CR 78/84

AQUITAINE AUSTRALIA MINERALS PTY. LTD.

E.L. 357, ELDORADO, N.T.

DIAMOND DRILLING - TC 12

1977

Distribution:

S.N.E.A.
Manager/Archives
Minerals
Le Nickel (2)
Preussag (5)
Mines Branch

By: W.A. Brook
I. Macdonald

August 1977

MG : 927

C O N T E N T S

1. SUMMARY

A new ground magnetometer survey of TC 12 produced results which up-graded the potential of TC 12. One further hole (TTE 128) was drilled to a depth of 219m. The target was intersected over 11m. between 66m. and 77m. Mineralisation was massive crystalline haematite and minor quartz.

There was no significant base metal or gold values.

2. CONCLUSIONS

(1) TTE 128 passed through the target zone 20 - 30m. earlier than expected because the strike of the body is more southerly than predicted.

(2) The intersection of 11m. of haematite with minor magnetisation is indicative that a massive magnetite body will occur at depth.

(3) The lack of anomalous base metal values in the above intersection is not encouraging.

(4) On present knowledge, no further work is recommended.

3. INTRODUCTION

A one hole diamond drill programme was approved by Partners to test for an east-plunging and south-dipping magnetite body at TC 12. A new magnetic survey of TC 12 on a closer-spaced pattern (30m. x 10m.) than previously, resulted in an up-grading of the potential of TC 12. The location of hole TTE 128 is shown on the accompanying plan.

3.1 Property

TC 12 lies 100 - 200m. outside the northern boundary and within the Tennant Creek Town Reserve. Approval had been given from the Northern Territory Administration to conduct exploration on TC 12.

3.2 Personnel

The drilling programme was supervised by contract geologist, Mr. Ian Macdonald of Brisbane.

4. EXPLORATION

4.1 DDH TTE 128

A monotonous sequence of siltstone, shale and sandstone was intersected with intense fracturing evident in the upper 100 metres. Eleven metres of massive crystalline haematite were intersected between 66m. and 77m. This material is only slightly magnetic and assay results indicate no significant mineralisation in this zone.

Summary Drill Log

0 - 60 m : Down hole hammer. Oxidised ferruginous sediments. Quartz veins common.

60 - 65.80m : Weathered siltstone and shale, brecciated and quartz veined. Areas of micaceous clay gouge common. Occasional thin bands of crystalline haematite.

65.80 - 76.80m : Massive crystalline haematite, minor quartz, areas of clay gouge and minor, interbedded, ferruginous sediments.

76.80 - 85.95m : Ferruginous siltstone and shale, fractured and quartz veined, bands of crystalline haematite.

85.95 - 96.60m : Pink to red, oxidized siltstone and shale.

96.60 - 219.00m : Interbedded and occasionally fractured, green-grey siltstone, shale and minor sandstone.

Sampling

Dust samples were collected in three metre intervals over the first 60 metres. Seven samples from 1.5 - 21.0 metres were assayed for Cu, Pb, Zn and As. Core from the massive haematite intersection was split and assayed, in one metre lengths, for Cu, Pb, Zn, Bi, Ag and Au. A table of assay results is provided below. Assaying was undertaken by Analabs of Perth.

Detailed Log

Collar Coordinates	:	1708N - 403E
Declination	:	60^{o}
Azimuth	:	360^{o} magnetic
Total Depth	:	219m. (0-60m. D.H.H., 60-117m. NQ, 117-219m. BQ)

Surveys	: Depth	Dip	Azimuth
	75m.	52^{o}	Acid Tube
	115m.	47^{o}	Acid Tube
	150m.	34^{o}	Acid Tube
	170m.	?	358^{o}-355^{o}
	200m.	36^{o}	Acid Tube
	210m.	36^{o}	350^{o}

Drilling : Associated Diamond Drillers, Vickers-Keogh top drive rig

Date : 7.7.77 to 18.7.77

Drill Log

(in metres)

0 - 60.00 : Down hole hammer - dust samples indicate red-brown, ferruginous sediments with white quartz veins common.

60.00 - 63.00 : Red-brown siltstone and minor shale with quartz veining generally along cleavage, but occasionally in cross fractures. Minor marcasite present, usually associated with quartz sediment slumping at 60.80m. and fracturing, broken core and deformation of quartz veins from 61.50 to 63.00m.

63.00 - 65.40 : Red-brown, irregularly broken and quartz veined siltstone as above in first 40cm. followed by 70cm. of massive, weakly magnetic crystalline haematite and 10cm. yellow-brown, friable siltstone. The remainder, red-brown impure sandstone and siltstone with occasional quartz veins and some marcasite blebs.

65.40 - 66.20 : The first 45cms. brick red siltstone and sandstone with broken areas and red, micaceous fault gouge. Remainder very broken, weakly magnetic, crystalline haematite.

66.20 - 66.40 : Broken crystalline haematite, slightly magnetic in part. White clayey material and slickenslides on fracture surfaces. Minor quartz veining.

66.40 - 69.00 : Broken crystalline haematite with red, micaceous clay gouge, minor siltstone fragments and some quartz veins.

69.00 - 72.00 : 80cms. brecciated core, mainly haematite with fragments of red-brown shale and interstitial clay gouge. Solid crystalline haematite, the remainder with 5 - 10% disseminated quartz.

72.00 - 73.70 : Solid, slightly magnetic crystalline haematite with rusty pits (? after sulphides) common but less than 10%.

73.70 - 74.50 : Very broken crystalline haematite, slightly magnetic in part. Minor red clay gouge for the first 10cms. 30cms. of irregular admixture of haematite and siltstone which becomes progressively altered to dark brown, clayey material for the rest of the interval.

74.50 - 79.00 Dark purplish-brown, clayey material continues for 50cm. followed by 20cm. of hard, pink shale with quartz veins and associated haematite. The remainder is brick red siltstone and shale with occasional haematite zones and quartz veins becoming increasingly altered to clayey material.

79.00 - 81.00 : Broken fragments of siltstone, shale and clay gouge with some vein quartz. Marked core losses.

81.00 - 83.40 : Brick red siltstone and minor shale, occasional white quartz fracture fill and rare associated haematite. Broken rock with clay gouge and core losses at 82.00m. and 83.80m.

83.40 - 84.80 : Brick red siltstone with quartz veins and rare haematite blebs. Zones of more intense fracturing grade into red clayey material.

84.80 - 85.30 : Soft, altered haematite with whisps of soft, red, clayey material grades into solid, slightly magnetic crystalline haematite with minor quartz veining.

85.30 - 87.00 : Crystalline haematite with occasional quartz views for first 60cms. Rusty clay filled pits common. Crystalline haematite grades into dark grey-brown siltstone over 3cm. contact and this siltstone has a well defined 'soft sediment' contact with slumped and deformed red siltstone and shale below. The remainder is dark grey or red siltstone and shale with slumping and fracturing, deformed and offset quartz veins and occasional blebs of haematite.

87.00 - 88.53 : Pinkish-grey and greenish-grey siltstone, deformed plastically, blebs elongate in the cleavage direction. Stringers of haematite, less than 5%, usually adjacent to quartz veins which are often along the

87.00 - 88.53 (continued) : cleavage. Broken core with brick red, micaceous clay alteration between 88.0 and 88.30m.

88.53 - 90.00 : Red siltstone, deformed and fractured with irregular fine quartz veining and minor haematite blebs. Broken core and red clayey alteration at 89m., then as above to 89.70m. The remainder, green-grey, less deformed siltstone with chloritic alteration in part. Quartz views larger and more regular and haematite rare.

90.00 - 93.00 : Green-grey siltstone to 91.80m. with occasional quartz veins (along cleavage) and minor haematite. Strong cleavage deformation, but not fracturing (obvious offset of fabric by cleavages). The rest is more broken pinkish-grey siltstone with red clay material along fracture surfaces.

93.00 - 96.00 : Brick red, altered, fractured and deformed siltstone and shale for the first 1.5m., with minor haematite stringers and rusty, micaceous material along fractures. Green-grey siltstone and tan shale. The remainder with fine fractures and minor quartz veining. Minor haematite, sediments plastically deformed and cleavage development in two directions.

96.00 - 99.00 : 60cms. of pinkish-grey to tan shale with fine, irregular fracturing and some quartz veining grades into altered, brick-red, clayey, altered shale. Over a sharp, irregular contact dark green-grey shale

96.00 - 99.00 (continued) : continues. Bedding features not evident, at least four planes of cleavages defined, showing rusty staining, quartz veining, some chloritic alteration and slickensliding.

99.00 - 101.60 : Dark green-grey shale as above with only two obvious cleavage planes. Some slumped lenses of siltstone evident from 101m. on.

101.60 - 104.70 : Dark green-grey siltstone as above, occasional siltstone interbeds, some graded (indicating top up). Rare blebs of haematite.

104.70 - 107.80 : As above, evidence of sediment slumping and movement along cleavage planes. Minor haematite and quartz veins.

107.80 - 110.70 : Fine (1cm.), graded, green-grey shale siltstone units becoming more fractured towards end of interval. Red clay material on fracture surfaces.

110.70 - 113.80 : Siltstone and shale with slumping, fracturing and brecciation rehealed with quartz. 40cm. graded units evident with siltstones and impure sandstone becoming increasingly abundant.

113.80 - 117.00 : Green-grey sandstone dominant with quartz healed fracture zones prominent. Cleavage evident in two directions and some shale interbeds. End of NQ drilling.

117.00 - 120.00 : Green-grey siltstone, shale and impure sandstone, plastic deformation evident, "bedding" almost entirely transposed into prominent cleavage plane. Fracturing common, rehealed with quartz, slight,

117.00 - 120.00 (continued) : dark green chloritic alteration in more broken areas with rusty staining on cleavage planes.

120.00 - 123.00 : As above, quartz healed fracture zones and brecciation more abundant. Cleavage still apparent but core breaking irregularly. Slight trace of haematite / magnetite in quartz veins.

123.00 - 126.00 : In the first metre, zone of fracturing parallel to core axis with major quartz veins, red clay and slickensliding on fracture surfaces. The rest is siltstone and shale with some coarse grained arkosic? sandstone. Cleavage not well developed and minor quartz veining.

126.00 - 129.00 : Slumped, green-grey siltstone with at least two well developed cleavage planes. Occasional quartz veins often offset by cleavage.

129.00 - 132.00 : Monotonous green-grey shale and siltstone, some 10cm. graded units (tops up). Bedding contacts slumped and irregular, cleavage well developed and fine quartz veins often stylolitically deformed.

132.00 - 135.00 : As above, bedding contacts slumped and irregular. Cleavage prominent. Brassy stain on some fracture surfaces. Shale dominant.

135.00 - 138.00 : As above, quartz healed fractures more common. 5cms. of broken core and clayey material at 137m. Bedding contacts irregular.

138.00 - 141.00 : As above with broken zone and minor clay at 139.20m. Brassy stain on some fractures, quartz rare, bedding contacts irregular where evident.

141.00 - 144.00 : Green-grey shale and siltstone as above, quartz veining more common. Breccia zones rehealed with quartz and iron oxide near 144m. Sediment contacts slumped and irregular.

144.00 - 147.00 : As above, similar breccia to 144.20m., quartz healed fractures common. Medium grained, impure sandstone in last metre with little fracturing or veining. Bedding in upper 2m. very slumped and contorted where evident.

147.00 - 149.34 : As above with shale units increasingly altered to dark green chlorite, especially where more fractured. Cleavage well developed, bedding irregular.

149.34 - 152.50 : Green-grey siltstone, sandstone and shale with dark green chloritic alteration evident in shaly sections. Cleavage well developed, bedding not apparent.

152.50 - 155.60 : Green-grey siltstone, sandstone and shale with dark green chloritic alteration of the shale along fractures. Cleavage more irregular with prominent quartz veined fractures, parallel to the core axis, dividing lithologies. Bedding contacts irregular.

155.60 - 158.50 : Cleavage parallel to core axis persists and appears to represent bedding. Quite intense fracturing, almost perpendicular to the core, in places.

158.50 - 159.00 : As above, core broken, no bedding evident. Irregular fracturing rehealed with quartz and iron oxide. Siltstone dominant.

159.00 - 161.90 : As above, with fracturing and major cleavages almost along core axis with lithological contrast and quartz veins. From 161m. on, quite uniform siltstone, well developed regular cleavages and only occasional quartz veins.

161.90 - 163.24 : Cleavage irregular, iron oxide on fracture surfaces, minor chlorite in shale sections. Bedding contacts irregular.

163.24 - 164.80 : Bedding irregular, iron oxide on well developed cleavage surfaces.

164.80 - 166.90 : For the first 90cm. cleavage well developed, prominent quartz vein almost parallel to core axis and bedding contacts irregular. Brecciated shale in the remainder with dark green chloritic alteration and clay gouge.

166.90 - 169.40 : Brecciated shale persists for 1.8m. with chloritic alteration, minor clay and quartz veining. Cleavage still apparent. Uniform green-grey siltstone and shale in the remainder with no bedding evident.

169.40 - 171.00 : Green-grey shale, minor brecciation. Bedding appears to be almost along core axis, quartz veins common and cleavage well developed.

171.00 - 174.00 : Bedding almost parallel to core axis, cleavage well developed and quartz veining common. Some chloritic alteration and clay gouge on some fracture surfaces.

174.00 - 175.60 : Green-grey shale dominant, irregular fracturing along core axis between 174 and 174.80m. Cleavage well developed and bedding not evident.

175.60 - 178.70 : As above, fine graded units common, shale dominant. Bedding at small angle to core axis. Cleavage well developed. Quartz veins common and chlorite in fracture zone at 176m.

178.70 - 181.80 : Fine graded units common, shale dominant. Cleavage evident but not as prominent as above.

181.80 - 184.90 : As above, breccia zones rehealed with quartz and iron oxide. Quartz veining and sediment slumping in last 40cms.

184.90 - 188.00 : Green-grey shale and siltstone, quartz healed fractures common in first metre. Cleavage well developed with no sign of alteration. Bedding contact irregular at about 20^{0} to the core axis.

188.00 - 191.00 : As above, bedding about 20^{0} - 30^{0} to the core axis, cleavage well developed. Quartz veins with whisps of chlorite from 189.9 - 190.6m. with a trace of pyrite paint on one chloritic slickenslided fracture surface.

191.00 - 194.00 : As above, bedding 5^{0} - 10^{0} from core axis. Core more irregularly fractured and a trace of pyrite paint between 192.4 - 193.4m. Minor chloritic alteration of shale and cleavage generally well developed.

194.00 - 196.00 : Featureless green, well cleaved shale, no bedding evident. Zone of fracturing, rehealed brecciation and slight chloritic alteration at 195.6m.

196.00 - 198.00 : Dark green shale as above, well developed cleavage with lime green chlorite and trace of pyrite paint. Bedding at low angle to core axis where evident.

198.00 - 201.00 : As above, with trace of pyrite paint on chloritic fracture surfaces. Quartz veins with chloritic alteration between 199.0 and 199.4m.

201.00 - 203.80 : Well cleaved shale and siltstone, low angle bedding, irregular but measureable in places. Irregular fractures and quartz veining in last 80cms.

203.80 - 206.90 : As above, cleavage well developed, bedding contacts irregular where observed.

206.90 - 210.00 : Dark green shale dominant, cleavage less regular, but still evident. Quartz healed breccia zones common. Bedding contacts irregular where evident.

210.00 - 213.00 : As above, bedding irregular, cleavage prominent, fine quartz veining common.

213.00 - 216.00 : Dark green siltstone and sandstone dominant, fracturing common along core axis, no bedding contacts evident. 50cm. of broken, sheared, chloritized siltstone with 10 - 15% haematite from 214.5m.

216.00 - 219.00 : As above, well defined 5cm. graded units (tops up). Cleavage prominent.

END OF HOLE

Interval (m)	Length Cored (m)	Length Recovered (m)	Recovery %
0 - 60.00	Non Core Drilling		
60.00 - 63.00	3.00	2.80	93%
63.00 - 65.40	2.40	2.30	92%
65.40 - 66.20	0.80	0.70	88%
66.20 - 66.40	0.20	0.20	100%
66.40 - 69.00	2.60	2.40	92%
69.00 - 72.00	3.00	3.00	100%
72.00 - 73.70	1.70	1.50	88%
73.70 - 74.50	0.80	0.80	100%
74.50 - 74.95	0.45	0.40	89%
74.95 - 76.40	1.45	1.30	90%
76.40 - 79.00	2.60	2.60	100%
79.00 - 81.00	2.00	0.40	20%
81.00 - 83.40	2.40	2.00	83%
83.40 - 84.80	1.40	1.30	93%
84.80 - 85.30	0.50	0.50	100%
85.80 - 87.00	1.70	1.70	100%
87.00 - 88.53	1.53	1.30	85%
88.53 - 90.00	1.47	1.50	102%
90.00 - 93.00	3.00	3.00	100%
93.00 - 96.00	3.00	2.90	97%
96.00 - 99.00	3.00	3.00	100%
99.00 - 101.60	2.60	2.60	100%
101.60 - 104.70	3.10	3.10	100%
104.70 - 107.80	3.10	3.10	100%
107.80 - 110.70	2.90	2.90	100%
110.70 - 113.80	3.10	3.10	100%
113.80 - 117.00	3.20	3.15	98%
117.00 - 120.00	3.00	3.10	103%
120.00 - 123.00	3.00	3.05	102%
123.00 - 126.00	3.00	3.10	103%
126.00 - 129.00	3.00	3.00	103%
129.00 - 132.00	3.00	3.00	100%

Interval (m)	Length Cored (m)	Length Recovered (m)	Recovery %
132.00 - 135.00	3.00	3.00	100%
135.00 - 138.00	3.00	3.00	100%
138.00 - 141.00	3.00	3.00	100%
141.00 - 144.00	3.00	3.05	102%
144.00 - 147.00	3.00	3.00	100%
147.00 - 149.34	2.34	2.20	94%
149.34 - 152.50	3.16	3.20	101%
152.50 - 155.60	3.10	3.15	102%
155.60 - 158.50	2.90	2.90	100%
158.50 - 159.00	0.50	0.55	110%
159.00 - 161.90	2.90	2.90	100%
161.90 - 163.24	1.34	1.30	97%
163.24 - 164.80	1.56	1.65	106%
164.80 - 166.90	2.10	2.05	98%
166.90 - 169.40	2.50	2.60	104%
169.40 - 171.00	1.60	1.60	100%
171.00 - 174.00	3.00	3.00	100%
174.00 - 175.60	1.60	1.50	94%
175.60 - 178.70	3.10	3.05	98%
178.70 - 181.80	3.10	3.10	100%
181.80 - 184.90	3.10	3.05	98%
184.90 - 188.00	3.10	3.10	100%
188.00 - 191.00	3.00	2.95	98%
191.00 - 194.00	3.00	3.00	100%
194.00 - 196.00	2.00	1.95	98%
196.00 - 198.00	2.00	2.00	100%
198.00 - 201.00	3.00	2.80	93%
201.00 - 203.80	2.80	2.70	96%
203.80 - 206.90	3.10	3.10	100%
206.90 - 210.00	3.10	3.10	100%
210.00 - 213.00	3.00	3.05	102%
213.00 - 216.00	3.00	3.00	100%
216.00 - 219.00	3.00	3.05	102%

Structural Measurements

Intense fracturing was common throughout much of the hole and no one cleavage plane appears dominant. As many as six distinct fracture surfaces can be measured in many sections. The table below lists angles between the core axis and the planar fractures averaged over 20 metre intervals. The first two values are most persistent. Due to brecciation and soft sediment deformation, bedding is not evident in most places. Where recognized, bedding angle to core axis is suffixed 'B'.

Interval	Cleavage Angles					
60 - 80m.	31^{o}	50^{o}				
80 - 100m.	41^{o}	48^{o}	27^{o}	18^{o}	70^{o}	60^{o} B
100 - 120m.	35^{o}	47^{o}	42^{o}	20^{o}	75^{o}	56^{o} B
120 - 140m.	34^{o}	46^{o}	24^{o}	10^{o}	79^{o}	64^{o}
140 - 160m.	41^{o}	50^{o}	33^{o}	26^{o}	75^{o}	65^{o}
160 - 180m.	43^{o}	50^{o}	34^{o}		70^{o}	12^{o} B
180 - 200m.	35^{o}	47^{o}				15^{o} B
200 - 220m.	40^{o}	47^{o}	30^{o}			20^{o} B

ASSAY RESULTS

Split Core Samples

Sample No.	Interval	Cu	Pb	Zn	Bi	Au	As
MBC 827	63.5 - 64.5m.	250	50	200	25	-	-
" 828	66.0 - 67.0m.	75	-	75	100	-	-
" 829	67.0 - 68.0m.	225	-	125	50	-	-
" 830	68.0 - 69.0m.	150	50	75	100	T	-
" 831	69.0 - 70.0m.	150	-	75	150	0.10	-
" 832	70.0 - 71.0m.	150	-	100	150	0.30	-
" 833	71.0 - 72.0m.	50	-	50	75	-	5
" 834	72.0 - 73.0m.	75	-	75	50	0.10	-
" 835	73.0 - 74.0m.	50	-	100	25	-	-
" 836	74.0 - 75.0m.	75	-	425	75	-	-
" 837	75.0 - 76.0m.	200	-	175	75	0.80	-
" 838	84.5 - 85.5m.	100	-	150	-	-	5
" 839	85.5 - 86.5m.	150	-	700	-	-	-

\- below limit of detection

T concentration too low to measure

Dust Samples

Interval	Cu	Pb	Zn	As
0 - 1.5m.	Contaminated			
1.5 - 4.5m.	25	40	20	-
4.5 - 7.5m.	10	20	10	-
7.5 - 9.0m.	20	20	15	-
9.0 - 12.0m.	10	20	10	-
12.0 - 15.0m.	20	20	20	-
15.0 - 18.0m.	15	15	15	-
18.0 - 21.0m.	10	15	10	-

5.2 Discussion of Results

At the time of intersecting the haematite in TTE 128, it was not clear whether this was the target body or not as surface mapping shows numerous ironstone bodies. The hole was continued to 219m. to ensure that the upper intersection was indeed the target.

The interpretation (by P. Gunn) of the magnetic data, contained in the Appendix, would confirm that DDH TTE 128 did intersect the target.

APPENDIX

INTERPRETATION OF GROUND MAGNETIC DATA,

E.L. 357, TENNANT CREEK, N.T., TC 12 AREA

AQUITAINE
Australia

Memorandum

From	Department MINERALS	Ref PJG/GP/M4007	Date 2.3.78
To	W.A. BROOK		
	Copy to G.L. KULBICKI		

Your Reference

Attachments

Subject: INTERPRETATION OF GROUND MAGNETIC DATA, E.L. 357, TENNANT CREEK, N.T., TC 12 AREA

Summary

This memorandum discusses drill hole results into the TC 12 magnetic anomaly and shows that the latest hole, TTE 128, has confirmed the existence of a postulated magnetic sheet.

1. Introduction

Ground magnetic data over the TC 12 anomaly on E.L. 357 was originally interpreted in detail by Argaud (1976); however, subsequent ground magnetic data collected in greater detail over TC 12 by I. Macdonald under contract to Aquitaine Australia Minerals Pty. Ltd. (A.A.M.) presents a significantly different contour pattern than the data Argaud interpreted. Map 1 is a contoured version of Macdonald's data and this should be compared with Figure 1 of Argaud's report. The differences are simply due to under-sampling of the magnetic field in the original survey and, although Argaud's results are probably correct with respect to the information he was provided with, they do not indicate the true geological structure of the area.

This memorandum presents an alternative interpretation based on the new data.

2. Interpretation of the Magnetic Data of Map 1

Two magnetic structures are visible on Map 1.

2.1 Magnetic Haematite Shale

A narrow linear magnetic marker strikes ENE across the map. This feature correlates with outcrops of haematite shale mapped by Macdonald and doubtless this unit is magnetic at depth and causes the anomalies. The magnetic marker is disrupted at several localities which may correspond to faults.

../

This anomaly has been modelled by Argaud and his interpretation for this feature is probably valid as the section of the profile he interpreted is similar to the field observed in the same area by Macdonald. Argaud calculated that the magnetic marker has a depth of the order of 20 metres and a dip of approximately 50^{o} to the north.

2.2 Magnetic Sheet

The main anomaly of interest is the elliptical shaped high with its peak at 1830N, 330E as this indicates a major magnetic sheet (c.f. Figures 1 and 2), which, according to the characteristics of the Tennant Creek area, may be associated with Cu-Au mineralization.

As shown in Figure 3 of Argaud (1976), three drill holes have investigated the feature. The logs of these holes are given by Cambrell (1972). DDH 6 intersected a significant thickness of haematite magnetite but DDH 13, which was drilled beneath DDH 6, failed to intersect such a zone but instead found a minor amount of haematite magnetite in a chloritic alteration zone. These results imply that the magnetic body plunges east and/or dips south. As the magnetic body did not appear to have been fully tested, an additional drill hole was proposed. Unfortunately, because of time limitations it was not possible to apply three dimensional computer modelling techniques to the anomaly as has been done successfully for other A.A.M. projects (Gunn, 1976; Gunn, 1977) and it was necessary to visually estimate the attitude of the magnetic sheet. As the inclination of the earth's magnetic field in the Tennant Creek area is 50^{o}, considerable asymmetry is induced into the magnetic contour pattern which complicates any estimates of body shapes.

Figure 1, taken from Smith and Webster (1975), illustrates model anomaly patterns with similar shapes to the field of the TC 12 anomaly. Dipping plates magnetized by induction cause these fields. The examples are for field inclinations of 65^{o} so the observed asymmetry is not as great as would be observed for similar models at the same magnetic latitude as Tennant Creek; nevertheless, the models illustrate the problems of interpretation in the area.

The fields of both models are fundamentally the same despite the fact that the causative sheets dip in opposing directions.

The plate dipping to the south causes a sharper, stronger anomaly, but this is not necessarily diagnostic as this will weaken and broaden as the causative source gets deeper. The low is less on the southern side of the south dipping plate but not significantly so. These anomaly patterns which are for plates dipping at 45^{o} are ambiguous. Unfortunately, the author has no models readily available for the case of steeper dips but it is obvious that the anomaly pattern must become even more similar for dips of 70^{o} north and 70^{o} south. In fact, the anomalies may be visually indistinguishable.

Against this background of uncertainty, it was decided to drill TTE 128 from the south to test a south dip for the following reasons:

../

(i) The absence of an intersection in DDH 13 suggested a south dip.

(ii) The absence of a magnetic low on the south side of the anomaly suggests that the magnetization of the sheet is aligned parallel to the earth's magnetic field and, if the sheet is magnetized by induction, this implies a southerly dip for the sheet.

(iii) Argaud's computer modelling of the anomaly, while not being considered quantitatively correct, was thought to be qualitatively correct in indicating a south dip.

Mainly on the basis of these factors, TTE 128 was drilled as is shown on Map 1. A haematite intersection in this hole corresponds with a haematite magnetite intersection in DDH 6 and in the author's opinion these two intersections define the strike of the magnetic sheet, although unfortunately both intersections occur at relatively shallow depths and the dip of the body still has not been established.

Figure 2 (also taken from Smith and Webster (1975)) shows a theoretical magnetic field over a north dipping plate at the same magnetic latitude as the TC 12 anomaly and it must be agreed that it shows great similarity to the observed field of Map 1. Possibly a magnetic low does occur off the southern flanks of the TC 12 anomaly which is observed by the east-northeast striking magnetic "haematite shale". If this is so, then the similarities between Figure 2 and Map 2 may be even greater. It is possible that the magnetic sheet dips steeply to the north and plunges to the southeast. This model would be consistent with the drill results to date as well as with the observed magnetic field. Such a plate is plotted on Map 1.

In either case of a north or south dip of the sheet, the author is confident that it has been intersected by TTE 128. The most positive way of resolving the dip question is by three dimensional computer modelling although even this may be complicated by the occurrence of remanent magnetization which can be significant in the Tennant Creek field (Gunn, 1976).

Peter J. Gunn

PETER J. GUNN

REFERENCES

Argaud, M., 1976. Re-interpretation of Magnetic Data, TC 12 - E.L. 357, Eldorado. A.A.M. MG: 686.

Cambrell, R., 1972. Report on Drilling Program, E.L. 357, Tennant Creek. A.A.M. MG: 227.

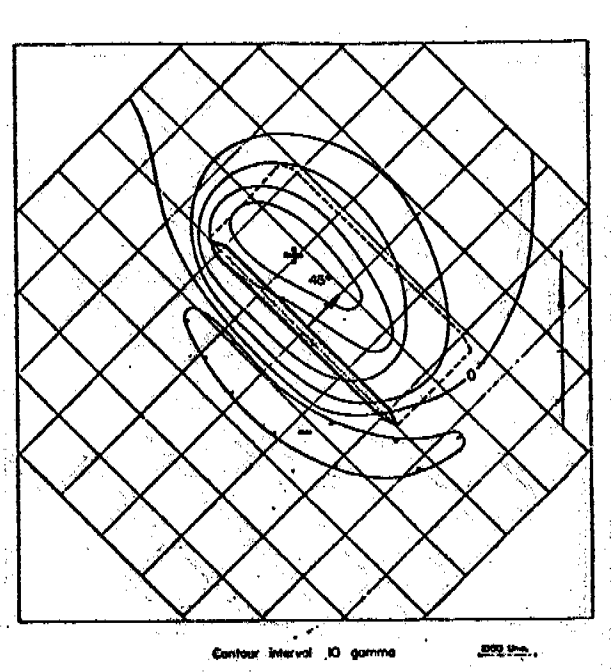
Gunn, P.J., 1976. Re-interpretation of Ground Magnetic Data, Warrego South, Northern Territory.

————, 1977. Interpretation of Ground Magnetic Data, E.L. 356, Daly River, Northern Territory.

Smith, R.J. and Webster, S.S., 1975. Problems of Magnetic Interpretation in Areas of Low Magnetic Latitude in Northern Australia. A.I.M.M. Conference Proceedings, Adelaide, June 1975.

MAP ENCLOSED

Map 1 E.L. 357, Tennant Creek, TC 12 Area, Ground Magnetometry. (Dwg. No. 14569)



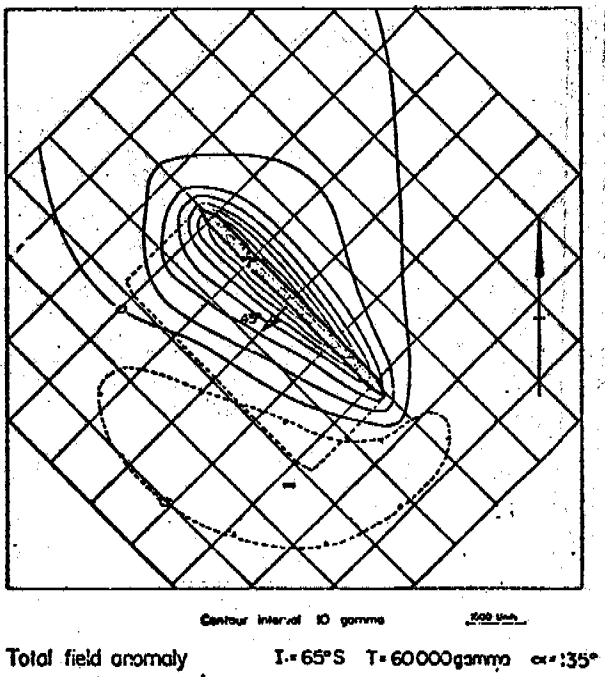


Figure 1

Theoretical Magnetic Fields
Over Magnetic Sheets for Inclination 65^{0}

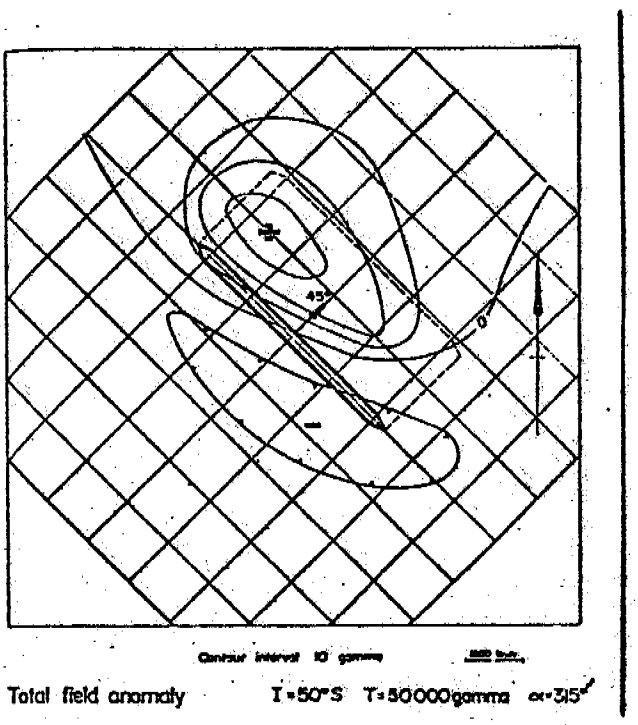


Figure 2

Theoretical Magnetic Field
Over a Magnetic Sheet for Inclination 50^{o}

030 W | 030 E | 090 E | 150 E | 210 E | 270 E | 330 E | 390 E | 450 E | 510 E | 570 E | 630 E | 690 E | 750 E

2130 N
2070N
2010 N
1950 N
1890 N
1830 N
1770 N
1710 N
1650 N
1590 N
1530 N
1470 N
1410 N
1350N
1290 N
1230 N
1170 N

DDH 13
DDH 9
DDH 6
TTE 128
DIP
66m
95m
55m
65m
1050
1100
1150
1200
1250
1300
1400
1500

Areas where readings were erratic or had poor repeatability due to surface magnetite.

DDH 13 — Drill Hole Projection

Magnetic Marker Corresponding to Haematitic Shale

65m / 70m — Haematitic Intersected in Drill Holes (numbers give depth below surface in metres)

Interpreted Fault

Possible Outline of Haematitic Magnetite Body

MN

Aquitaine Australia Minerals Pty. Ltd.

EL 357

Tennant Creek TC 12 area

Scale 1:2000

GROUND MAGNETOMETRY (G816 PROTON PRECESSION MAGNETOMETER)
TOTAL FIELD CORRECTED FOR DIURNAL VARIATION
ESTIMATED PRECISION OF CORRECTED INDIVIDUAL READINGS ± 5 GAMMAS
CONTOURS IN GAMMAS

CR 78/84

Author P GUNN	Date: Oct. '77	Dwg. No: 14569	1
Drafting: M F	Report No	Base Plan:	