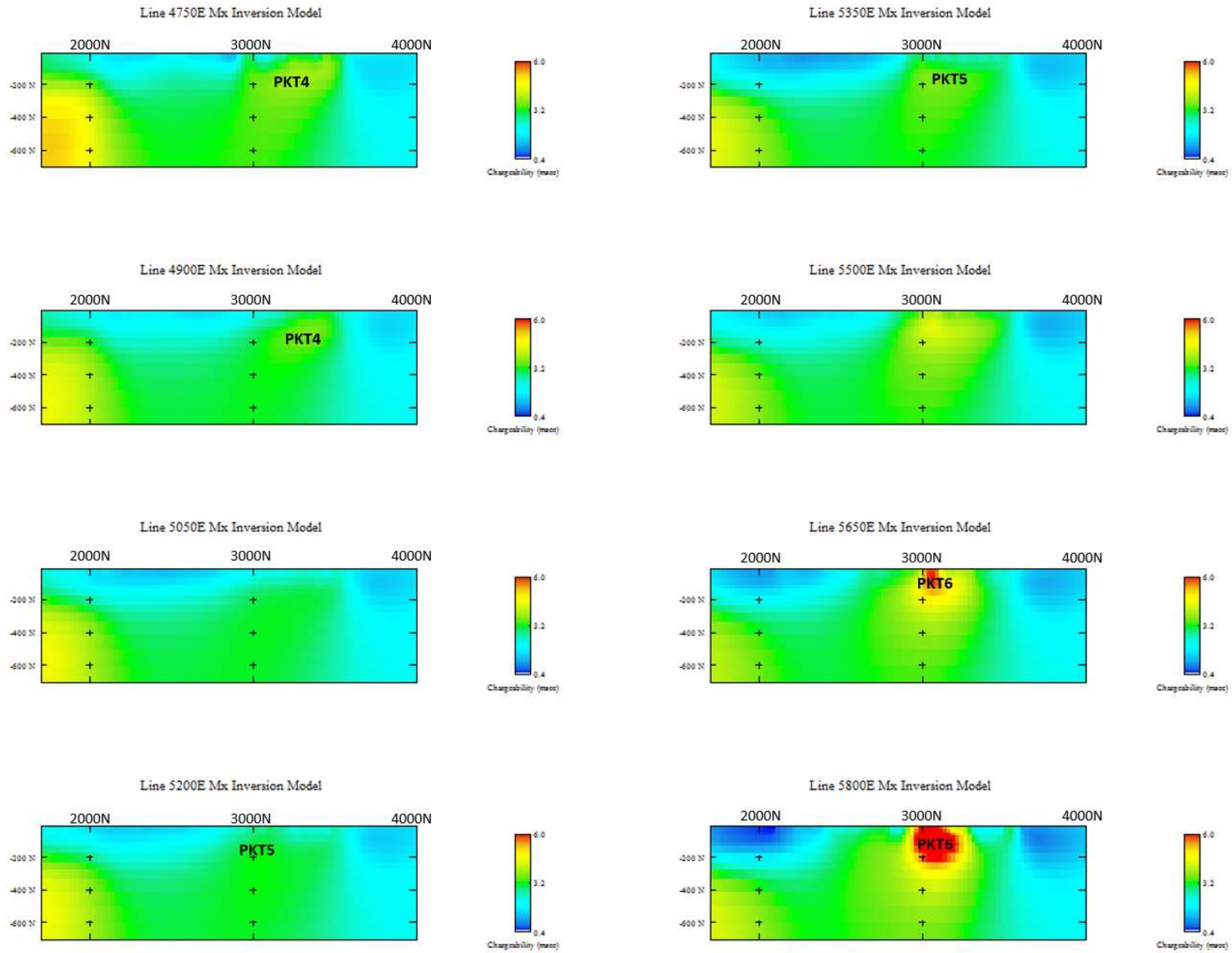

Figure 6: Parakeet 3D chargeability inversion model sections.

7.1 Line 365,200E

Line 365,200E was surveyed in 2005 using the dipole-dipole technique described briefly in section 2.2 of this report. These field data display exceptional low amplitude chargeability anomalies (below 1 milliradian) and such should be approached with caution.

This line was repeated in the 2017 double offset pole-dipole survey to determine if anomalous zones previously identified could be replicated.

Figure 7 shows the 2005 chargeability inversion model compared to the 2017 chargeability inversion model section of the same line. The difference between the two models may be attributed to a combination of the following:

1) Frequency domain (2005) vs time domain data (2017) may play a part due to different equipment and data capture units
2) Inversion model algorithms – smooth vs block model
3) Poor definition of the northern anomaly in the 2005 anomaly
4) 3D complexities in the geology that the original 2D DDIP lines simplified into discrete anomalies along the line. Current flow between the offset transmitter and receiver lines in the 2017 survey indicates the anomalous IP response of PKT5 may be broader than the original inversion suggests.

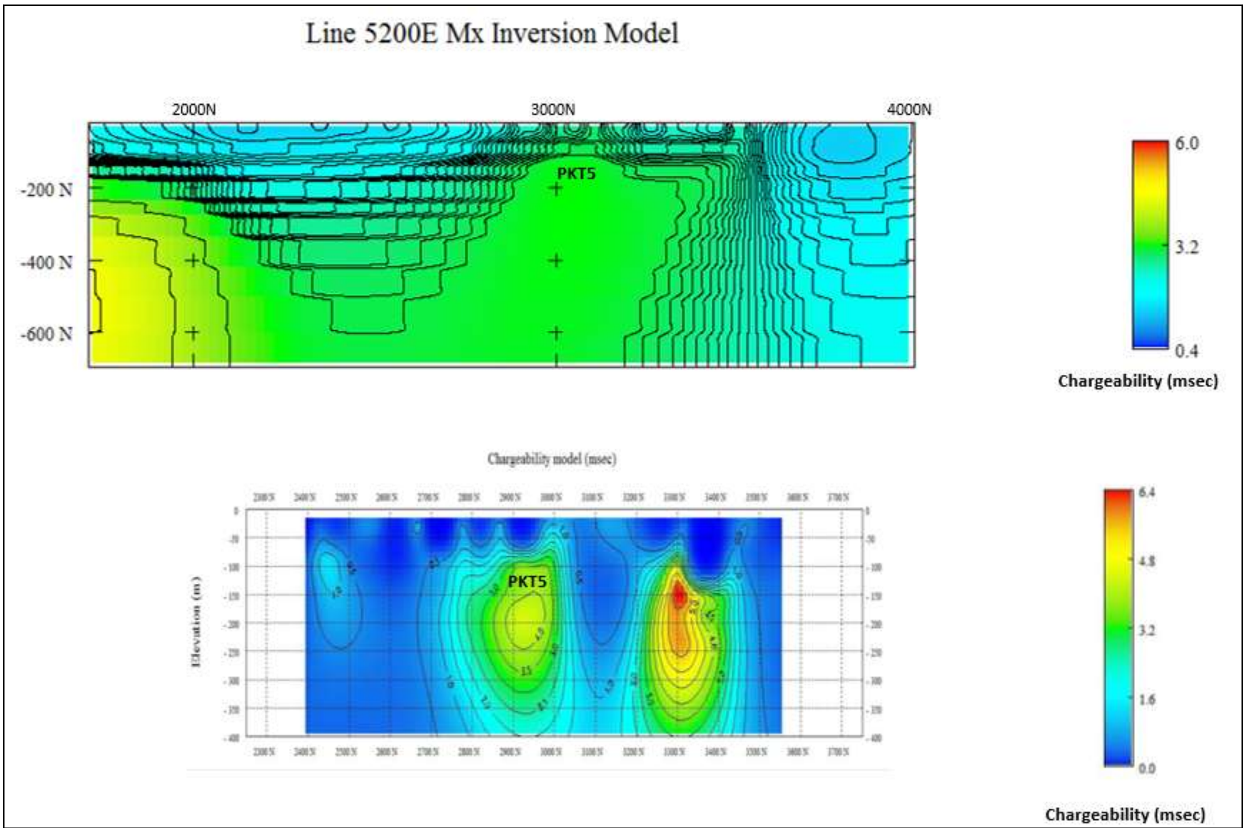

Figure 7: Line 365,200E chargeability inversion models from 2005 and 2017 IP surveys.

7.2 Resistivity

Resistivity data has not defined any anomalies consistent with massive sulphide.

All lines showed a more conductive layer at surface tending to more resistive at depth (Figure 8) which may be associated with the position of the ironstone. Resistivity values increase moving east through the survey area implying the ironstone is located predominately at the eastern end of the survey area.

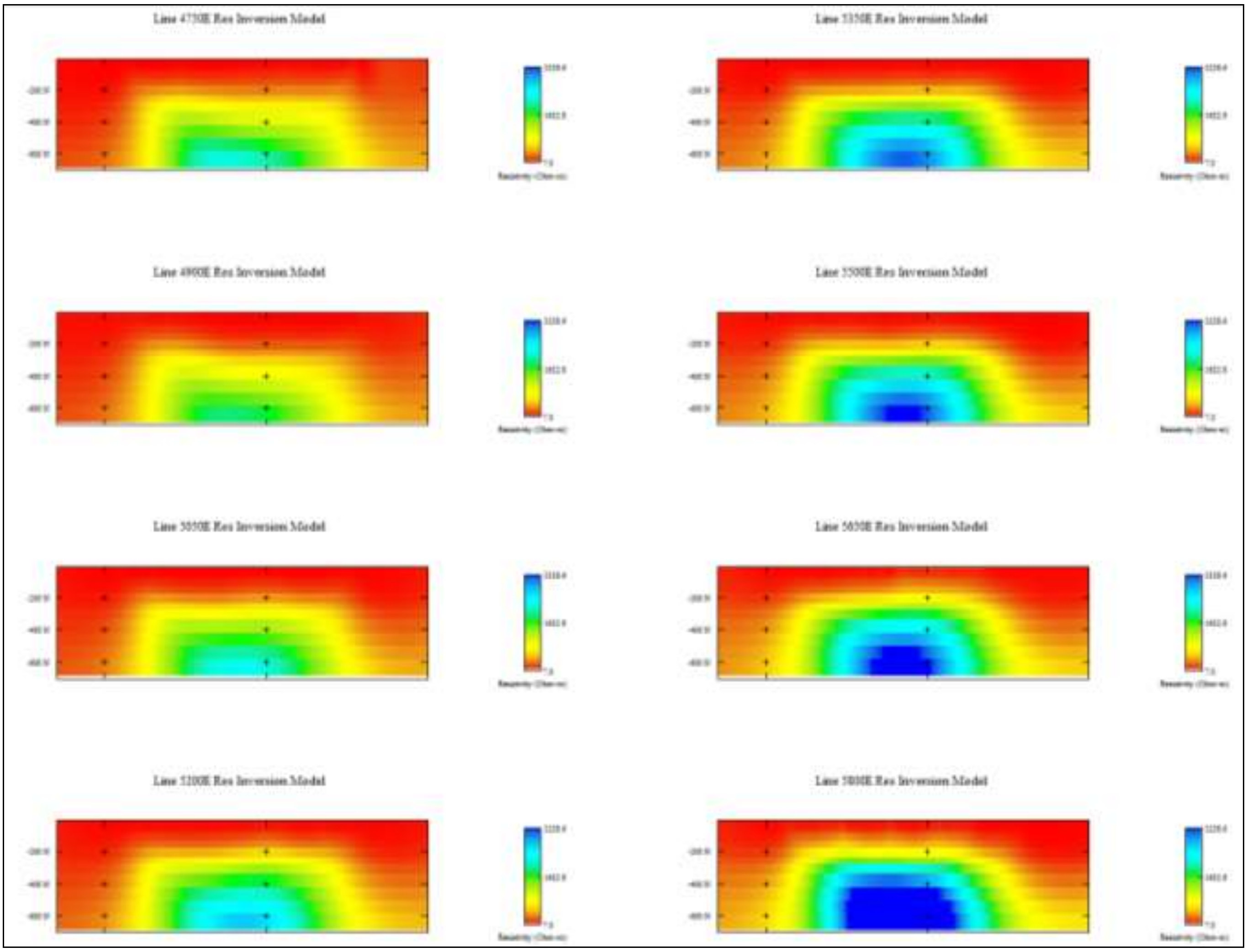

Figure 8: Parakeet 3D resistivity inversion model sections.

8. CONCLUSION AND RECOMMENDATIONS

Eight (8) lines of double offset pole dipole IP were completed in July 2017 at Parakeet prospect covering 12 line kilometres and 3600 plot points.

Chargeability amplitudes were low across the entire survey area (1.5-8.5 msec). Three anomalous zones were identified within the 3D chargeability inversion model – PKT4, PKT5 and PKT6.

Western anomaly PKT4 has low chargeability (3msec) and is not well resolved at depth by the inversion. Further investigation of this anomaly is recommended due to the shallow depth to the top of the anomaly (60m) and correlation with a magnetic high. PKT4 is category 3.

A broad zone of low chargeability (2.5 msec) was identified as anomaly PKT5 through the central portion of the survey area. The inversion has not resolved the lateral or depth extent of this anomaly well, however it does represent elevated chargeability values compared to background. This anomaly should be treated with some caution and is category 3.

Anomaly PKT6 exhibits the highest chargeability and is resolved well by the inversion, however uneconomic previous drilling results in the area downgraded this anomaly. No further work is recommended at this stage.

APPENDIX 1

DATA FILES IN AMIRA FORMAT

APPENDIX 2

PSEUDOSECTION PLOTS

APPENDIX 3

Coordinate transformation

Parakeet Local Grid to GDA94 / MGA zone53

The local grid was created by Spinifex Geophysics in the absence of a known pre-existing grid.

Two point scale and rotation

X1	Y1	East 1	North 1
4750	2000	364750	7862100

X2	Y2	East 2	North 2
5800	3600	365800	7863600