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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD No. 1966/14

A SUMMARY OF THE GEOPHYSICAL BRANCH CONTRIBUTION TO THE SPECIAL MINERAL SURVEY PROGRAMME IN THE NORTHERN TERRITORY, 1962-1963

by

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CONTENTS

ILLUSTRATIONS

Record No. 1966/14

SUMMARY

During 1962 and 1963, the Bureau of Mineral Resources planned and supervised a special mineral survey programme in the Northern Territory at the request of the Department of Territories. The programme comprised four surveys - two electromagnetic surveys in the Union Reefs and McArthur River areas and two aeromagnetic surveys in the McArthur River and Darwin-Pine Creek areas.

Many anomalies were detected by the electromagnetic surveys, but it is most likely that they are due to a heterogeneous composition of the weathered layer, combined with a varying depth to the ground water level and an irregular content of saline water. It is possible, however, that some of the anomalies are due to conductive layers of sulphides, and several drill holes are recommended to test the anomalies.

The results of the McArthur River aeromagnetic survey failed to show any correlation with geological structure except in the region of the Emu and Tawallah Faults, but the magnetic 'lows' in the vicinity of the McArthur River Homestead may be associated with small basins that may contain lead-zinc mineralisation, and therefore indicate targets for future exploration.

In the Darwin-Pine Creek area, four lineations of magnetic anomalies were detected which bear no simple relation to the known geology, but which are considered to be due to dykes intruded into the lower Proterozoic sediments. It is recommended that further testing of these anomalies be done to determine whether economic minerals are associated with them. Also in this area, in the vicinity of Mount Masson, it is recommended that geochemical traverses be made to test the magnetic 'highs' that resemble in character the 'high' detected over the Mount Masson tin mine.

1. INTRODUCTION

Early in 1962, the Commonwealth Government approved a submission by the Department of Territories to spend £150,000 on a special mineral survey in the Northern Territory. The work was to be done during the two financial years from 1962 to 1964 and the Bureau of Mineral Resources (BMR) was asked to plan and supervise the programme.

The purpose of the survey was to stimulate interest in exploration and mining in the Northern Territory and to encourage private companies to invest in further activities and so promote the development of this part of Australia.

The programme was divided into three roughly equal parts: a phosphate search in the Rum Jungle area; a geological programme of drilling, logging, mapping, and geochemical sampling in several different areas; and geophysical surveys in the northern part of the Territory. The first two parts of the programme were supervised by the Geological Branch of the BMR and have been summarised by Ivanac (1965). The geophysical part of the programme was all done under contract to the BMR and was supervised by the Geophysical Branch. It consisted of four surveys - two electromagnetic surveys in the Union Reefs and McArthur River areas and two aeromagnetic surveys in the McArthur River and the Darwin-Pine Creek areas (Plate 1).

Union Reefs

The Union Reefs goldfield was one of the richest in the Northern Territory towards the end of the last century, but since the turn of the century, activities have been sporadic, and operations were finally abandoned in 1935. The workings, however, had been only shallow and it is possible that payable gold may occur at greater depth. With the object of locating auriferous quartz reefs and sulphides at depths greater than about 100 feet, a programme of detailed geological mapping, electromagnetic and electrical potential ratio surveys, and diamond and waggon drilling was planned.

McArthur River

Lead-zinc-copper mineralisation was first discovered in the area of the McArthur River Homestead in 1887, but little systematic work was done in the field until 1955, when exploration by Mount Isa Mines Ltd. indicated the presence of several base-metal prospects, one of which, the H.Y.C. prospect, has proved to be the largest lead-zinc orebody so far discovered in the Northern Territory.

Contract augering, geochemical sampling, and aeromagnetic and ground electromagnetic surveys were programmed to investigate possible extensions or repetitions of the known lead-zinc deposits.

Darwin-Pine Creek

The primary object of the survey was the detection of new iron ore deposits in the Mount Bundey area, where ground magnetic surveys had previously shown that ironstone bodies produce anomalies of a size and intensity that could readily be detected with an airborne magnetometer. It was decided, however, to extend the survey area to cover the one-mile map areas of Mount Bundey, Woolwanga, and Burrundie and parts of the one-mile map areas of Marrakai, Batchelor, and Ban Ban, in order to extend the aeromagnetic coverage provided by earlier BMR surveys. Apart from the Mount Bundey iron ore deposits, the area also covered the Mount Masson and Mount Harris tinfields, the Union Reefs goldfield, and the iron ore prospects at Frances Creek, as well as a number of smaller prospects and

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old mines. It was hoped that the results of the survey would stimulate further prospecting in the area and provide targets for more detailed geophysical surveys.

2. UNION REEFS GEOPHYSICAL SURVEY

Basically, the problem in the Union Reefs area was the location of auriferous quartz reefs and sulphides within an environment of interbedded greywacke and shale. Greywacke and shale are usually poor conductors of electricity, whereas quartz is a very poor conductor and most sulphides are comparatively good conductors. Electrical methods that depend on differences in conductivity were applied: the Turam electromagnetic method for the location of sulphides, and the Turam Transformer potential ratio method for the location of quartz reefs.

The survey was done under contract to the BMR with J. J. Masur & Co. Pty. Ltd., Melbourne, as the main contractor and Aktiebolaget Electrisk Malmletning (ABEM) as subcontractor. The field work was done during the dry season in 1963, between 19th June and 16th August, the geophysical work being done by two ABEM geophysicists and the land surveying by J. J. Masur & Co. Pty. Ltd.

The survey area included the area covered by the detailed geological mapping done by the Geological Branch of the BMR, and also extensions into the soil-covered areas to the north and east.

A full report on the survey and results has been made by the BMR (1965).

Turam electromagnetic survey

Traverses were made at 200-ft intervals, as shown in Plate 2, and readings were taken at 50-ft intervals. A frequency of 660 c/s was used for all readings as it was much easier to obtain sharp readings at this frequency. For control purposes, selected stations were also read with a frequency of 220 c/s. The coil separation was generally 50 feet.

In order to tie the results of each traverse, a line (3W) was surveyed parallel to the baseline.

Many anomalies were obtained; in the whole area there was scarcely an undisturbed spot. The depth to the current concentrations was calculated to be of the order 50-100 feet.

Particularly strong anomalies were observed on Traverses 120N and 122N at about 18E, and several strong indications of considerable length were observed.

Turam Transformer survey

The first results of the Turam Transformer survey were very irregular and difficult to interpret, and in view of the difficulty in performing the survey over the uneven, hard, rocky ground, it was decided to confine the systematic surveying by this method to the flat, soil-covered area in the north where it was thought that useful information on the extension of the Union and Lady Alice lines of reefs could be obtained.

Traverses were made at 200-ft intervals and readings were taken every 50 feet.

Many anomalies were obtained (Plate 3).

Conclusions

As the thickness of the overburden is generally small, it is assumed that the Turam anomalies are produced by sections of good conductivity in the rock. Sulphide deposits of such frequent occurrence are unlikely and there is no evidence of extensive carbonaceous shales in the area.

Because the shears and fractures in the area acted as channels for the mineral-bearing solutions and deposits of both sulphides and quartz, the comparative importance of the Turam Transformer anomalies is founded on their nearness to Turam anomalies.

It is most likely that the anomalies are due to the heterogeneous composition of the weathered layer, combined with a varying depth to the ground water level and an irregular content of saline water.

It is possible that some of the Turam anomalies originate from small, shallow depositions of sulphides. The influence from possible larger orebodies at greater depth cannot be discerned.

Recommendations

Of the drill holes drilled so far in this area, none has been based on the geophysical results. Although the geophysical results were disappointing and apparently inconclusive as far as the location of possible orebodies is concerned, twenty drill holes have been recommended (Appendix A) to verify both the Turam and Turam Transformer anomalies. To check the strong Turam anomalies on Traverses 120N and 122N, a costean is recommended.

3. McARTHUR RIVER ELECTROMAGNETIC SURVEY

The problem was the location of the H.Y.C. pyritic shale layer within the Barney Creek Member of the Amelia Dolomite. The shale layer contains sphalerite and galena, which together with the pyrite make it a relatively good electrical conductor. The Turam electromagnetic method was chosen to detect the layer and the electromagnetic gun method was used for reconnaissance.

The survey was done under contract to the BMR with J. J. Masur & Co. Pty Ltd., Melbourne, as the main contractor and Aktiebolaget Electrisk Malmletning (ABEM) as subcontractor. The field work was done during the dry season in 1963, between 17th August and 30th October, the geophysical work being done by two ABEM geophysicists and the land surveying by J. J. Masur & Co. Pty Ltd.

The survey was divided into three areas, where it was thought that the ore-bearing formation may extend under a cover of surface soils.

A full report on the survey has been made by the BMR (1964).

Turam electromagnetic survey

Traverses were made at 400-ft intervals, as shown in Plate 4, and readings were taken every 50 feet. A frequency of 660 c/s was used for all readings as it was much easier to obtain sharp readings at this frequency. For control purposes, selected stations were also read with a frequency of 220 c/s. The coil separation was generally 50 feet.

Many anomalies were obtained (Plate 4), especially in Areas Nos. 2 and 3.

Electromagnetic Gun survey

Only eight EM Gun traverses were surveyed as shown in Plate 4. The traverses in Areas Nos. 1S and 2 were surveyed in order to find the approximate position of the pyritic shale layer so as to be able to select the best positions for the Turam cable layout.

In Area No. 1SW, EM Gun traverses were made in place of Turam in order to form a quick link between Areas 1NW and 1S.

Traverses 96S and 100S in Area No. 2 were made to determine the southerly extent of the Turam anomaly on Traverse 92S.

On traverses where both Turam and EM Gun methods were used, the EM Gun anomalies coincided with the Turam anomalies.

Interpretation

Most of the anomalies (Plate 4) are thought to originate from an overburden that, owing to the presence below ground water level of conductive solutions, constitutes a conductor of varying thickness and conductivity, depending on the height of the ground water level, the configuration of the bedrock surface, the amount of fissures in it, and the varying strength of the solution.

However, some of the deeper-seated conductors, with depths ranging from 50 to 250 feet, may be due to conductive pyritic shale.

In the eastern part of Area No. 1S, the results show that the pyritic layer is more to the south than anticipated. In Areas Nos. 1NW and 1N, the positions of the anomalies, taken as a whole, correspond to the anticipated position of the pyritic layer and to the Bald Hills fault.

In Area No. 2, anomalies were obtained almost everywhere because of the conductive overburden. Here it is difficult to recognise the folded pyritic layer as pictured by the geologists.

Area No. 3 is wholly disturbed and most of the anomalies are most likely due to the conductive overburden.

Recommendations

Twenty-seven drill holes are recommended to test the anomalies; they are listed in Appendix B. If any one of these holes should enter the pyritic shale, it is recommended that further holes be drilled along the indications shown in Plate 4.

4. McARTHUR RIVER AEROMAGNETIC SURVEY

The primary object of the survey was to investigate the structure of the small sedimentary basin that contains the H.Y.C. prospect and two similar basins (known from regional mapping by the BMR) in order to determine the possibility of extensions of the mineralised formation. It was decided, however, to make this investigation part of a larger survey that would cover an area of about 3000 square miles in the 1:250,000 map area of Bauhinia Downs. It was hoped that magnetic anomalies would provide targets for detailed electromagnetic surveys.

The survey was flown by Adastra Hunting Geophysics Pty Ltd under contract to the BMR, between October and November 1963, at an altitude of 500 feet above ground level and at a line spacing of half a mile. Reduction of the survey data and the presentation of the results in map form were completed by the contractor in June 1964.

Additional, more detailed aeromagnetic surveying was done at an altitude of 300 feet above ground level in the vicinity of the McArthur River Homestead by the BMR in September 1964 in order to obtain greater resolution of a group of magnetic 'lows' thought to be associated with the small sedimentary basins.

A full report on the survey has been made by Young (1965).

Interpretation

The magnetic data (Plate 5) reveal sources of magnetic disturbance on both regional and local scales.

The regional magnetic anomalies are probably due, not so much to topographical features in the basement, as to intrabasement zones of contrasting susceptibilities. The two zonal boundaries that trend approximately N20°W are the outstanding features of the regional magnetic field and indicate a structural relation between the magnetic basement and the Emu Fault and the northern part of the Tawallah Fault. However, the geological structures indicated in the sections of the Bauhinia Downs 1:250,000 map area (Smith, 1962) cannot be supported by the magnetic data. The magnetic basement in the area between the Tawallah and Emu Faults may have a basic or ultra-basic character in the south and an acidic character in the north or it may dip to the north. It appears that post-Lower Proterozoic structure does not make a significant contribution to the regional magnetic anomalies.

A number of isolated magnetic anomalies arising from shallow sources can be correlated with outcrops of either the Scrutton Volcanics (Anomalies S1 and S2) or rocks of the overlying Tawallah Group (Anomalies T1 to T9). The anomalies have distinctive forms, which mostly indicate dipping structures.

Another series of magnetic anomalies (Anomalies L1 to L8) also produced by shallow sources, are characterised by pronounced elongation and low amplitude. These rarely show any relation to mapped geology, although some can be correlated with faults. The most probable interpretation for all of these elongated anomalies is mineralisation along fault planes.

The most important result obtained from the survey data is the delineation of magnetic 'lows' in the vicinity of the McArthur River Homestead (Plate 6). It is probable that these 'lows' are associated with small basins, which might contain lead-zinc mineralisation, and therefore indicate targets for future exploration.

Recommendations

In general, no further investigation of the anomalies associated with either the Scrutton Volcanics or rocks of the Tawallah Group is considered warranted owing to the volcanic environment of the sources. A possible exception to this is anomaly T2, which is located to the east of an outcrop of the Wollogorang Formation. In the Tawallah Homestead locality copper mineralisation has been found to be associated with these rocks (Smith, 1962).

Further geophysical investigations of L1, L3, L4, and L6 might be worthwhile as these anomalies lie almost parallel to the direction of the flight lines and cannot be fully resolved.

The magnetic 'lows' in the McArthur River Homestead area (Plate 6) outline the areas where further geophysical work might most advantageously be done.

5. DARWIN-PINE CREEK AEROMAGNETIC SURVEY

The survey was flown by Adastra Hunting Geophysics Pty Ltd under contract to the BMR, between August and October 1963, at an altitude of 500 feet above ground level and at a line spacing of half a mile.

In order to obtain greater resolution of the magnetic anomalies in two areas of very distrubed magnetic field, the BMR later made additional, more detailed aeromagnetic surveys over an area near Mount Bundey (Milsom & Finney, 1965) in October and November 1964 and over an area near Mount Masson (Tipper & Finney, in preparation) in June and July 1965.

A full report on the survey is being made by Goodeve (in preparation).

Interpretation

Contours of the total magnetic intensity are shown in Plate 7 and the geophysical interpretations of the main anomaly features are shown in Plate 8. The most interesting features are the four pronounced lineations (features 1 to 4) of magnetic anomalies extending in a south-easterly direction over a distance of about 30 miles. Lineations 1 and 3 are positive and lineations 2 and 4 are negative. Their sources range in depth from zero to 900 feet, and must be very close to the surface in many places. The lineations bear no simple relation to the known geology, but are considered to be due to dykes intruded into the lower Proterozoic sediments.

The anomaly group in the region of Mount Bundey was surveyed in more detail by Milsom and Finney (1965) and was attributed mainly to remnants of metamorphosed country rock on the margins of an intrusive igneous complex. Large amplitude anomalies were found to be associated with the known iron ore, but similar anomalies were not detected elsewhere. Lineation 4 was traced in detail through the Mount Bundey Granite and it was clearly shown that the lineation post-dates the granite.

In Area A, a highly disturbed magnetic field occurs over the Masson Formation and the Golden Dyke Formation and is believed to be due to the effect on the iron-rich components within these formations of thermal metamorphism associated with the granite intrusion. The detailed aeromagnetic survey (Tipper and Finney, in preparation) over this area failed to show any correlation between the magnetic pattern and either fold structures or lithological boundaries, although the magnetic trends do parallel the regional geological strike. Some faults have magnetic expression, but the correlation is insufficiently conclusive to enable further faults to be postulated. The known tin lodes are expressed by magnetic 'highs' and it is possible that some of the other 'highs' mark the sites of hitherto unknown tin occurrences.

Feature B is probably due to sources within the basal beds of the Golden Dyke Formation, which are rich in pyrite and may be associated with a narrow tongue of granite beneath the magnetic ridge of feature B.

The magnetic trend C passes close to the North Ringwood and South Ringwood groups of mines and may be due to a lithological change at shallow depth within the Burrell Creek Formation, but it is more likely that it derives from a very deep source, possibly outside the formation.

Magnetic trends D, E, and F along the axis of the Pine Creek Geosyncline are probably due to dykes within the Burrell Creek Formation.

Recommendations

A more detailed geological survey should be made in the area of the four lineations (Plate 8) at points where the postulated dykes are thought to be shallow and the older rocks are not covered with soil. If still no evidence of the dykes is forthcoming, a few geochemical traverses across their lines may indicate whether economic minerals are associated with them. Should it become desirable to test them by drilling, it is recommended that detailed magnetic surveying, either ground or airborne, be done first in order to select drilling sites more accurately.

Geochemical testing is recommended in the Mount Masson area over some of the magnetic 'highs' that resemble in character the 'high' detected over the Mount Masson tin mine.

6. REFERENCES

BMR 1964 McArthur River electromagnetic survey, N.T. 1963. *Bur. Min. Resour. Aust. Rec.* 1964/159 (unpubl.).

BMR 1965 Union Reefs geophysical survey near Pine Creek, N.T. 1963. *Bur. Min. Resour. Aust. Rec.* 1965/74 (unpubl.).

GOODEVE, P.E. -- Darwin-Pine Creek contract aeromagnetic survey, N.T. 1963 *Bur. Min. Resour. Aust. Rec.* (in preparation).

IVANAC, J.F. 1965 Special Mineral Survey programme in Northern Territory. Summary of Geological Branch contribution. *Bur. Min. Resour. Aust. Rec.* 1965/89.

MILSOM, J.S. and FINNEY, W.A. 1965 Mount Bundey detailed aeromagnetic survey, N.T. 1964. *Bur. Min. Resour. Aust. Rec.* 1965/61 (unpubl.).

SMITH, J.W. 1962 Explanatory notes to the Bauhinia Downs 1:250,000 sheet area (revised edition) *Bur. Min. Resour. Aust. Rec.* 1962/111

TIPPER, D.B. and FINNEY, W.A. -- Mount Masson detailed aeromagnetic survey, N.T. 1965. *Bur. Min. Resour. Aust. Rec.* (in preparation).

YOUNG, G.A. 1965 McArthur River area aeromagnetic survey, N.T. 1963-1964. *Bur. Min. Resour. Aust. Rec.* 1965/173 (unpubl.).

APPENDIX A

Details for recommended drill holes in the Union Reefs area

In the lists below, the co-ordinates indicate the approximate positions of the upper edge of expected sulphide bodies and quartz reefs respectively. The approximate depths for the conductors have also been listed.

A. Drill holes to check conductors indicated by Turam anomalies

No.	Co-ordinates	Depth	No.	Co-ordinates	Depth
1.	3.0N/10.9W	90'	6.	55.5N/19.8W	70'
2.	7.5N/16.0W	80'	7.	61.0N/20.4W	80'
3.	10.0N/11.0W	100'	8.	62.0N/15.7W	60'
4.	18.0N/9.3W	50'	9.	68.0N/15.7W	110'
5.	50.0N/5.2W	70'	10.	69.0N/19.3W	70'

B. Drill holes to check non-conductors indicated by TT anomalies

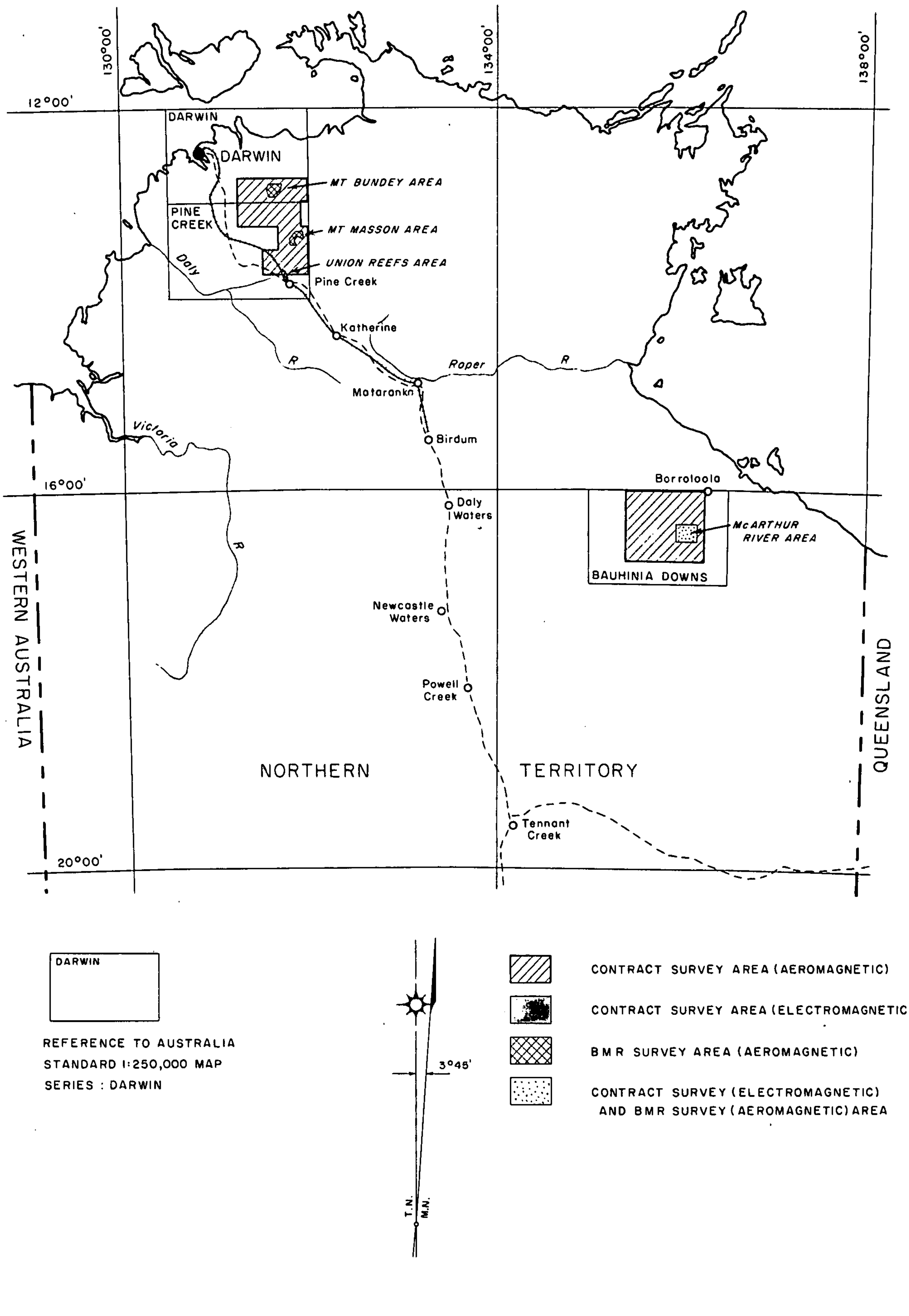
No.	Co-ordinates	No.	Co-ordinates
1.	6N/12W	6.	74N/17.6W
2.	6N/17.2W	7.	96N/11.5W
3.	22N/10.9W	8.	96N/14.3W
4.	24N/15.7W	9.	98N/19.3W
5.	74N/8.8W	10.	102N/13.8W

APPENDIX B

List of proposed diamond-drill holes in the McArthur River area

DDH No.	Area No.	Plate	Co-ordinates X	Co-ordinates Y	Length in ft	Direction	Depression
1	1S	2	4W	3.35N	160	S	60°
2			20W	0.2 N	300	S	60°
3		3	60W	1.75N	250	S	60°
4			64W	1.5 N	260	S	60°
5		4	108W	6.05S	180	S	60°
6			100W	14.3 N	150	S	60°
7	1NW	5	12NE	8.15SE	200	NW	60°
8			12NE	10.05SE	180	NW	60°
9		6	44NE	10.6 SE	200	NW	60°
10			60NE	13.35SE	150	NW	60°
11	1N	7	20E	5.4 S	150	N	60°
12			16E	13.15S	200	N	60°
13		8	60E	9.05S	240	N	60°
14			44E	12.15S	240	N	60°
15		9	80E	10.5 S	180	N	60°
16	2	10	0	15.75E	320	W	60°
17			36S	4.3 W	220	W	60°
18		11	68S	2.25E	200	-	90°
19			76S	11.2E	220	E	60°
20		12	8S	29.9E	350	W	60°
21			4S	36.85E	240	W	60°
22		13	76S	23.1E	160	-	90°
23		14	4S	58.5E	200	-	90°
24		15	92S	76.2E	200	W	60°
25	3	16	12E	18.1 N	200	S	60°
26			0	11.6 N	220	S	60°
27			20W	11.3 N	240	S	60°

PLATE I



NORTHERN TERRITORY , 1962-63
SPECIAL MINERAL SURVEY

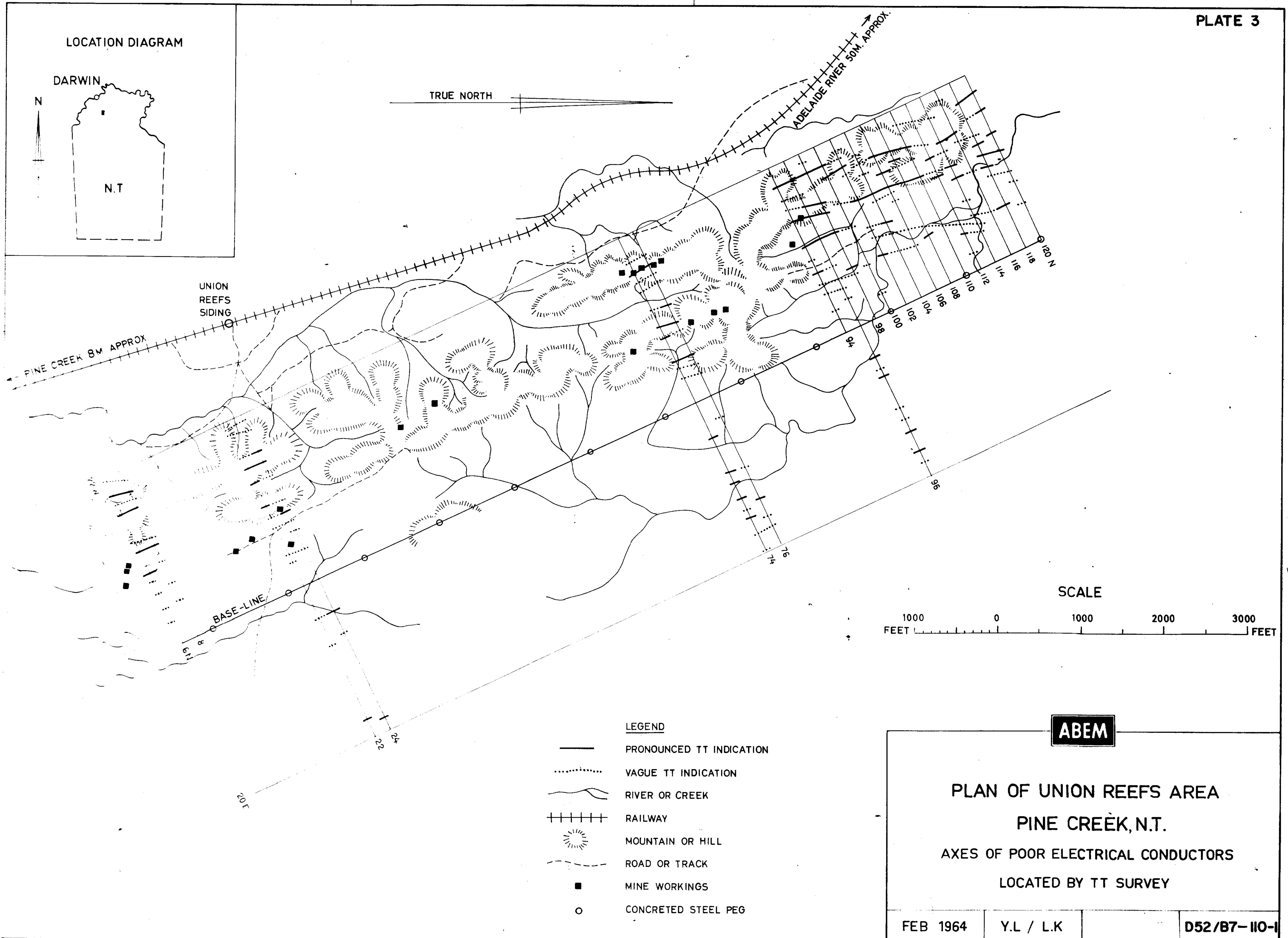
LOCALITY MAP

100 75 50 25 0 100 200 MILES

GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS D52/B7-135

TO ACCOMPANY RECORD No.1966/14

TO ACCOMPANY RECORD No. 1966/14



TO ACCOMPANY RECORD No. 1966/14

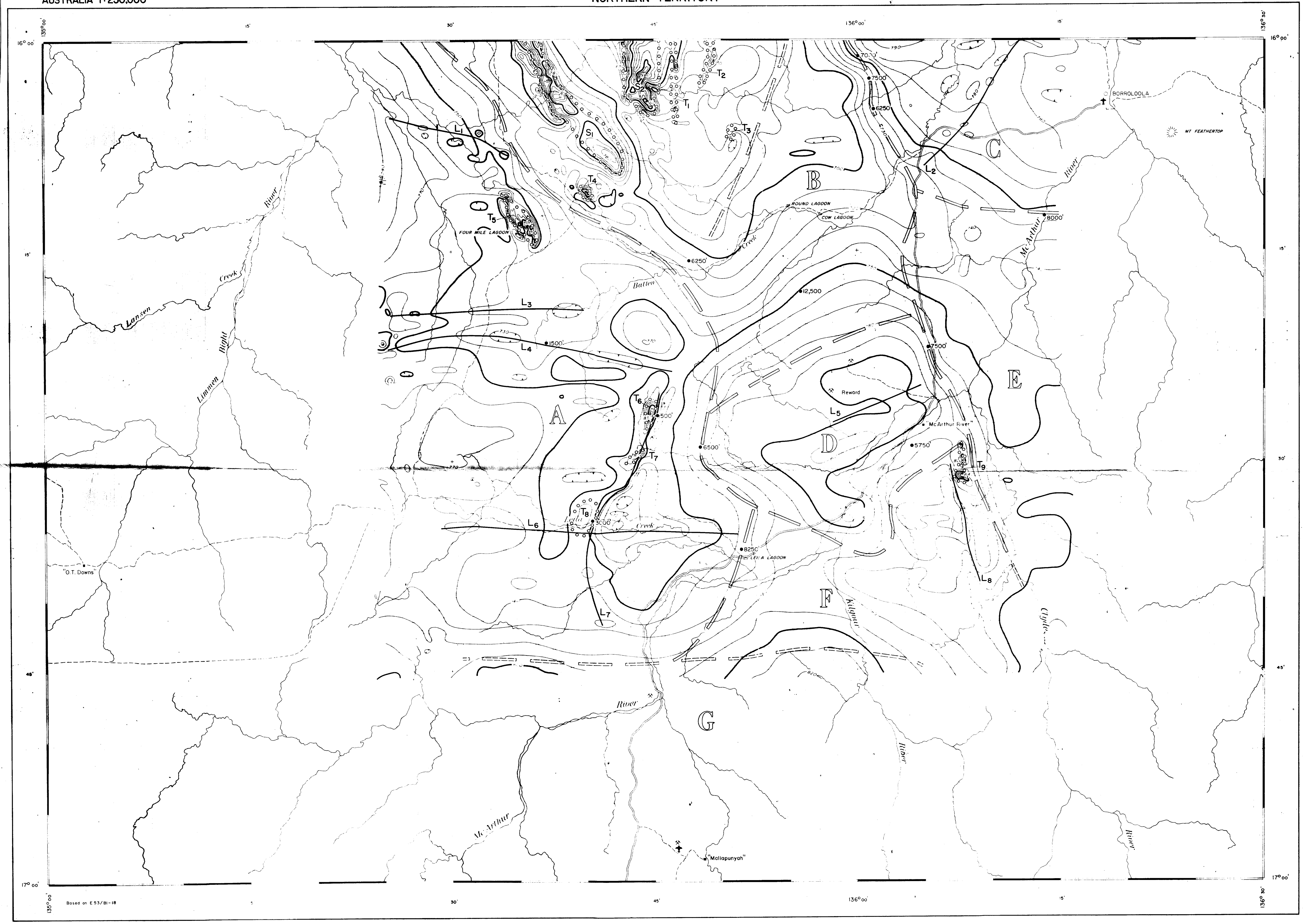
PLATE 4


AREA No. 1N
AREA No. 1NW
AREA No. 1SW
AREA No. 1S
AREA No. 2
AREA No. 3
TEENA
BOKO HILL
BOKO WATERHOLE
BARNEY HILL
AIRSTRIP
MAGN. NORTH
DREAM SNAKE HILL
BULL CREEK FAULT
BULL CREEK
Mc ARTHUR RIVER
DOLOMITE
CEC TRAVERSE
EM GUN TRAVERSE
LEGEND:
STRONG TURAM INDICATION
WEAK TURAM INDICATION
INVERTED TURAM INDICATION (POSITIVE PHASE DIFFERENCE)
EM GUN INDICATION
ROAD
WIRE FENCE
CEMENTED STEEL PEG
TRIGONOMETRIC FIX POINT
PREVIOUS SURVEY GRID PEGS
RECOMMENDED DIAMOND DRILL HOLE No. 1
FAULT
ESTABLISHED GEOLOGICAL BOUNDARY
SYNCLINAL AXIS
ANTICLINAL AXIS
OUTCROP
STRIKE & DIP
ul UPPER LYNOTT
ll LOWER LYNOTT
rsb REWARD SEDIMENTARY BRECCIAS
rd REWARD DOLOMITE
dcd DEEP CREEK DOLOMITE
HYC H.Y.C. PYRITIC SHALES
gvt GREEN VITRIC TUFFS
ld LAMINATED DOLOMITE
nd NGARIJINMA DOLOMITE
cb CHERT BRECCIAS
md MARA DOLOMITE
ts TAWALLAH SANDSTONES
LOCATION DIAGRAM
Darwin
N T
SCALE
FEET 1000 0 1000 2000 3000 FEET
TO ACCOMPANY RECORD No. 1966/14
ABEM
PLAN OF Mc ARTHUR RIVER AREA, N T
AXES OF ELECTRICAL CONDUCTORS
LOCATED BY TURAM SURVEY
APRIL 1964
Y.L / L.K
E53/B7-16

AUSTRALIA 1:250,000

BAUHINIA DOWNS
NORTHERN TERRITORY

PLATE 5



GEOPHYSICAL LEGEND

- Magnetic basement zone boundary
- Probable magnetic basement zone boundary
- Zone symbol
- ● 1500' Magnetic basement depth estimates (below ground level)
- o o o o Areal extent of magnetic disturbance
- Magnetic trend
- 800 / 750 Magnetic contours with flight-line intersections
- Magnetic "low"

AEROMAGNETIC SURVEY, McARTHUR RIVER, NT 1963–1964

TOTAL MAGNETIC INTENSITY CONTOURS
AND
GEOPHYSICAL INTERPRETATION

MILES 5 0 5 10 15 20 MILES

KILOMETRES 5 0 5 10 15 20 25 30 KILOMETRES

TOPOGRAPHICAL LEGEND

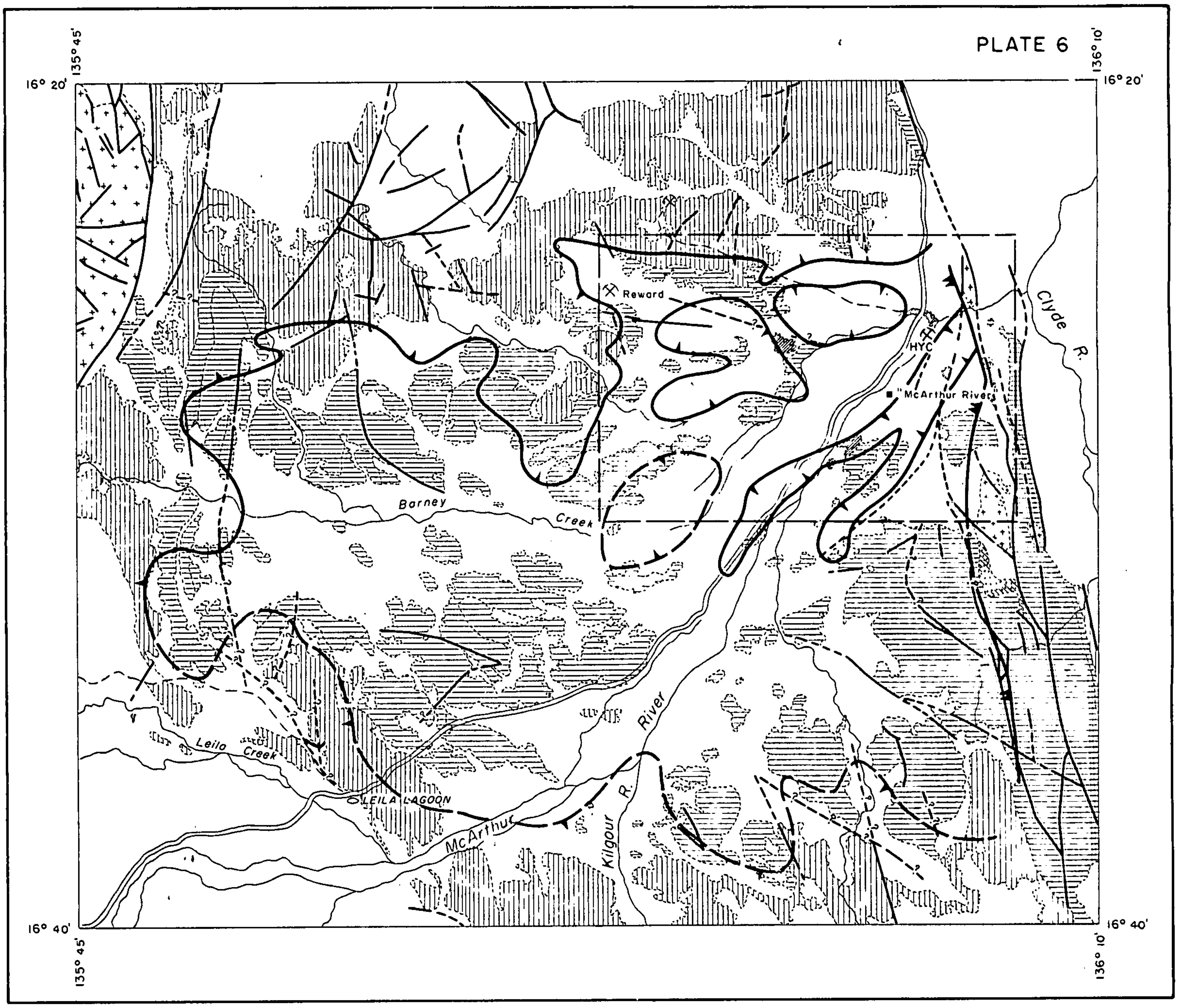
- River or creek
- Secondary road
- Road or track
- Named place
- Homestead
- Mine
- Aerodrome or landing ground
- Swamp
- Hill feature

EXPLANATORY NOTES

THE TOTAL MAGNETIC INTENSITY WAS CONTINUOUSLY RECORDED BY AN AIRBORNE MAGNETOMETER, AND HAS BEEN CORRECTED FOR A REGIONAL GRADIENT IN TOTAL MAGNETIC FIELD OF 10·5 GAMMAS PER MILE IN A DIRECTION S. 7° W.

Geophysical Branch, Bureau of Mineral Resources, Geology and Geophysics. E53/B1-18-1

TO ACCOMPANY RECORD No. 1966/14



GEOLOGICAL LEGEND

- Undifferentiated. Recent alluvium to rocks of McArthur Group
- Lynott Formation
- Amelia Dolomite
- Amelia Dolomite Barney Creek Member
- Mallapunyah Formation
- Undifferentiated Tawallah Group

TOPOGRAPHICAL LEGEND

- River or creek
- Road

GEOPHYSICAL LEGEND

- Change in level of Total Magnetic Intensity greater than 5 gammas
- Change in level of Total Magnetic Intensity less than 5 gammas
- Probable change in level of Total Magnetic Intensity less than 5 gammas
- Survey area boundary flown by B.M.R

AEROMAGNETIC SURVEY, McARTHUR RIVER, NT 1963-1964

McARTHUR RIVER HOMESTEAD AREA

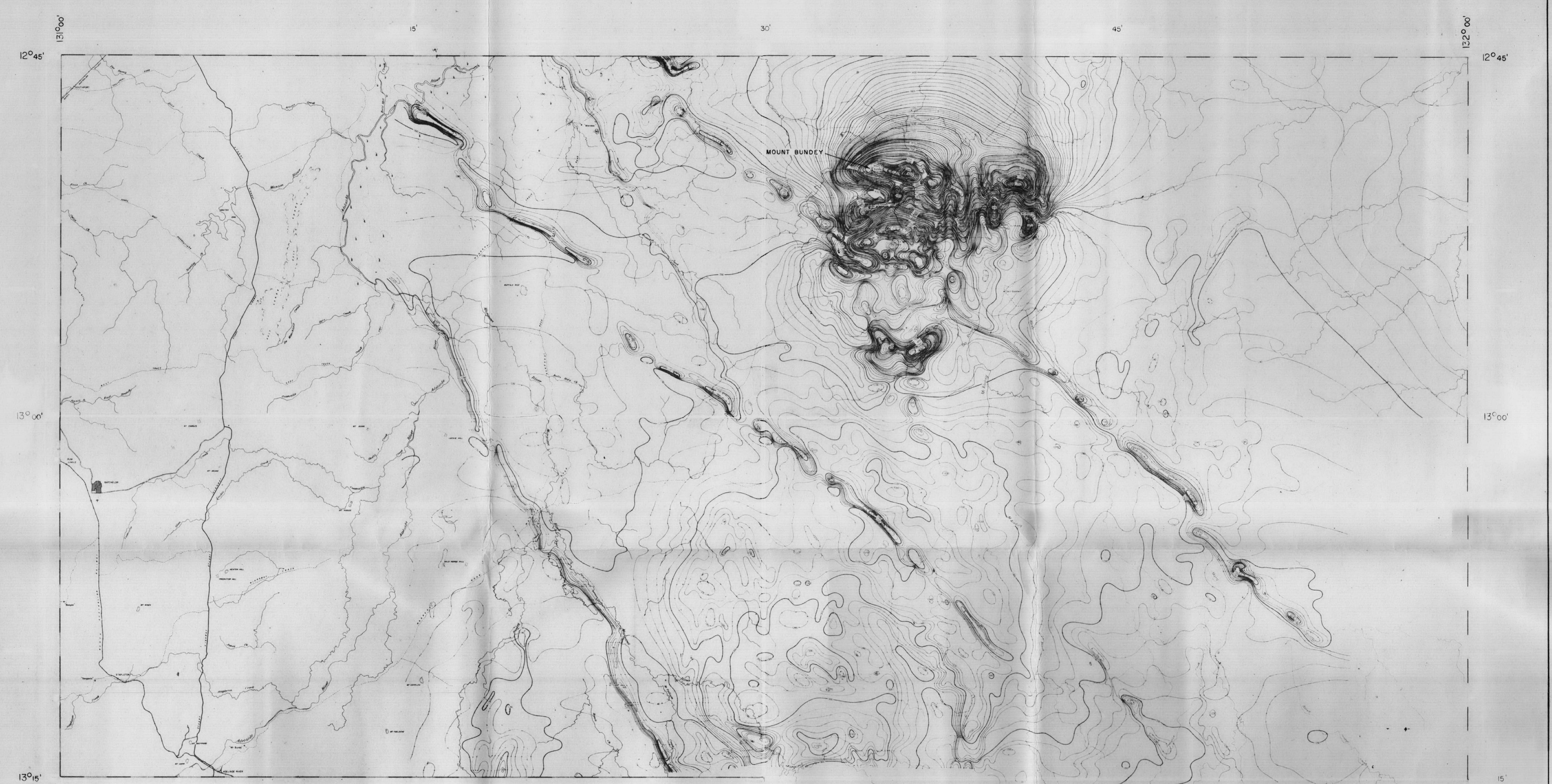
GEOPHYSICAL INTERPRETATION AND GEOLOGY

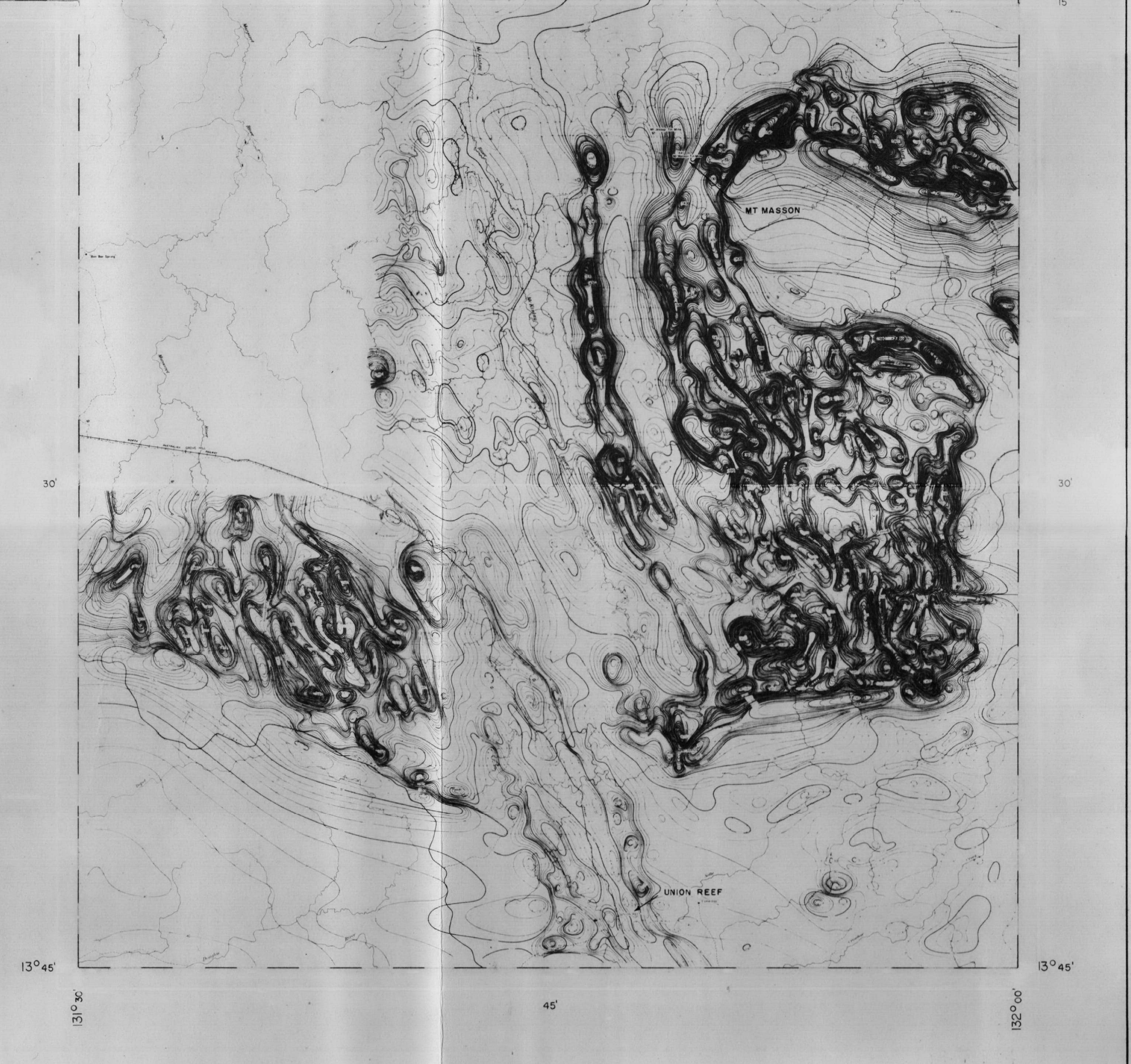
GEOLOGY AFTER 1:250,000 GEOLOGICAL MAP OF BAUHINIA DOWNS, PRELIMINARY EDITION 1962, SHEET SE 53-3

MILES 5 0 5 10 15 MILES

KILOMETRES 5 0 5 10 15 20 KILOMETRES

PLATE 7





AEROMAGNETIC SURVEY, DARWIN - PINE CREEK N T, 1963

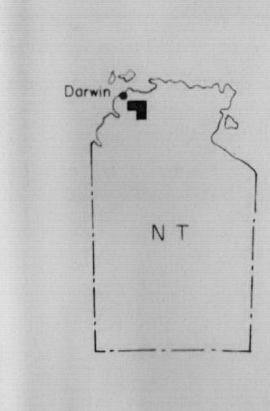
TOTAL MAGNETIC INTENSITY

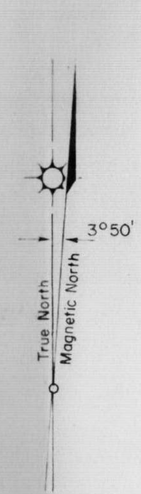
MILES 5 0 5 10 15 MILES

KILOMETRES 5 0 5 10 15 20 KILOMETRES

CONTOUR INTERVAL 10 GAMMAS

LOCATION DIAGRAM





EXPLANATORY NOTE

THIS COMPOSITE MAP HAS BEEN COMPILED FROM PHOTO-REDUCTIONS OF 1:63,360 SCALE MAPS OF TOTAL MAGNETIC INTENSITY, REFERENCE NOS D52/B1-14; D52/B1-15; D52/B1-16; D52/B1-17; D52/B1-18; D52/B1-19: PUBLISHED BY GEOPHYSICAL BRANCH, BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS. DEPARTMENT OF NATIONAL DEVELOPMENT.

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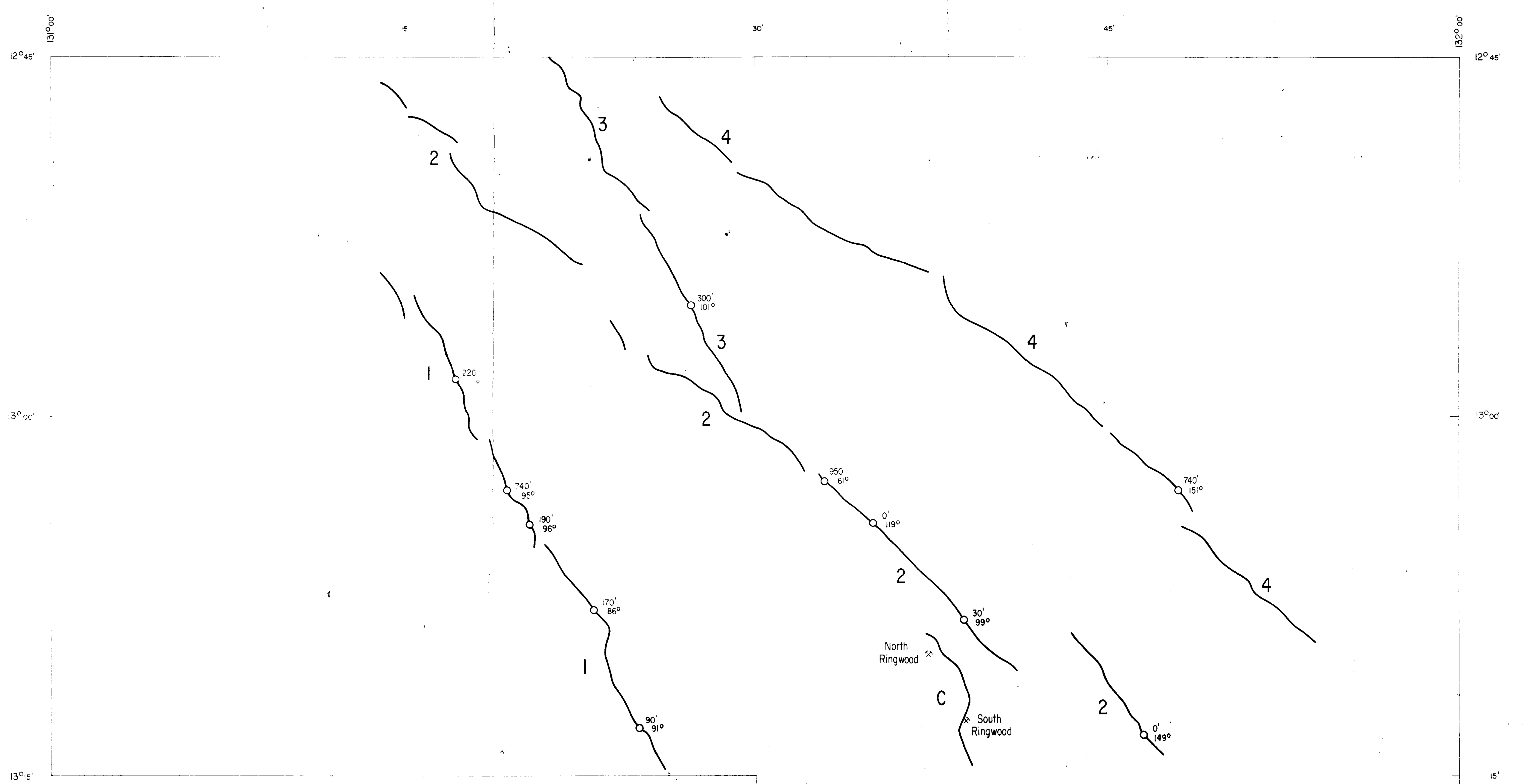
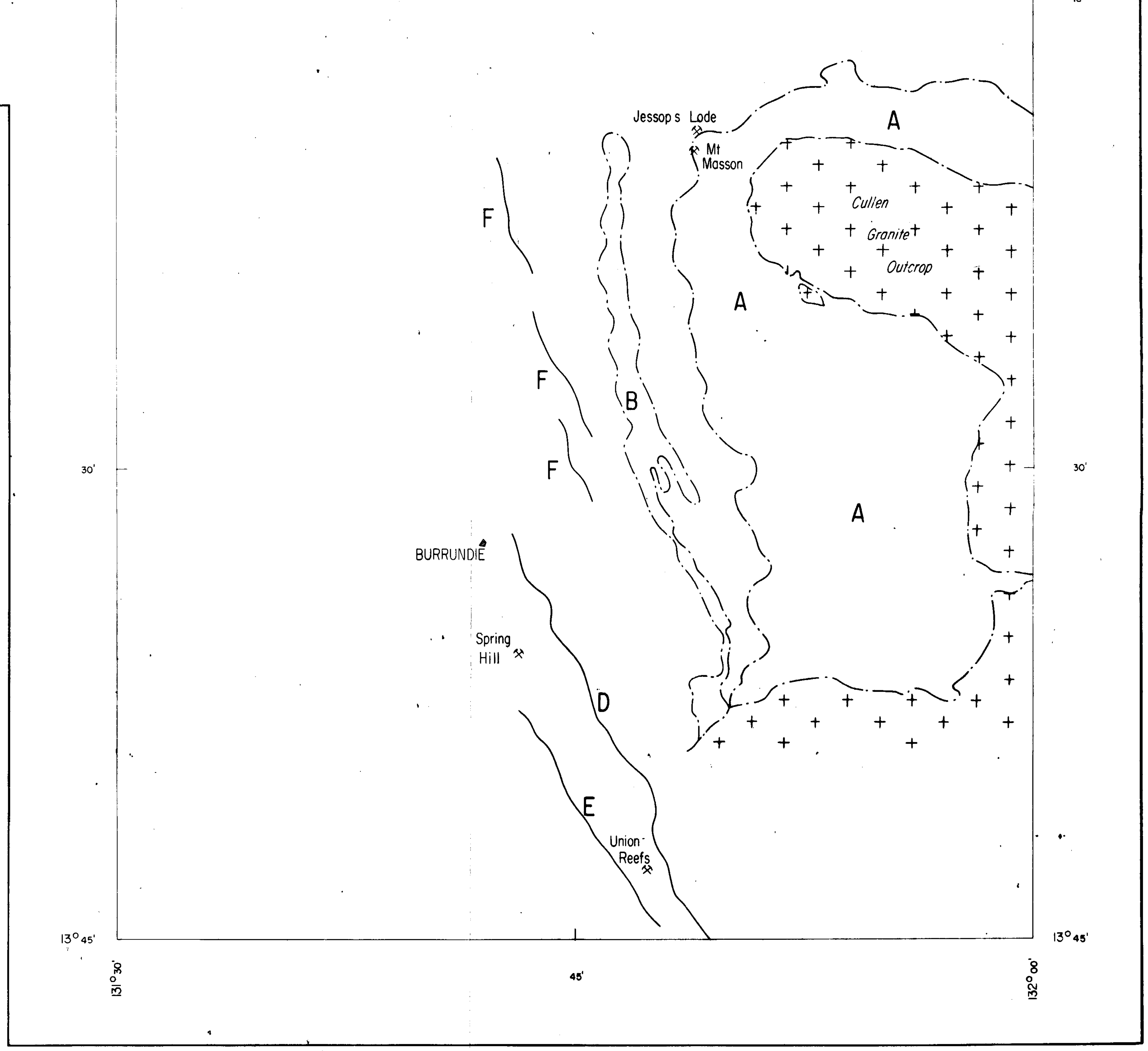




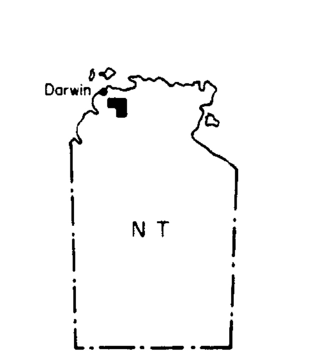
AEROMAGNETIC SURVEY, DARWIN-PINE CREEK NT, 1963

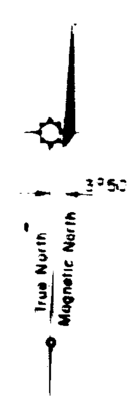
GEOPHYSICAL INTERPRETATION

MILES 5 0 5 10 15 MILES

KILOMETRES 5 0 5 10 15 20 KILOMETRES

LOCATION DIAGRAM





GEOPHYSICAL LEGEND

2	Magnetic lineation
○ 250' 80°	Depth and dip estimate
B	Zone boundary
D	Magnetic feature

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