ANNUAL REPORT ON

EXPLORATION ACTIVITIES

EL 1284 TENNANT CREEK

27.12.80 - 26.12.81

OPEN FILE

K. McPhee

September, 1981

TABLE OF CONTENTS

LIST OF PLATES

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

SUMMARY

Exploration Licence 1284 in the Tennant Creek area of the Northern Territory was granted to Uranerz Australia Ltd. on September 27, 1976. Its original area of 222.76 square kilometres has been reduced in accordance with the Mining Act to the current area of 25.85 square kilometres.

Exploration for gold and base metals is being carried out by Marathon Petroleum Pty. Ltd. under the terms of a Joint Venture that received Ministerial approval on October 27, 1980.

Work during the past twelve months has included gridding, ground magnetic surveying, gravity profiling and diamond drilling.

1.0 INTRODUCTION

1.1 Location, Climate, History

The township of Tennant Creek is located on the Stuart Highway approximately 500 kilometres north of Alice Springs and 1,000 kilometres south of Darwin in the Northen Territory. The Exploration Licences held in Joint Venture by Uranerz Australia Ltd. and Marathon Petroleum Australia Ltd. lie within the Tennant Creek 1:250,000 sheet area bounded by latitudes 19°S and 20°S and longitudes 133°30'E and 135°E. (Fig. 1-1).

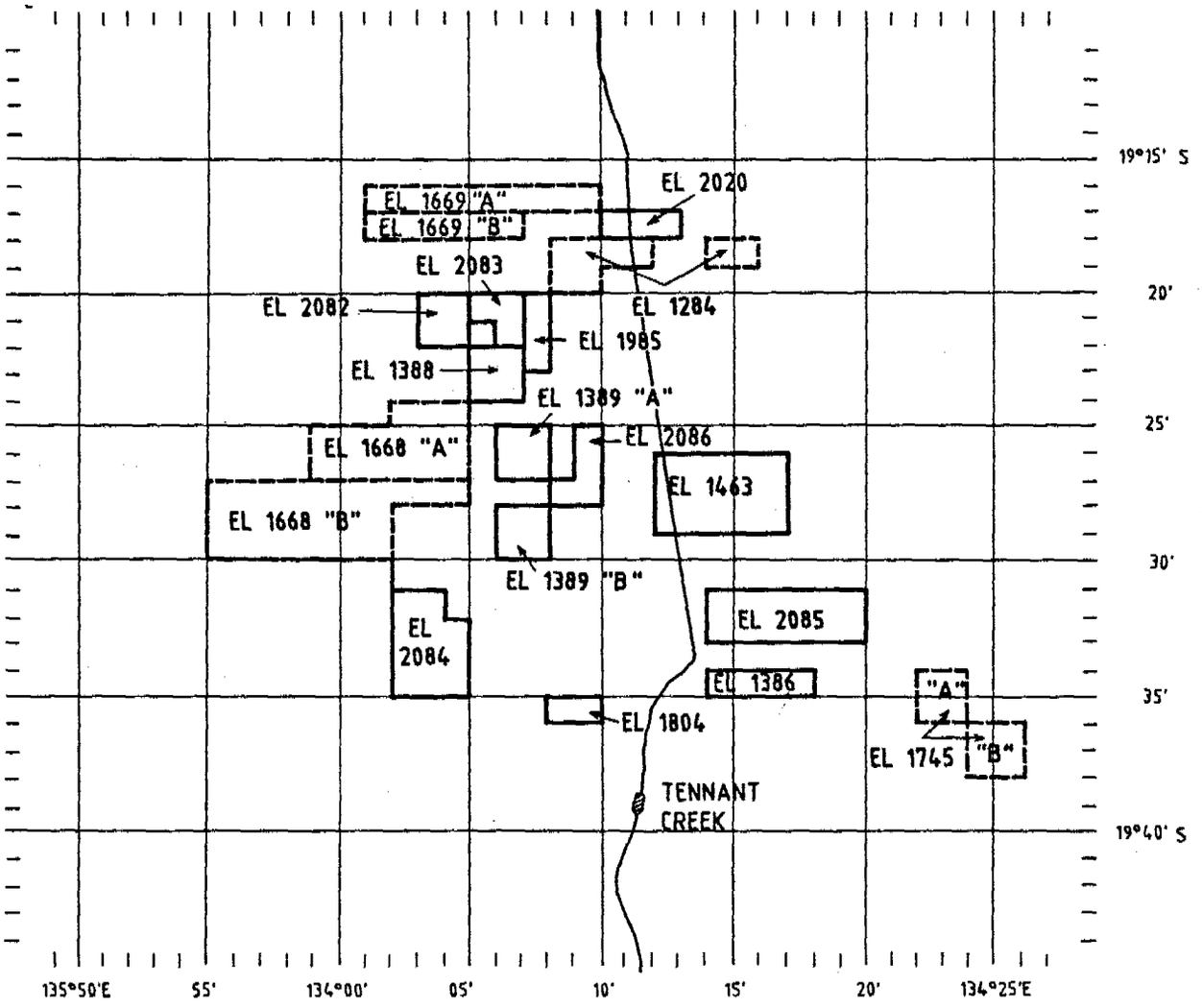
The main centre of population is Tennant Creek (population approximately 3500), however smaller settlements occur at Nobles Nob and Warrego Mines, the Threeways Roadhouse, and the two pastoral properties of "Phillip Creek" and "Tennant Creek".

The climate is hot in summer (mean daily temperature ranges from 24°C to 37°C) and mild in winter (11°C to 24°C). Temperatures into the mid-forties are common in summer. The yearly average rainfall is 365mm, confined mainly to the summer months.

The semi-arid country supports semi-desert vegetation comprising porcupine bush, spinifex, turpentine bush, small eucalypts and mulga.

Gold was first recognised in the area probably around 1870, but it wasn't until 1932 that the first significant deposit was discovered. The field subsequently developed into a major producer of copper and gold. Three major mines are in production at the present time:- Warrego (Au, Cu, Bi, Se, Ag), Gecko (Cu, Au) and Nobles Nob (Au). Details relevant to the geology and mineralization of various mines are presented in White (1962), Crohn (1965, 1975), Crohn and Oldershaw (1965), Wright (1965), Dunnet and Harding (1967), Large (1975) and Goulevitch (1975).

Marathon Petroleum Australia Ltd. are currently involved in exploration for U, Cu, Au, Bi, and associated mineralization on Exploration Licenses in the Tennant Creek field.



LEGEND

MPAL-AOM Participation

MPAL-UAL Participation

SCALE 10 0 10 20km

FIGURE I-I

MARATHON PETROLEUM AUSTRALIA LTD.

BRISBANE AUSTRALIA

Tennant Creek Northern Territory

TENNANT CREEK PROJECT

TENEMENT SITUATION TO DEC. '81

Drawn by J.Andrews Plan No. C1 G2 Date Nov. '81

1.2 Land Title

Exploration Licence 1284 was granted to Uranerz Australia Ltd., in September 1976; the tenement has subsequently been reduced in accordance with the Mining Act. Figure 1-1 outlines the land situation.

During 1980-81 exploration on EL 1284 was carried out by Marathon Petroleum Australia Ltd., under the terms of a Joint Venture Agreement that received Ministerial approval on 27th October, 1980.

1.3 Previous Exploration

The first geological report on the Tennant Creek goldfield was compiled in 1936 by Woolnough. Ivanac carried out a comprehensive study of the regional geology and mineral deposits of the area in 1954. The geology of the Tennant Creek 1-mile sheet area was described by Crohn and Oldershaw (1965) and this was followed in 1967 by Dunnet and Harding's report on the adjoining Mount Woodcock 1-mile sheet area. Numerous unpublished geological and geophysical reports have been prepared by both government and private bodies (in particular the BMR, Geopecko Ltd., and Australian Development Ltd.). The most recent geological survey undertaken was in 1970-71 (Mendum and Tonkin).

1.4 Acknowledgements

A number of people have contributed in some way to the Tennant Creek programme. Geologists M.J. Cussen and M.A. Yates and Field Assistants M. Williams and P. Todd assisted the author in the field.

2.0 REGIONAL GEOLOGY, STRUCTURAL AND METAMORPHIC HISTORY

2.1 Regional Geology

Comprehensive reviews of the regional geology have been given by Crohn (1965), Large (1975) and Black (1977). The generalised geology is shown in Figure 2-1.

The Lower Proterzoic Warramunga Group forms a large proportion of the Tennant Creek Block and consists predominantly of tuffaceous greywackes, greywackes and shales with major intercalations of acid volcanics and associated pyroclastics. The Group is approximately 3,000 metres thick (Mendum and Tonkin, 1979).

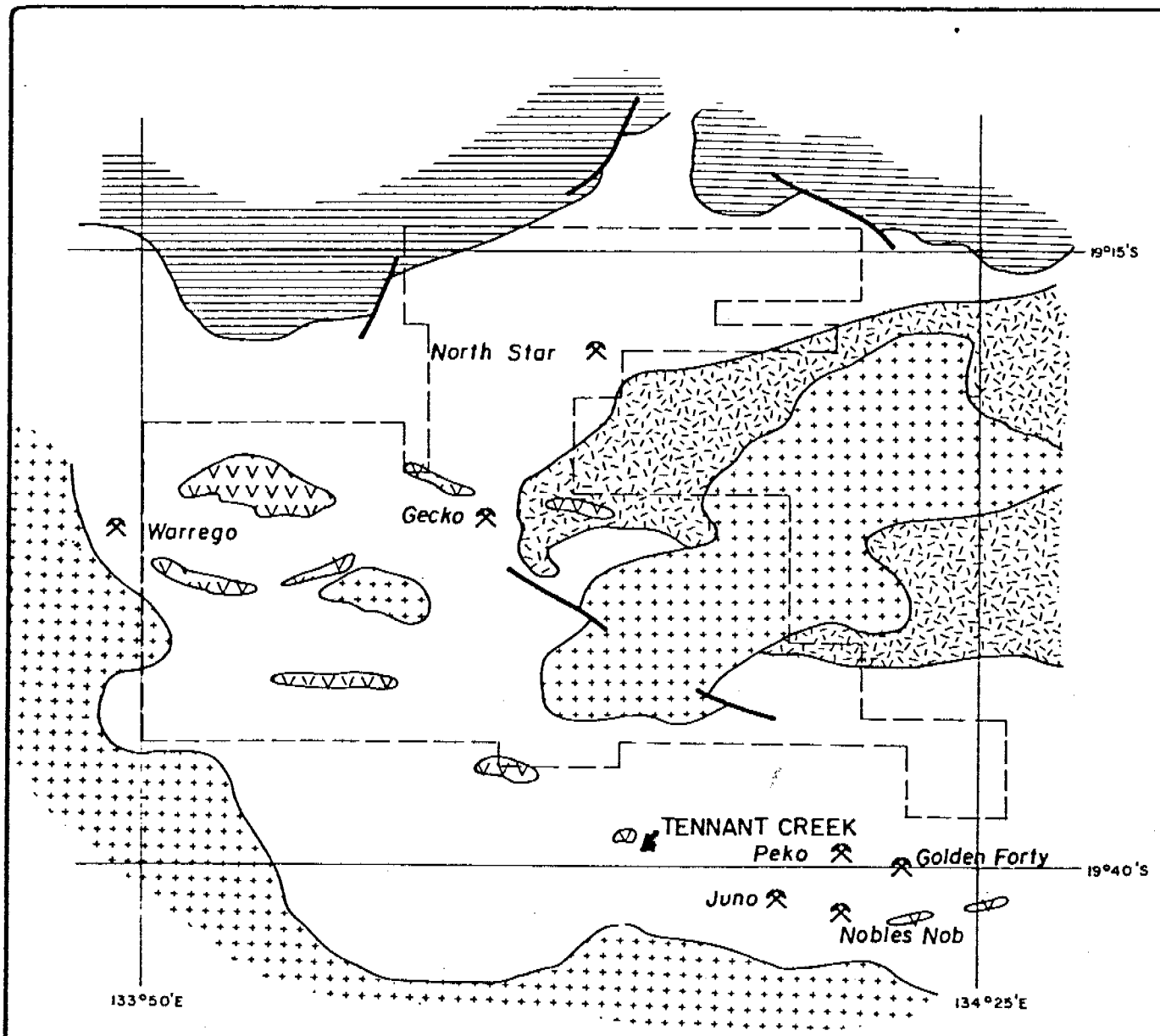
The stratigraphic succession of the Warramunga Group comprises three formations, namely the Whippet Formation, the Bernborough Formation and the Carraman Formation in order of decreasing age.

The Whippet Formation underlies the eastern part of the Tennant Creek area and consists of shallow water sandstone with subordinate amounts of greywacke and shale.

The Bernborough Formation consists of acid volcanic rocks, tuff, and tuffaceous greywacke that are interbedded with subordinate amounts of red shale and siltstone.

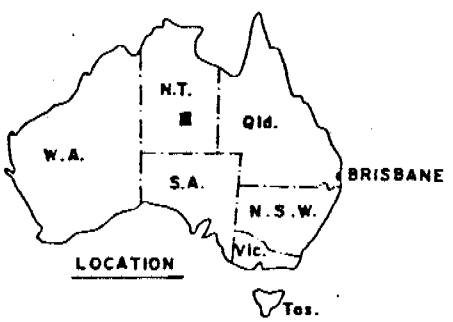
The Carraman Formation forms approximately 50 percent of the outcrops in the area, and consists mainly of argillite, shale, siltstone and tuffaceous greywacke that form units with features indicative of deposition by turbidity current. Isolated occurences of dolomite have been reported at several localities (Dunnet and Harding, 1967, pp 48-49), as have hematitic shales, ironstones, cherts and conglomerates.

Felsic volcanism is present throughout the formation and forms lenses that have been variously named Warrego, Orlando and Gecko Volcanics on the previous geological maps (Scales 1:63,360 and 1:250,000).



LEGEND

- Geological contact
- Fault
- Major mine workings
- Limit of present exploration activities
- Tomkinson Creek Group
- Carraman Formation
- Bernborough and Whippet Formations
- Rhyolite extrusives and quartz feldspar porphyries
- Granitic intrusives



SCALE
5 0 5 10 15 20km.

MARATHON PETROLEUM AUSTRALIA LTD.
BRISBANE AUSTRALIA

TENNANT CREEK PROJECT

SOLID GEOLOGY

Drawn by L.PETERSON Plan No. C1025 Date SEPT. 80

Fig 2-1

Sills and dykes of diorite and, less commonly, dolerite, intrude the upper parts of the Warramunga Group and lower part of the Tomkinson Creek Beds. Small lamprophyre dykes and sills intrude Warramunga Group sediments, particularly in the vicinity of the granite bodies.

The Warramunga Group is overlain unconformably by sediments of shallower water facies, namely the Hatches Creek Group in the south and the Tomkinsons Creek Beds to the north. The Warramunga Group was intruded by granitic plutons, deformed and metamorphosed prior to the deposition of both of the abovementioned Groups.

The Proterozoic rocks are overlain by flat-lying Cambrian, Mesozoic and Cainozoic lithologies.

2.2 Structural and Metamorphic History

The structural and metamorphic histories of the region are only vaguely understood. Dunnet and Harding (1967) and Mendum and Tonkin (1979) briefly touch on both topics in their reports.

It appears that the structural and metamorphic events in the Tennant Creek area can be summarized as follows:-

(i) The Warramunga Group was intruded by the Tennant Creek Granite Complex and then tightly to isoclinally folded during D_1. Parallel S_1 surfaces in the sediments and the granite confirm this. Metamorphism accompanying this deformation was of low greenshist facies grade.

(ii) Uplift and erosion occurred. The Tomkinsons Creek Group was deposited unconformably over the Warramunga Group and the Tennant Creek Granite Complex.

3.0 MINERALIZATION

Comprehensive details of the geology, structure and mineralization are described in White (1962), Crohn (1965 and 1975), Crohn and Oldershaw (1965), Dunnet and Harding (1967), Large (1975) and Goulevitch (1975).

Mineralization in the Warramunga Group is widespread and consists of gold deposits associated with more massive ironstones, and copper-gold-bismuth orebodies associated with quartz-hematite and quartz-magnetite lodes and chlorite alteration.

According to Large (1977), all known economic gold, bismuth and copper mineralization in the field occurs within the Carraman Formation. He also indicates that the economic gold-bismuth-copper mineralization within the field invariably occurs within lenticular, ellipsoidal or pipe-like bodies rich in magnetite and/or hematite.

Seven to eight hundred ironstone bodies of various sizes occur within the Warramunga Group, but only carry economic concentrations of ore minerals when located within the hematite facies of the Carraman Formation. Within this environment, mineralized magnetite-hematite bodies are commonly found close to thin beds of argillaceous banded iron formation and hematite rich shales (e.g. at Noble's Nob, Juno and Eldorado Mines), which Large interprets as representing "normal shales which received contributions from iron-rich submarine volcanic exhalations during their period of deposition".

Economic ore minerals found comprise gold, silver, sulphides of copper, lead and iron, sulfosalts of lead, bismuth and selenium. Uraninite is known to be present in submicroscopic grains with values of over 80 ppm in the Juno ore deposit (Large, 1975, p. 1401), and monazite is present at Warrego (Goulevitch, 1975) with uranium values up to 500 ppm.

(iii) During the second deformation event (D_2) the Warramunga and Tomkinsons Creek Groups were folded into broad, open anticlinal and synclinal structures.

(iv) A third, weak deformational event (D_3) affecting the region causing flexuring of pre-existing folds.

(v) Cambrian strata was laid down unconformably on all Proterozoic rock types.

4.0 WORK UNDERTAKEN

4.1 Geophysical Surveys

In the Tennant Creek area aeromagnetics is the only cost-effective method of reconnaissance exploration that has been used with success in locating the magnetite-hosted mineralization.

Low-level aeromagnetics had been flown over EL 1284 by Geometrics on behalf of Uranerz Australia Ltd. in 1977 (Plate 1) and subsequently interpreted by their in-house geophysicist (Duus, 1977). In 1981 a re-evaluation of this data was undertaken by Consultant Geophysicist R.K. Jones of Melbourne. Jones (1981) indicates that the source of Duus's A2 anomaly to be at a depth of 150 metres. If a sphere is assumed as the target then the centre would be at a depth of about 600 metres.

4.1.2 Gridding

In order to systematically survey this anomaly the local grid was re-established. The grid was orientated north-south and stations spaced at 100m on traverse lines 100m apart.

4.1.3 Ground Magnetic Traversing

A Scintrex MP-2 portable proton precession magnetometer (± 1nT accuracy) was used throughout the survey that was conducted in August, 1981. The staff mounted sensor was 1.65m above ground level. All field readings were taken with the operator facing north. A Scintrex MBS 2(P) portable 12 volt base station was used to graphically record changes in the earth's magnetic field. From this record diurnal drift corrections were calculated.

The survey was conducted on the established grid with stations spaced at 100 metre intervals on traverse lines 100 metres apart.

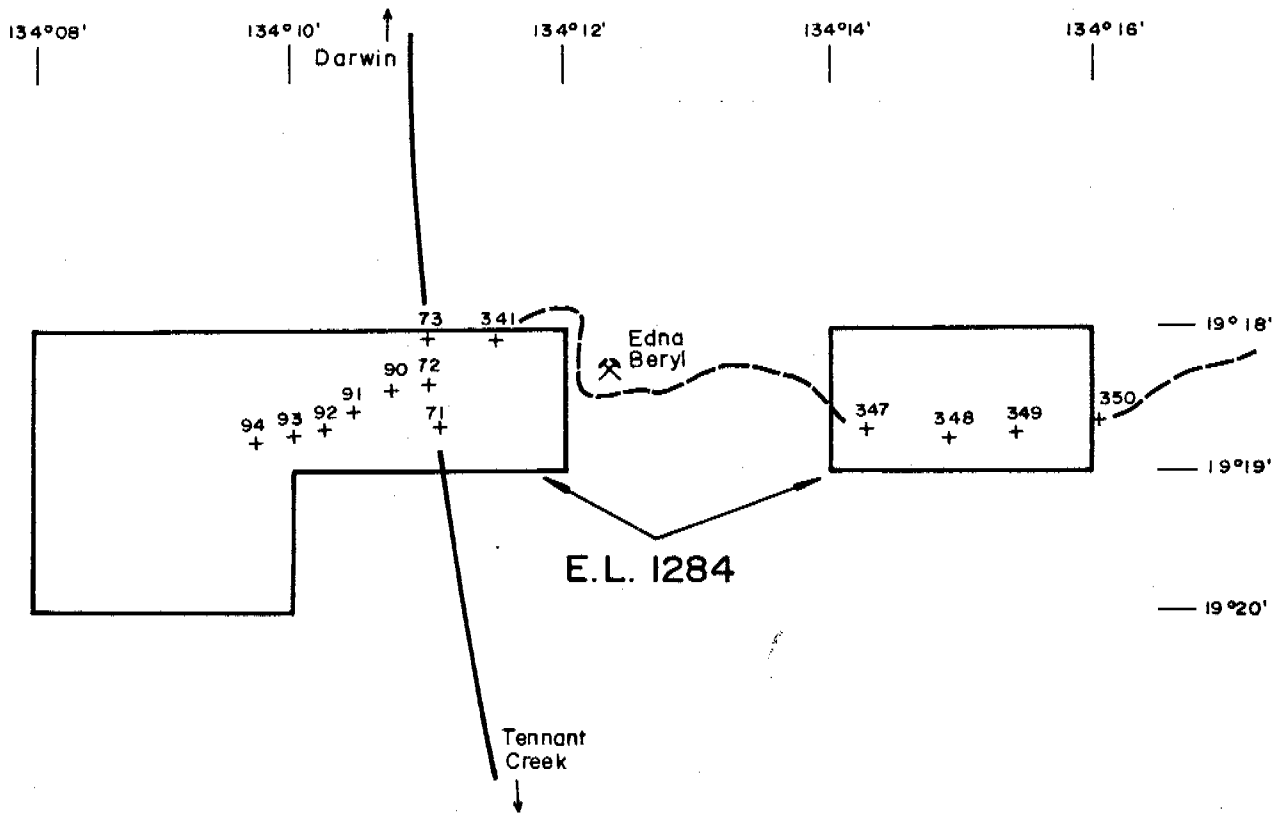
The field readings as collected were corrected for diurnal drift prior to plotting. Plate 2 shows the resultant total magnetic field intensity isograd map for the gridded area while Appendix I contains the factual data from the survey. Contouring and profiling of the magnetic data presented was undertaken by a computer.

4.1.4 Gravity Survey

Although gravity is not a cost-effective tool in reconnaissance exploration it can be used in detailed surveys where coincident gravity and other geophyscial (e.g. magnetic) anomalies enhance the value of a prospect. In the detailed survey stage gravity has the ability to provide reasonably quantative information on the size and depth location of the target.

In August, 1981 Solo Geophysics and Company of Adelaide undertook a gravity survey within EL 1284. The survey consisted of two phases - a number of wide spaced station readings along major access routes and closer spaced detailed profiling. The wider spaced stations were read as part of a more regional programme conducted over other MPAL leases in the area. Details of this phase are included as Appendix II and station locations appear on Plate 3.

Detail profiling (minimum spacing of 50 metres) was undertaken over the significant magnetic anomaly outlined on Plate 2. Results are attached on Appendix II and station localities shown on Fig. 4-1. The field operations undertaken by Solo Geophysics and Company were conducted efficiently and effectively however the turn-around time of approximately eight weeks in providing the final draft of the corrected data was too long. This caused delays in compilation and interpretation of the data and, in turn, delayed follow-up phases of the field programme.



LEGEND

90 + Gravity Station

Road

Track

SCALE 1:100 000

2 0 2 4 Km.

N

FIGURE 4-1

MARATHON PETROLEUM AUSTRALIA LTD.

BRISBANE AUSTRALIA

Tennant Creek Northern Territory

E.L. 1284 — TENNANT CREEK PROJECT

Plan Showing

LOCATION OF GRAVITY STATIONS

Drawn by J. Andrews Plan No. C2 N3-41 Date Nov. '81

4.2 Geophysical Interpretation

R.K. Jones and Associates Pty. Ltd undertook an interpretation of the ground magnetic survey and detailed gravity profile data obtained within EL 1284. Jones (1981) found a distinctly coincident gravity/magnetic anomaly on Line 50800E (Fig. 4-1).

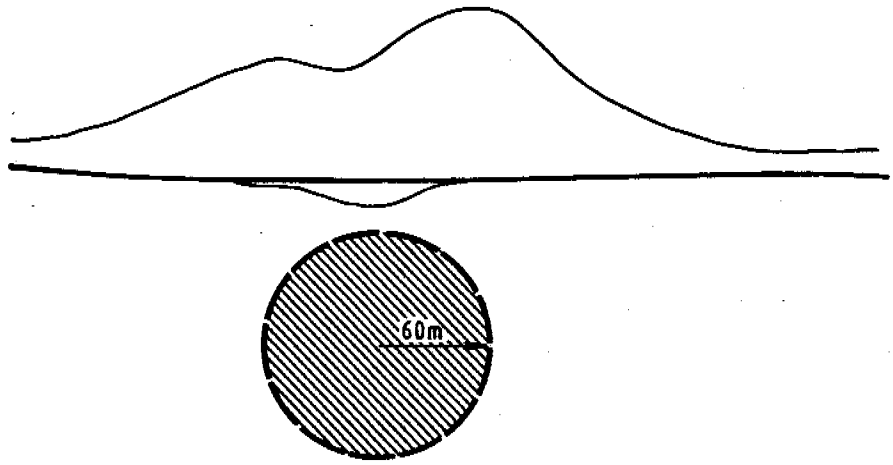
Assuming a vertically dipping prismatic body as a source for the ground magnetic anomaly the interpreted depth to the top is in the range of 100-120 metres from the surface. The residual gravity anomaly has a amplitude of 0.26 uG however the form of this anomaly is complicated by a slight low in the central part (Fig. 4-2). Jones (1981) offers two interpretations for this - either it relates to there being two separate sources or that the value reflects a local variation within the overburden and the true anomaly results from a deeper source. The possible situations envisaged by Jones (1981) are outlined as Fig. 4-3. If we assume one source at depth, then using a sphere as the model, the depth to top is estimated at 100-120 metres with a radius of about 60 metres. A density contrast of 1.5 gm/cc is assumed. Jones (1981) considers that the interpretations gained from the magnetic and gravity data agree extremely well.

Of the three interpretations offered that shown as No.3 on Fig. 3 is the best geological model to assume. In the case here the two tabular bodies could represent hematite shale horizons.

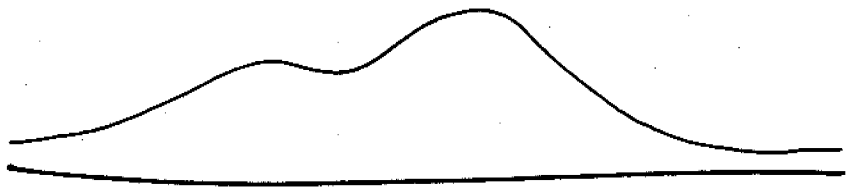
4.3 1981 Drilling Programme

In September 1981, Rockdril Contractors Pty. Ltd of Brisbane provided a Foxmobile drilling rig and support equipment needed to undertake a diamond drilling programme in the area.

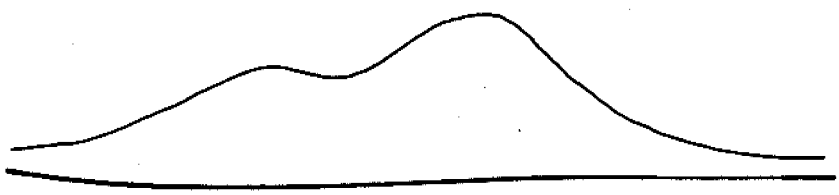
The prime target was the coincident gravity/magnetic anomaly on Line 50800E and a vertical diamond drillhole was sited in order to ascertain the source of the anomaly. Plate 3 shows the location and geological log of Diamond Drillhole 84119. Lithologies intersected include shale, siltstone and lithic sandstone (very fine to fine grained) that can be assigned to the Early Proterozoic Carraman Formation. The hole terminated at 208.30 metres. The predominant



1. Localised low density overburden producing low point; assume sphere of 60m radius at depth to centre of 160 -180m



2, Residual gravity profile assuming two smaller spherical sources at shallow depth



3, Residual gravity profiles assuming two distinct tabular bodies

FIGURE 4-3

MARATHON PETROLEUM AUSTRALIA LTD.

BRISBANE AUSTRALIA

Tennant Creek Northern Territory

E.L. 1284 TENNANT CREEK PROJECT

Plan Showing

POSSIBLE GEOLOGICAL MODELS FOR PROFILE LINE 50800E

AFTER: R. K. JONES & ASSOC. PTY. LTD.

Drawn by J. ANDREWS Plan No. C2 N3-33 Date OCT 1981

colour of the rock types drilled is red brown however below about 90 metres local grey green sandstones occur intercalated in the red brown pelites. The sequence appears to dip to the south at angles of 50-75^{o} and faces up the hole (ie. to the south). The detailed Drillhole Descriptive Log is attached as Appendix III.

Magnetic susceptibilities were read on all precollar chips and at regular intervals down the cored portion of the hole. An Elliott Geophysical Company PP-2A metre showed that all intervals recorded $< 0.1 \times 10^{-3}$ cgs units.

5.0 DISCUSSION OF RESULTS

Exploration work within EL 1284 has not lead to the discovery of mineralization.

The approach of using ground magnetic and gravity surveying lead to the location and definition of a coincident ground anomaly that had previously been noted on the available low-level aeromagnetic map. This anomaly was tested by one diamond drillhole which failed to intersect lithologies that could adequately explain its presence. Assay data from the hole indicates no anomalous values for the elements tested.

In summary, the work completed in the past year has been disappointing in that no mineralization was located within EL 1284.

6.0 RECOMMENDATIONS

As exploration activities by MPAL and its Joint Venture partners have failed to locate mineralization of the "Tennant Creek type" it is recommended that, given the current in-house knowledge, exploration activities cease on EL 1284.

TABLE 7-1

STATEMENT OF EXPENDITURE
EL 1284
FOR PERIOD 27.09.80 TO 26.09.81

	$
SALARIES NATN'L	4,477
GEN. BUSINESS EXP.	967
CAR RENTAL EXP.	2,537
COML. TRANSPORT	1,288
OFF. SUPPLIES	48
DRAFTING SUPPLIES	27
COMMUNICATIONS	165
OUTSIDE LEGAL	5,460
AUTOMOTIVE EXP.	1,492
FIX/WNG AVIA EXP.	1,172
MISCELLANEOUS	7
TECHNICAL INFO.	234
CONTRACT SERV.	793
OUT. REPRODUCTION	864
FREIGHT	340
DENVER RESEARCH CENTRE	222
MAT. & SUPPLIES	1,990
EQUIP EXP & RENT	1,224
CAMP FOOD	456
CAMP SHELTER	905
CAMP EQUIP & SUP.	597
CAMP FUEL	198
CAMP GENERAL	20
CONTRACT GEOL.	3,893
CONTRACT GEOCHEM.	168
GEOCHEM ANALYSIS	1,010
GEOPHYS CONSULT.	315
MAGNETICS SURVEY	618
GRAVITY SURVEYS	509
CONTRACT DRILL	12,836
ADMINISTRATIVE SERVICES	4,477
TOTAL EXPENDITURE	49,273

REFERENCES

BLACK, L.P. (1977) "A Rb-Sr geochronological study of the Proterozoic Tennant Creek Block, Central Australia"; B.M.R. Journal Aust. Geol. Geophy., 2pp. 111-122.

CROHN, P.W. (1965) "Tennant Creek Gold and Copper Field"; in "Geology of Aust. Ore Deposits"; Vol. 1, 8th Comm. Min. Metal, Cong. A.I.M.M., pp. 176-182.

CROHN, P.W. (1975) "Tennant Creek - Davenport Proterozoic Basins - Regional Geology and Mineralization"; in Knight, C.L. (Editor) "Economic Geology of Australia and Papua New Guinea"; Vol. 1, Metals, A.I.M.M., pp 421-424.

CROHN, P.W. and OLDERSHAW W. (1965) "The Geology of the Tennant Creek One Mile Sheet Area, N.T."; B.M.R. Rep. No. 83.

DUNNET, D. and HARDING, R.R. (1967) "Geology of the Mt. Woodcock One Mile Sheet Area, Tennant Creek, N.T."; B.M.R. Report No. 114.

DUUS, L.G. (1977) Interpretation of Geometrics Magnetic and Radiometric Airborne Survey over EL 1284, Tennant Creek, Northern Territory. UAL Special Report No. 23.

GOULEVITCH, J. (1975) "Warrego Copper - Gold Orebody"; in Knight, C.L. (Editor) Geol. of Aust. and Papua New Guinea; Vol. 1, Metals, A.I.M.M. pp 430-436.

JONES, R.K. (1981) "Interpretation of Gravity/Magnetic Data - Tennant Creek"; unpubl. Letter Report to Marathon Petroleum Aust. Ltd.

LARGE, R.R. (1975) "Zonation of the hydrothermal minerals at the Juno Mine, Tennant Creek Goldfield, Central Australia"; Economic Geology, Vol. 70, pp. 1387-1413.

LARGE, R.R. (1975) "Juno Gold - Bismuth Mine, Tennant Creek" in Knight C.L. (Editor) "Economic Geology of Australia and Papua New Guinea"; Vol. 1, pp 424-430.

LARGE, R.R. (1977) "Chemical Evolution and Zonation of Massive Sulphide Deposits in Volcanic Terrains"; Economic Geology, Vol. 72, pp 549-572.

MENDUM, J.R. and TONKIN, P.C. (1979) Geology of the Tennant Creek 1:250,000 Sheet Area, Northern Territory. BMR.

WHITE, R.E. (1962) "A Summary of operations at Peko Mines N.L."; Min. and Chem. Eng. Ref., June 15, pp 36-47.

APPENDIX I

FACTUAL DATA
FROM
GROUND MAGNETIC SURVEY

EL 1284

EAST	NORTH	MAG
50400	49300	50758
50400	49200	50753
50400	49100	50761
50400	49000	50762
50400	48900	50767
50400	48800	50774
50500	48800	50774
50500	48900	50776
50500	49000	50763
50500	49100	50760
50500	49200	50759
50500	49300	50756
50600	49300	50763
50600	49200	50760
50600	49100	50759
50600	49000	50767
50600	48900	50766
50600	48800	50764
50700	48800	50772
50700	48900	50758
50700	49000	50759
50700	49100	50762
50700	49200	50747
50700	49300	50756
50800	49300	50758
50800	49200	50758
50800	49100	50759
50800	49000	50762
50800	48900	50767
50800	48800	50770
50900	48800	50763
50900	48900	50761
50900	49000	50757
50900	49100	50753
50900	49200	50754
50900	49300	50758
51000	49300	50756
51000	49200	50746
51000	49100	50752
51000	49000	50760
51000	48900	50764
51000	48800	50770
51100	48800	50760
51100	48900	50765
51100	49000	50759
51100	49100	50747
51100	49200	50756
51100	49300	50757
51200	49300	50756
51200	49200	50755
51200	49100	50758
51200	49000	50757
51200	48900	50763
51200	48800	50760
50125	50250	50775
50125	50225	50776
50125	50200	50784

EAST	NORTH	MAG
50125	50175	50788
50125	50150	50794
50125	50125	50772
50125	50100	50785
50125	50075	50786
50125	50050	50779
50125	50025	50792
50125	50000	50807
50125	49975	50793
50125	49950	50791
50125	49925	50787
50125	49900	50791
50125	49875	50788
50125	49850	50785
50150	49850	50786
50150	49875	50790
50150	49900	50789
50150	49925	50789
50150	49950	50787
50150	49975	50767
50150	50000	50790
50150	50025	50789
50150	50050	50772
50150	50075	50785
50150	50100	50771
50150	50125	50775
50150	50150	50771
50150	50175	50780
50150	50200	50767
50150	50225	50769
50150	50250	50774
50175	50250	50770
50175	50225	50771
50175	50200	50772
50175	50175	50776
50175	50150	50777
50175	50125	50784
50175	50100	50772
50175	50075	50770
50175	50050	50754
50175	50025	50791
50175	50000	50784
50175	49975	50784
50175	49950	50782
50175	49925	50779
50175	49900	50793
50175	49875	50782
50175	49850	50781
50200	49850	50804
50200	49875	50796
50200	49900	50788
50200	49925	50803
50200	49950	50801
50200	49975	50804
50200	50000	50832
50200	50025	50801
50200	50050	50774

EAST	NORTH	MAG
50200	50075	50789
50200	50100	50795
50200	50125	50791
50200	50150	50804
50200	50175	50802
50200	50200	50896
50200	50225	50796
50200	50250	50802
50225	50250	50782
50225	50225	50774
50225	50200	50789
50225	50175	50791
50225	50150	50790
50225	50125	50794
50225	50100	50796
50225	50075	50773
50225	50050	50772
50225	50025	50788
50225	50000	50795
50225	49975	50792
50225	49950	50783
50225	49925	50793
50225	49900	50797
50225	49875	50793
50225	49850	50804
50250	49850	50785
50250	49875	50787
50250	49900	50791
50250	49925	50794
50250	49950	50785
50250	49975	50789
50250	50000	50788
50250	50025	50772
50250	50050	50776
50250	50075	50789
50250	50100	50784
50250	50125	50789
50250	50150	50792
50250	50175	50787
50250	50200	50769
50250	50225	50777
50250	50250	50775
50275	50250	50770
50275	50225	50773
50275	50200	50773
50275	50175	50787
50275	50150	50795
50275	50125	50789
50275	50100	50785
50275	50075	50781
50275	50050	50787
50275	50025	50786
50275	50000	50780
50275	49975	50795
50275	49950	50789
50275	49925	50782
50275	49900	50786
50275	49875	50795

EAST	NORTH	MAG
50275	49850	50793
50300	49850	50792
50300	49875	50783
50300	49900	50786
50300	49925	50787
50300	49950	50783
50300	49975	50785
50300	50000	50775
50300	50025	50780
50300	50050	50785
50300	50075	50774
50300	50100	50775
50300	50125	50770
50300	50150	50766
50300	50175	50773
50300	50200	50774
50300	50225	50772
50300	50250	50777
50325	50250	50776
50325	50225	50767
50325	50200	50762
50325	50175	50765
50325	50150	50771
50325	50125	50785
50325	50100	50799
50325	50075	50788
50325	50050	50782
50325	50025	50772
50325	50000	50786
50325	49975	50780
50325	49950	50783
50325	49925	50788
50325	49900	50773
50325	49875	50794
50325	49850	50800
50350	49850	50787
50350	49875	50780
50350	49900	50780
50350	49925	50783
50350	49950	50786
50350	49975	50802
50350	50000	50775
50350	50025	50778
50350	50050	50764
50350	50075	50770
50350	50100	50772
50350	50125	50778
50350	50150	50779
50350	50175	50767
50350	50200	50770
50350	50225	50775
50350	50250	50768
50125	50400	50739
50175	50400	50740
50200	50400	50735
50250	50400	50741
50300	50400	50741
50350	50400	50739

EAST	NORTH	MAG
50400	50400	50742
50450	50400	50738
50500	50400	50738
50550	50400	50741
50600	50400	50737
50650	50400	50738
50700	50400	50742
50750	50400	50738
50800	50400	50737
50850	50400	50732
50900	50400	50739
50950	50400	50738
51000	50400	50740
51050	50400	50734
51100	50400	50736
51150	50400	50729
51200	50400	50730
51250	50400	50731
51300	50400	50727
51350	50400	50725
51400	50400	50729
51450	50400	50726
51500	50400	50728
51550	50400	50727
51600	50400	50723
51600	50350	50735
51550	50350	50738
51500	50350	50737
51450	50350	50743
51400	50350	50741
51350	50350	50742
51300	50350	50740
51250	50350	50740
51200	50350	50744
51150	50350	50744
51100	50350	50743
51050	50350	50743
51000	50350	50743
50950	50350	50742
50900	50350	50744
50850	50350	50745
50800	50350	50748
50750	50350	50747
50700	50350	50747
50650	50350	50746
50600	50350	50746
50550	50350	50746
50500	50350	50746
50450	50350	50750
50400	50350	50750
50350	50350	50747
50300	50350	50747
50250	50350	50747
50200	50350	50751
50175	50350	50740
50125	50350	50738
50125	50300	50753
50175	50300	50747

EAST	NORTH	MAG
50200	50300	50749
50250	50300	50748
50300	50300	50749
50350	50300	50750
50400	50300	50749
50450	50300	50749
50500	50300	50748
50550	50300	50747
50600	50300	50746
50650	50300	50743
50700	50300	50744
50750	50300	50742
50800	50300	50748
50850	50300	50747
50900	50300	50744
50950	50300	50749
51000	50300	50745
51050	50300	50743
51100	50300	50742
51150	50300	50742
51200	50300	50741
51250	50300	50741
51300	50300	50741
51350	50300	50737
51400	50300	50736
51450	50300	50738
51500	50300	50736
51550	50300	50731
51600	50300	50729
51600	50250	50729
51550	50250	50729
51500	50250	50727
51450	50250	50727
51400	50250	50728
51350	50250	50728
51300	50250	50732
51250	50250	50735
51200	50250	50735
51150	50250	50732
51100	50250	50746
51050	50250	50747
51000	50250	50749
50950	50250	50749
50900	50250	50750
50850	50250	50749
50800	50250	50746
50750	50250	50747
50700	50250	50749
50650	50250	50744
50600	50250	50746
50550	50250	50747
50500	50250	50747
50450	50250	50751
50400	50250	50745
50350	50250	50746
50300	50250	50746
50250	50250	50746
50200	50250	50744

EAST	NORTH	MAG
50175	50250	50738
50125	50250	50749
50350	50200	50741
50400	50200	50744
50450	50200	50743
50500	50200	50743
50550	50200	50733
50600	50200	50736
50650	50200	50744
50700	50200	50744
50750	50200	50745
50800	50200	50744
50850	50200	50743
50900	50200	50746
50950	50200	50733
51000	50200	50731
51050	50200	50735
51100	50200	50738
51150	50200	50735
51200	50200	50738
51250	50200	50739
51300	50200	50737
51350	50200	50740
51400	50200	50736
51450	50200	50729
51500	50200	50736
51550	50200	50733
51600	50200	50733
51600	50150	50735
51550	50150	50733
51500	50150	50734
51450	50150	50733
51400	50150	50734
51350	50150	50738
51300	50150	50732
51250	50150	50735
51200	50150	50734
51150	50150	50733
51100	50150	50742
51050	50150	50743
51000	50150	50739
50950	50150	50741
50900	50150	50739
50850	50150	50738
50800	50150	50739
50750	50150	50742
50700	50150	50746
50650	50150	50746
50600	50150	50746
50550	50150	50739
50500	50150	50746
50450	50150	50742
50400	50150	50748
50350	50150	50752
50350	50100	50741
50400	50100	50741
50450	50100	50742
50500	50100	50741

EAST	NORTH	MAG
50550	50100	50740
50600	50100	50740
50650	50100	50739
50700	50100	50743
50750	50100	50739
50800	50100	50740
50850	50100	50740
50900	50100	50742
50950	50100	50740
51000	50100	50742
51050	50100	50745
51100	50100	50742
51150	50100	50740
51200	50100	50739
51250	50100	50738
51300	50100	50741
51350	50100	50736
51400	50100	50736
51450	50100	50732
51500	50100	50734
51550	50100	50733
51600	50100	50731
51600	50050	50735
51550	50050	50738
51500	50050	50737
51450	50050	50742
51400	50050	50746
51350	50050	50749
51300	50050	50751
51250	50050	50747
51200	50050	50749
51150	50050	50752
51100	50050	50748
51050	50050	50748
51000	50050	50749
50950	50050	50747
50900	50050	50752
50850	50050	50752
50800	50050	50755
50750	50050	50756
50700	50050	50753
50650	50050	50753
50600	50050	50749
50550	50050	50747
50500	50050	50746
50450	50050	50747
50400	50050	50747
50350	50050	50747
50350	50000	50740
50400	50000	50738
50450	50000	50735
50500	50000	50733
50550	50000	50741
50600	50000	50737
50650	50000	50741
50700	50000	50738
50750	50000	50745
50800	50000	50746

EAST	NORTH	MAG
50850	50000	50742
50900	50000	50741
50950	50000	50741
51000	50000	50741
51050	50000	50741
51100	50000	50741
51150	50000	50740
51200	50000	50735
51250	50000	50734
51300	50000	50731
51350	50000	50723
51400	50000	50727
51450	50000	50723
51500	50000	50726
51550	50000	50729
51600	50000	50725
51600	49950	50736
51550	49950	50741
51500	49950	50740
51450	49950	50740
51400	49950	50737
51350	49950	50736
51300	49950	50733
51250	49950	50737
51200	49950	50743
51150	49950	50752
51100	49950	50757
51050	49950	50759
51000	49950	50758
50950	49950	50767
50900	49950	50759
50850	49950	50762
50800	49950	50758
50750	49950	50758
50700	49950	50756
50650	49950	50750
50600	49950	50746
50550	49950	50748
50500	49950	50744
50450	49950	50753
50400	49950	50752
50350	49950	50758
51600	49850	50751
51550	49850	50757
51500	49850	50756
51450	49850	50760
51400	49850	50767
51350	49850	50768
51300	49850	50768
51250	49850	50766
51200	49850	50763
51150	49850	50774
51100	49850	50771
51050	49850	50778
51000	49850	50768
50950	49850	50770
50900	49850	50774
50850	49850	50777

EAST	NORTH	MAG
50800	49850	50773
50750	49850	50774
50700	49850	50766
50650	49850	50767
50600	49850	50760
50550	49850	50763
50500	49850	50762
50450	49850	50760
50400	49850	50762
50350	49850	50761
50300	49850	50761
50250	49850	50763
50200	49850	50758
50150	49850	50760
50150	49800	50758
50200	49800	50757
50250	49800	50759
50300	49800	50751
50350	49800	50752
50400	49800	50752
50450	49800	50742
50500	49800	50743
50550	49800	50744
50600	49800	50756
50650	49800	50762
50700	49800	50759
50750	49800	50758
50800	49800	50761
50850	49800	50766
50900	49800	50765
50950	49800	50756
51000	49800	50756
51050	49800	50756
51100	49800	50756
51150	49800	50760
51200	49800	50756
51250	49800	50754
51300	49800	50761
51350	49800	50744
51400	49800	50741
51450	49800	50741
51500	49800	50742
51550	49800	50737
51600	49800	50734
51600	49750	50736
51550	49750	50745
51500	49750	50743
51450	49750	50744
51400	49750	50741
51350	49750	50744
51300	49750	50750
51250	49750	50745
51200	49750	50749
51150	49750	50749
51100	49750	50752
51050	49750	50752
51000	49750	50766
50950	49750	50768

EAST	NORTH	MAG	EAST	NORTH	MAG
50900	49750	50774	51000	49650	50767
50850	49750	50770	50950	49650	50772
50800	49750	50774	50900	49650	50776
50750	49750	50773	50850	49650	50776
50700	49750	50764	50800	49650	50778
50650	49750	50755	50750	49650	50777
50600	49750	50756	50700	49650	50772
50550	49750	50746	50650	49650	50768
50500	49750	50749	50600	49650	50759
50450	49750	50743	50550	49650	50756
50400	49750	50749	50500	49650	50753
50350	49750	50744	50450	49650	50756
50300	49750	50744	50400	49650	50755
50250	49750	50739	50350	49650	50751
50200	49750	50747	50300	49650	50751
50150	49750		50250	49650	50751
50150	49700	50748	50200	49650	50751
50200	49700	50751	50200	49600	50745
50250	49700	50750	50250	49600	50743
50300	49700	50753	50300	49600	50746
50350	49700	50757	50350	49600	50743
50400	49700	50755	50400	49600	50746
50450	49700	50756	50450	49600	50745
50500	49700	50753	50500	49600	50751
50550	49700	50756	50550	49600	50756
50600	49700	50758	50600	49600	50753
50650	49700	50762	50650	49600	50757
50700	49700	50773	50700	49600	50770
50750	49700	50777	50750	49600	50774
50800	49700	50779	50800	49600	50776
50850	49700	50776	50850	49600	50776
50900	49700	50771	50900	49600	50769
50950	49700	50763	50750	49600	50769
51000	49700	50762	51000	49600	50761
51050	49700	50761	51050	49600	50756
51100	49700	50759	51100	49600	50754
51150	49700	50756	51150	49600	50749
51200	49700	50759	51200	49600	50752
51250	49700	50760	51250	49600	50751
51300	49700	50761	51300	49600	50751
51350	49700	50756	51350	49600	50754
51400	49700	50762	51900	49600	50752
51450	49700	50757	51450	49600	50753
51500	49700	50757	51500	49600	50756
51550	49700	50755	51550	49600	50758
51600	49700	50753	51600	49600	50752
51600	49650	50754	51600	49550	50756
51550	49650	50758	51550	49550	50756
51500	49650	50758	51500	49550	50758
51450	49650	50756	51450	49550	50755
51400	49650	50752	51400	49550	50753
51350	49650	50758	51350	49550	50748
51300	49650	50760	51300	49550	50747
51250	49650	50755	51250	49550	50746
51200	49650	50756	51200	49550	50744
51150	49650	50757	51150	49550	50748
51100	49650	50763	51100	49550	50752
51050	49650	50759	51050	49550	50753

EAST	NORTH	MAG	EAST	NORTH	MAG
51000	49550	50764	51000	49450	50741
50950	49550	50761	50950	49450	50744
50900	49550	50771	50900	49450	50742
50850	49550	50772	50850	49450	50741
50800	49550	50769	50800	49450	50741
50750	49550	50768	50750	49450	50741
50700	49550	50756	50700	49450	50736
50650	49550	50751	50650	49450	50736
50600	49550	50752	50600	49450	50738
50550	49550	50752	50550	49450	50741
50500	49550	50746	50500	49450	50734
50450	49550	50743	50450	49450	50738
50400	49550	50743	50400	49450	50740
50350	49550	50740	50350	49450	50740
50300	49550	50739	50300	49450	50738
50250	49550	50738	50250	49450	50743
50200	49550	50729	50200	49450	50751
50200	49500	50729	50200	49400	50745
50250	49500	50731	50250	49400	50733
50300	49500	50731	50300	49400	50739
50350	49500	50736	50350	49400	50741
50400	49500	50734	50400	49400	50736
50450	49500	50731	50450	49400	50738
50500	49500	50730	50500	49400	50736
50550	49500	50731	50550	49400	50729
50600	49500	50738	50600	49400	50728
50650	49500	50735	50650	49400	50728
50700	49500	50741	50700	49400	50728
50750	49500	50742	50750	49400	50727
50800	49500	50748	50800	49400	50724
50850	49500	50743	50850	49400	50727
50900	49500	50743	50900	49400	50728
50950	49500	50732	50950	49400	50727
51000	49500	50734	51000	49400	50728
51050	49500	50737	51050	49400	50733
51100	49500	50736	51100	49400	50728
51150	49500	50738	51150	49400	50734
51200	49500	50732	51200	49400	50735
51250	49500	50738	51250	49400	50733
51300	49500	50738	51300	49400	50739
51350	49500	50731	51350	49400	50739
51400	49500	50741	51400	49400	50741
51450	49500	50746	51450	49400	50753
51500	49500	50760	51500	49400	50758
51550	49500	50761	51550	49400	50759
51600	49500	50752	51600	49400	50748
51600	49450	50743	51600	49900	50738
51550	49450	50765	51550	49900	50738
51500	49450	50771	51500	49900	50738
51450	49450	50763	51450	49900	50745
51400	49450	50755	51400	49900	50752
51350	49450	50749	51350	49900	50745
51300	49450	50751	51300	49900	50750
51250	49450	50745	51250	49900	50752
51200	49450	50745	51200	49900	50757
51150	49450	50743	51150	49900	50750
51100	49450	50744	51100	49900	50752
51050	49450	50746	51050	49900	50753

EAST	NORTH	MAG	EAST	NORTH	MAG
51000	49900	50752			
50950	49900	50755			
50900	49900	50758			
50850	49900	50756			
50800	49900	50754			
50750	49900	50756			
50700	49900	50748			
50650	49900	50750			
50600	49900	50750			
50550	49900	50751			
50500	49900	50748			
50450	49900	50745			
50400	49900	50748			
50350	49900	50746			
50300	49900	50747			
50250	49900	50748			
50200	49900	50743			

APPENDIX II

FACTUAL DATA
FROM
GRAVITY SURVEY

EL 1284

STATION ID	MERCATOR NORTH	MERCATOR EAST	ELEV (m)	OBSERVED GRAVITY	THEORETICAL GRAVITY	BOUGUER GRAVITY (gms/cc) 1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.67	2.7	2.8
71	414426	864268	295.92	978527.33	978612.46	-16.12	-17.36	-18.60	-19.84	-21.08	-22.33	-23.57	-24.81	-26.05	-26.91	-27.29	-28.53
72	414328	864859	296.82	978528.43	978612.16	-14.52	-15.77	-17.01	-18.25	-19.50	-20.74	-21.99	-23.23	-24.47	-25.35	-25.72	-26.96
73	414314	865474	297.30	978529.20	978611.85	-13.33	-14.58	-15.82	-17.07	-18.32	-19.56	-20.81	-22.05	-23.30	-24.17	-24.55	-25.79
90	413833	864777	298.32	978528.27	978612.20	-14.38	-15.63	-16.88	-18.13	-19.38	-20.63	-21.88	-23.13	-24.38	-25.25	-25.63	-26.88
91	413348	864505	298.58	978528.11	978612.34	-14.61	-15.86	-17.12	-18.37	-19.62	-20.87	-22.12	-23.37	-24.62	-25.50	-25.87	-27.13
92	412949	864277	299.33	978528.26	978612.45	-14.40	-15.65	-16.91	-18.16	-19.42	-20.67	-21.93	-23.18	-24.43	-25.31	-25.69	-26.94
93	412536	864164	299.35	978528.89	978612.51	-13.82	-15.08	-16.33	-17.58	-18.84	-20.09	-21.35	-22.60	-23.86	-24.74	-25.11	-26.37
94	412048	864087	293.08	978528.48	978612.55	-15.73	-16.96	-18.19	-19.42	-20.65	-21.88	-23.10	-24.33	-25.56	-26.42	-26.79	-28.02
341	415196	865443	292.86	978528.22	978611.86	-15.36	-16.59	-17.82	-19.04	-20.27	-21.50	-22.73	-23.95	-25.18	-26.04	-26.41	-27.64
347	420077	864264	301.88	978522.16	978612.46	-19.91	-21.17	-22.44	-23.70	-24.97	-26.23	-27.50	-28.76	-30.03	-30.91	-31.29	-32.56
348	421163	864151	307.40	978520.06	978612.52	-20.78	-22.07	-23.36	-24.65	-25.94	-27.23	-28.51	-29.80	-31.09	-31.99	-32.38	-33.67
349	422034	864218	297.23	978521.33	978612.48	-21.85	-23.09	-24.34	-25.59	-26.83	-28.08	-29.32	-30.57	-31.81	-32.69	-33.06	-34.31
350	423131	864390	297.63	978520.77	978612.39	-22.23	-23.48	-24.73	-25.97	-27.22	-28.47	-29.72	-30.96	-32.21	-33.08	-33.46	-34.71

APPENDIX III

DRILLHOLE DESCRIPTIVE LOGS
DIAMOND DRILLHOLE 84119

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG. — Page 01 of 06

HOLE No. B 4 1 1 9 — DATE DRILLED 02/81 — DATE LOGGED 02/81 — GEOLOGIST M. Cussen

DEPTH (m)	RECOVERY (%)	VISUAL LOG	LITHOLOGY	COLOUR	GRAIN SIZE (mm)	GRAIN SHAPE	SORTING	% CONSTITUENTS: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	BEDDING THICKNESS	FACING	ANGLE TO CORE AXIS: BEDDING	CLEAVAGE	FRACTURE / J-Joint / F-Fault	FRACTURE FILL	COMMENTS
0				Br																			
																							RBr shales, vfg sst & minor hematitic shale; Qtz (<5mm), Tertiary
5			Alluvium	Br-Cr																			sedimentary breccia.
10																							
				Lt Br.																			
15				Dk Br																			Shales well weathered to clays. Minor Qtz and vfg sst
				RBr to Pk Br																			
20			Shale, minor vfg sandstone & sacc. Qtz.																				
25																							
			Shale	Minor DkGr																			
30			Minor f/g sandstone																				
35																							

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG. — Page 02 of 06

HOLE No. B 4 1 1 9 — DATE DRILLED 09/81 — DATE LOGGED 09/81 — GEOLOGIST M. Cusser

DEPTH (m)	RECOVERY (%)	VISUAL LOG	LITHOLOGY	COLOUR	GRAIN SIZE (mm)	GRAIN SHAPE	SORTING	% CONSTITUENTS: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	BEDDING THICKNESS	FACING	ANGLE TO CORE AXIS: BEDDING	CLEAVAGE (in bedding)	FRACTURE: J-Joint F-Fault	FRACTURE FILL	COMMENTS
40																							
45			Shale																				
50																							
																							Minor v/f sst 53-55m
55			Minor v/fg sandstone		0.1-0.2																		
	60		Interbedded Shale/Siltstone f/g to v/f sandstone	Sh/Siltst - DkRd sst - Bi-Cr	<0.1												Sh/Siltst 1-5cms, sst 2-5cms	↑	40	15			Shale - Siltst > sst cleavage/CAA - 20° in el. plane, strike 5° counter-clwise to bedding strike.
	70																						
	10		Shale.	Sh - RBr													Sh 1-5 cms.						bedding / cleavage
60																							
	5																						
	50																						
65																							
	4																						
	95																						
70																			50				50° at 70.0m
	35																						
75																							

CORE ← 3 CHAINS

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG. — Page 03 of 06

HOLE No. B 4 1 1 9 — DATE DRILLED 02/81 — DATE LOGGED 02/81 — GEOLOGIST M. Cusack

DEPTH (m)	RECOVERY (%)	VISUAL LOG	LITHOLOGY	COLOUR	GRAIN SIZE (mm)	GRAIN SHAPE	SORTING	% CONSTITUENTS: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	BEDDING THICKNESS	FACING	ANGLE TO CORE AXIS: BEDDING	CLEAVAGE (Ca Angle to Plane)	FRACTURES (J-Joint F-Fault)	FRACTURE FILL	COMMENTS
75																							
	30																						Disrupted bedding very common.
80																		↑	60°	5°			Bedding at 79.7m cleavage at 79.9m / 15° In Cl. plane
	90																	↑	55				55° at 81.0m Bedding cleavage. Bedding disruption.
85	90																	↑	(35-75) av. 50°				Millimetric scale graded bedding in sst.
90	95		Interbedded Shale - Siltstone & Sandstone / Shale	Dk Gy - Sh - Silt RBr Shale. Lt Gy Gr sst													sst ≤ 5mm		50		F 80° - Vert. Qtz		Bedding disruption Qtz veins ≤ 5mm Bedding / CAA at 90.2m
	100																	↑	70 60				Bedding / CAA at 93.4m Bedding / CAA at 93.7m
95	100																		60-90				Bedding disruption.
100	90																		60	15			Average bedding dip
				Dk RBr Sh/Silt at 100m Lt RB - Shale													Sh < 3mm, sst ≤ 10mm, Separated by 2-3 cms of sh/silt/sst beds up to 20cms apart				F	Qtz (≤ 2mm) av. 0.5mm	Cl dips 20° in Cl. plane.
105	95			Lt Gy Gr sst																			
110	95																		60-70 35				Bedding / CAA at 108.3m Bedding disruption. Bedding / CAA at 110.5m
	95																Shale ≤ 2mm						Millimetric scale folding of RB - Shale beds (≤ 2mm)

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG — Page 04 of 06

HOLE No. 84112 — DATE DRILLED 02/81 — DATE LOGGED 02/81 — GEOLOGIST M. Cussen.

DEPTH (m)	RECOVERY (%)	VISUAL LOG	LITHOLOGY	COLOUR	GRAIN SIZE (mm)	GRAIN SHAPE	SORTING	% CONSTITUENTS: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	BEDDING THICKNESS	FACING	ANGLE TO CORE AXIS: BEDDING	CLEAVAGE	FRACTURE: γ-Joint E-Fault	FRACTURE FILL	COMMENTS
115	90			Lt Gy Gr sst															?20	~25			Bedding/CAA at 113.5m Cleavage/CAA at 113.5m (30° in cl plane) Bd. St. <5° clause to Bedding St.
				Dk RBr Sh															50				Bedding/CAA at 115.8m
120	100																sst & Sh 6mm	↑	50				Shale/Silt St >> Shale > sst Bedding/CAA at 118.6m
				Lt Gy Gr sst																			
125	95																		55 80				Bedding/CAA at 124.9m 123.7m
	90		Interbedded	Dk RBr Sh/SHSt Lt Gy Gr SSt Lt RBr Shale															60				Bedding/CAA at 125.0m
130	90 95		Shale-Siltstone/f.g. Sandstone/Shale														Sh 2-6mm		50			Qtz	Qtz veining 127.8-128.1m Millimetric scale folding of thin (2-6mm) Shale beds possibly during cleavage
																	sst thickens to 10-15mm					Qtz	development. Brecciation and Qtz in fill along fault zone
135	100																10-25cm apart	↑	75				Small scale folding continues. Bedding/CAA - 133.2-135.8m Sh-Silt St >> Shale > sst Graded bedding in sst.
																	Sh, 2-5mm, 2-30mm apart						Shale component increases in thickness sst beds uncommon (<5mm thick)
140	100																						Bedding/CAA at 141.8m Cl/CAA - 25° in cl. plane at 141.8m
					f.g.s - 0.2-3.0mm x 0.2-1.0m	Sa													75	10			Tuff component (Lt Bl Gy f.g.s?) at 141.2-141.5m. f.g.s? Flattened along cleavage plane
145	100			Dk Gy Sh/Silt St Lt Gy Gr SSt RBr Shale																			Bedding Cl St ~110° close to Cleavage Bedding St.
																							f.g. sst only a minor component
150	95																		60				Bedding/CAA at 150.0m

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG. — Page 05 of 06

HOLE No. 84/12 — DATE DRILLED 02/81 — DATE LOGGED 02/81 — GEOLOGIST M. Cossen

Depth (m)	Recovery (%)	Visual Log	Lithology	Colour	Grain Size (mm)	Grain Shape	Sorting	% Constituents: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	Bedding Thickness	Facing	Angle to Core Axis: Bedding	Cleavage	Fracture (J-Joint F-Fault)	Fracture Fill	Comments
150																							
	90																		70				Bedding/CAA at 152.0m
155																						Qtz	Fracturing and Qtz infill(<2mm between 153.0–166.5m
	95																						sst beds only minor component
160																							
	95																						
165			Shale-Siltstone/ fg Sandstone/ Shale																45°				Bedding/CAA at 169.1m Bedding disrupted.
	100																						
	90																						
170	0%																					Qtz	sst component increases between 169.9–171.0m
	95																					Qtz	Weakly to strongly sheared zone 167.4–168m, infilled by Qtz (av 2mm thick)
175	90																		60°			Qtz	Bedding disruption. Bedding/CAA at 172.3m sst component increases
																	sst up to 1cm, 1–40cm apart					Qtz	
180	90																		25°			Qtz	Bedding/CAA at 178.0m
																			40° 40°		F 0-vert	Qtz	Bedding/CAA at 180.6m. Bedding disrupted, Fracturing and Qtz infill
185	100																		25°			Qtz	Bedding/CAA at 184.8m Qtz veining, up to 1cm thick, rarely to 5cm
																			55°				Bedding/CAA at 186.5m

TENNANT CREEK PROJECT — DRILLHOLE DESCRIPTIVE LOG. — Page 06 of 06

HOLE No. 8 4 1 1 9 — DATE DRILLED 09/81 — DATE LOGGED 09/81 — GEOLOGIST M. Cussen

DEPTH (m)	RECOVERY (%)	VISUAL LOG	LITHOLOGY	COLOUR	GRAIN SIZE (mm)	GRAIN SHAPE	SORTING	% CONSTITUENTS: Qtz	F'spar	Lithics	Magnetite	Hematite	Limonite	Chlorite	Qtz Veins	Sulphides	BEDDING THICKNESS	FACING	ANGLE TO CORE AXIS: BEDDING	CLEAVAGE	FRACTURE (J-Joint, F-Fault)	FRACTURE FILL	COMMENTS
190	100																sst < 1cm		30				Bedding/CAA at 189.8m
																			35				Bedding/CAA at 190.6m
	100																		20				Bedding/CAA at 193.1m
195																							Bedding/CAA at 195.4m
			Interbedded	Dk RBr sh/shlt															30 (25-45)				
			Shale-Siltstone/ Fg Sandstone/ Shale	RBr Shale LtGy Gr sst															20				Bedding/CAA at 197.3m
200																			40				Bedding/CAA at 198.2m
																			20				Bedding/CAA at 199.8m
	100																						
																							Bedding/CAA at 203.1m
205																							
																	sst - ≤5mm, 1-10cm apart	↑	20	15			sst beds stump into shales
																							Bedding/CAA at 207.0m
210																							Cleavage/CAA at 207.6m 
							END OF HOLE 208.3m																

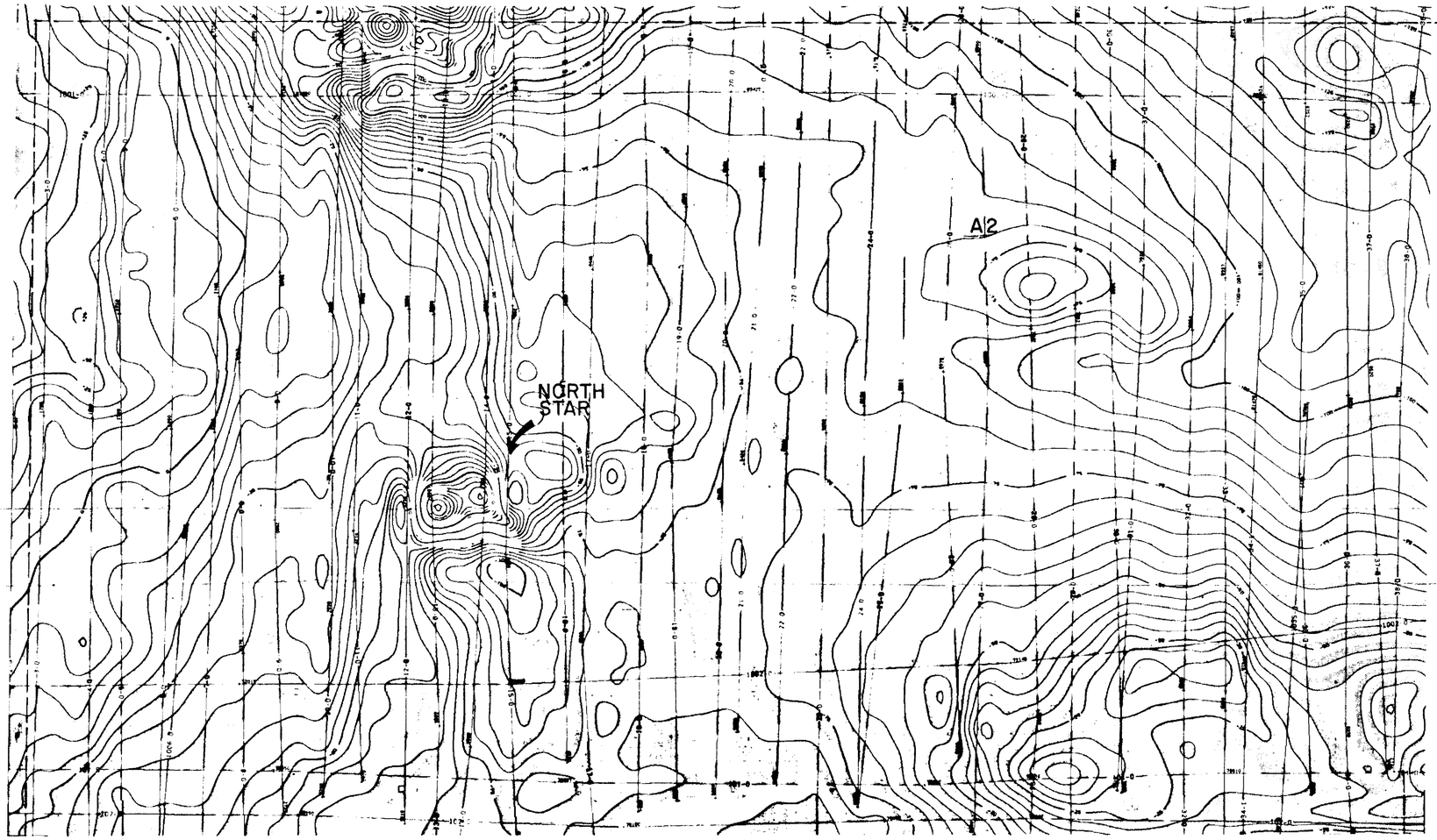
Assay Data - DDH 84119

Depth (m)	Cu	Pb	Zn	Co	Bi	Fe%
19-20	12	75	18	<4	<4	4.30
29-30	10	32	90	48	<4	3.50
39-40	10	40	36	12	<4	3.40
49-50	8	32	120	36	<4	3.80
54-55	4	32	60	24	<4	3.90
110.10-110.25	8	36	85	12	<4	6.50
120.00-120.09	8	16	150	20	<4	6.00
130.06-130.21	16	50	135	20	<4	6.40
134.94-140.05	10	100	120	14	<4	9.50
150.00-150.10	8	65	105	12	<4	8.80
159.86-159.99	14	50	100	14	<4	8.50
169.85-170.00	6	36	90	12	<4	6.50
179.94-180.03	6	28	85	14	<4	3.80
189.89-190.01	40	50	85	12	<4	7.80
199.94-200.08	6	40	90	14	<4	5.00
208.17-208.30	60	55	70	10	<4	6.60

Note: Results in ppm unless noted

134°07'E

19° 18' S



NORTHERN TERRITORY GEOLOGICAL SURVEY

CR81/303

LEGEND

—75— Aeromagnetic Isograd

A2 Anomaly Identification (after Duss, 1977)

SCALE 1:25000

0·5 0 0·5 1·0 1·5 2·0 2·5

Kilometres

Marathon Petroleum Australia, Ltd
Brisbane Australia

Tennant Creek Northern Territory

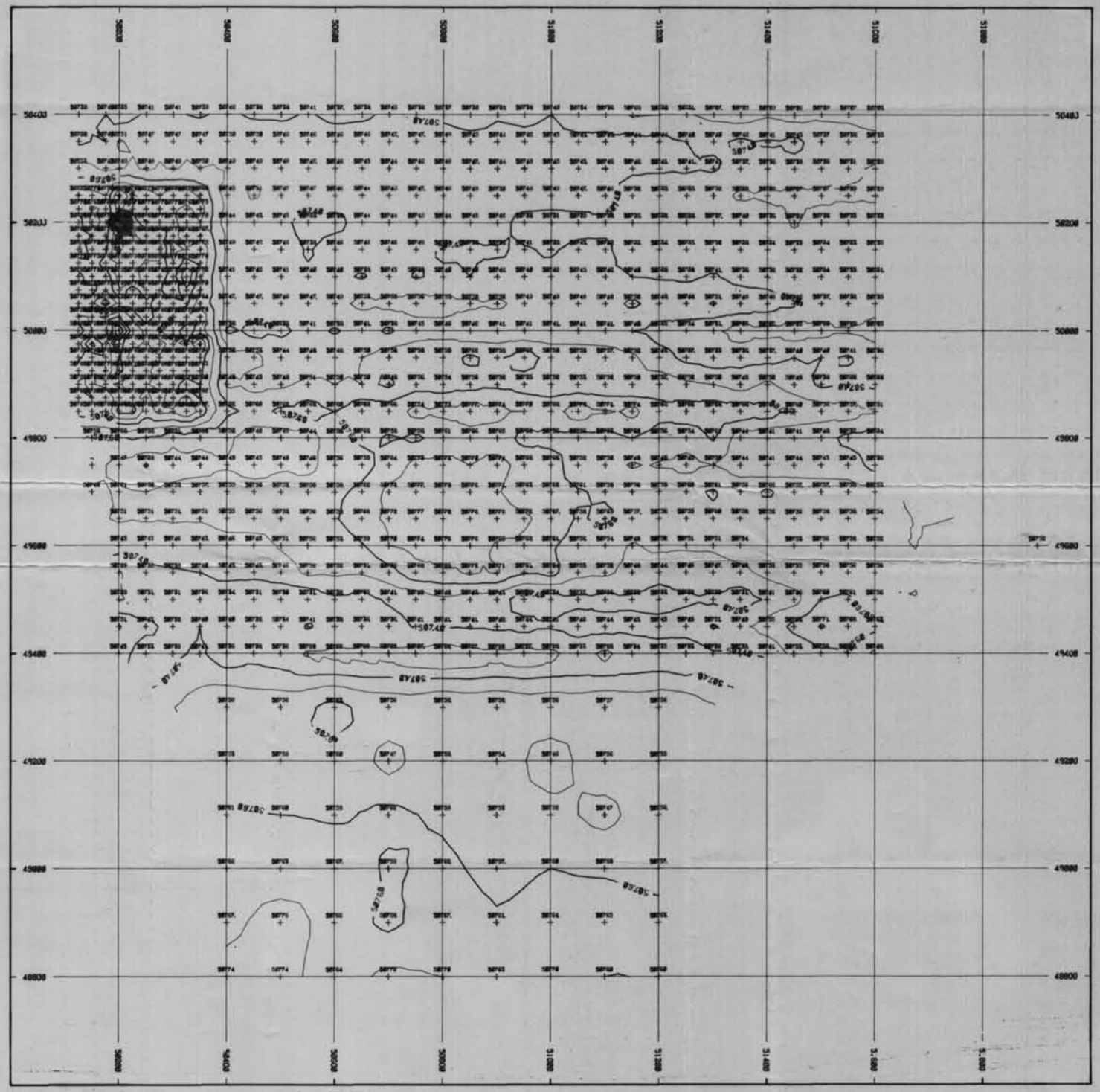
E.L. 1284-TENNANT CREEK PROJECT

Plan Showing

AEROMAGNETIC MAP

DRAWN BY J. Andrews	DATE Nov. '81	MAP No V.P. 44 FILE ORDER	PLATE 81
ORIGINAL DATA Geometrics	DATE '77	REVISED BY	DATE

B2



LEGEND

50752 + Total Magnetic Intensity

—50760— Total Magnetic Isograd

—49200— Local Grid Co-Ordinates (metric)

NORTHERN TERRITORY GEOLOGICAL SURVEY

CR81/303

SCALE 1: 5000

100 0 100 200 300 400 500

Metres

TN

Marathon Petroleum Australia, Ltd

Brisbane Australia

Tennant Creek Northern Territory

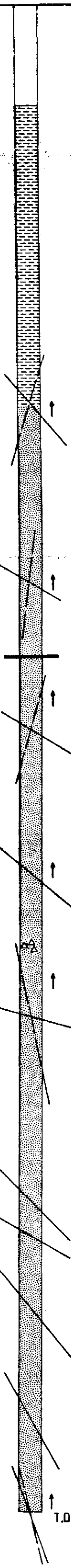
E.L. 1284 TENNANT CREEK PROJECT

Plan Showing

GROUND MAGNETIC SURVEY

DRAWN BY MINCOM	DATE Nov '81	MAP No V.P. 2.15	PLATE 02
ORIGINAL DATA G.S., M.W., P.T.	DATE Aug. '81	REVISED BY Pink DATE	

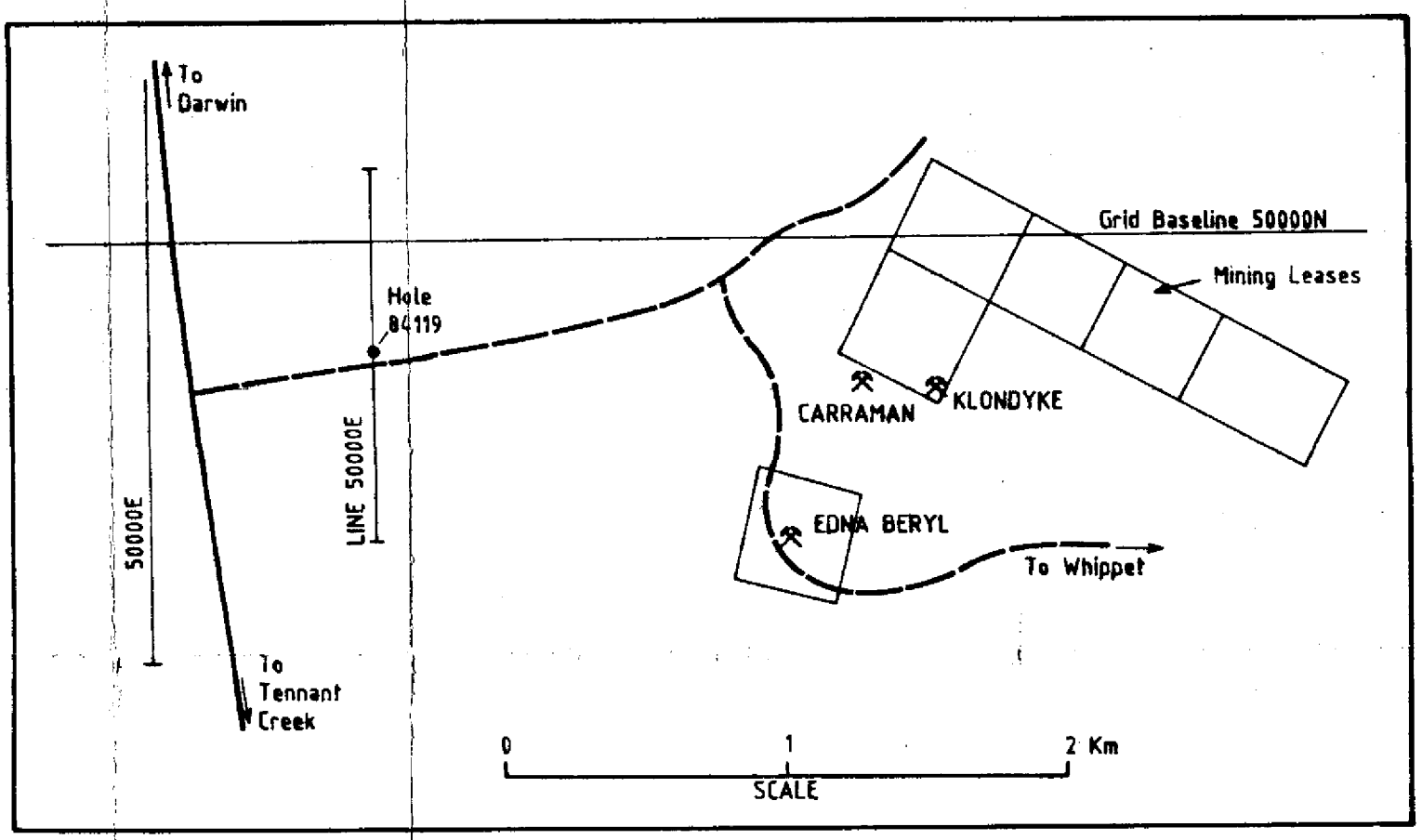
B2



T.D. 208.3m.

VERTICAL SCALE. 1:1000

LOCALITY PLAN



LEGEND

- QUATERNARY — Alluvium
- EARLY PROTEROZOIC (Carraman Formation) — Shale, minor Sandstone
- EARLY PROTEROZOIC (Carraman Formation) — Interbedded Shale, Siltstone, Sandstone
- Brecciation
- Facing Direction
- Bedding Plane
- Cleavage Plane
- Fault Trace

NORTHERN TERRITORY
GEOLOGICAL SURVEY

CR81/303

PLATE 3

MARATHON PETROLEUM AUSTRALIA, LTD.
BRISBANE AUSTRALIA

Tennant creek Northern Territory

E.L. 1284 TENNANT CREEK PROJECT

Plan Showing

SECTION THROUGH DIAMOND DRILL HOLE 84119

Data by M CUSSEN Sept '81 Plan No. VP 458 Date OCT. 1981