

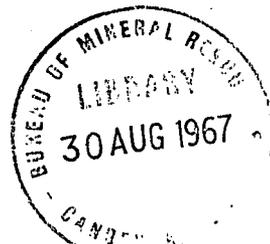
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COMMONWEALTH OF AUSTRALIA

DEPARTMENT OF NATIONAL DEVELOPMENT
BUREAU OF MINERAL RESOURCES
GEOLOGY AND GEOPHYSICS

RECORDS:

1965/51



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NAPPERBY DETAILED AEROMAGNETIC SURVEY, NORTHERN TERRITORY 1964.

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NAPPERBY DETAILED
AEROMAGNETIC SURVEY,
NORTHERN TERRITORY 1964

by

J.S. MILSOM

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CONTENTS

	Page
SUMMARY	
1. INTRODUCTION	1
2. GEOLOGY	1
3. INTERPRETATION	1
4. REFERENCES	2
APPENDIX. Operational details	

ILLUSTRATIONS

- Plate 1. Location diagram and total magnetic intensity contours (Drawing No. F53/B1-38)

SUMMARY

In September 1964, an aeromagnetic survey was made over some hematite ridges near Napperby in the Northern Territory. The object of the survey was to detect magnetic anomalies associated with these ridges and to determine if possible, whether the hematite was formed by the weathering of primary magnetite, which is frequently associated with ore deposits in the Northern Territory.

Anomalies of the order of several hundred gammas were detected, coinciding with the hematite ridges. Although other magnetic sources are probably present in the area, it seems likely that the hematite is derived from magnetite. A reconnaissance drilling programme is under consideration.

1. INTRODUCTION

In September 1964, a detailed aeromagnetic survey was made over a small area centred about two miles south of the Stuart Bluff Range near Napperby Creek in the Northern Territory. The survey was requested by the Resident Geologist of the Northern Territory Administration in Alice Springs, and was made by the Bureau of Mineral Resources, when their Cessna aircraft, VH-GEO, was in Alice Springs for a 100-hourly service.

In and around the survey area, prominent hematite ridges trend west, parallel to the Stuart Bluff Range, and it is possible that this hematite was formed by weathering of primary magnetite. Since magnetite is known to be associated with gold and copper deposits in many parts of the Northern Territory, notably in the Tennant Creek mineral field, it was thought that exploratory drilling might be justified. The aeromagnetic survey was suggested as the most readily available means of detecting magnetite at depth below the hematite. The area surveyed measures approximately two miles east-west and two and a half miles north-south and includes parts of several prominent hematite ridges, as well as some of the surrounding level areas. The detailed survey area is in the extreme south of the area in which an aeromagnetic survey of the south Ngalia Trough was made by Aero Service Limited under contract to Pacific American Oil Company (Pacific American Oil Company, 1963), but at a line spacing of two miles, which is too large for metals search.

2. GEOLOGY

The detailed aeromagnetic survey falls within the area described by Quinlan (1962). The extra information given below was obtained from the Resident Geologist in Alice Springs (Woolley, pers. comm.).

The Stuart Bluff Range consists of coarse-grained sandstone, of probable Upper Proterozoic age, that dips northwards at about 20° . This sandstone rests unconformably on a non-gneissic granite, which is part of the Arunta Block.

Quartz-magnetite-hematite veins, 10 to 20 ft thick, are emplaced along fault zones in the granite and occasionally penetrate the sandstone. The veins strike east and generally dip south at about 50° .

3. INTERPRETATION

The Ngalia Trough survey (Pacific American Oil Company, 1963) detected a roughly circular anomaly near the eastern border of the detailed survey area, the source of which is probably disturbing all magnetic contours in the eastern part of the detailed survey area. It does not appear to be connected in any way with the hematite ridges and is probably related to the Precambrian granite that outcrops in the area or to other concealed Precambrian rocks.

The results of the detailed survey are shown in Plate 1. Three hematite ridges crop out in the eastern half of the area. A small magnetic anomaly (Anomaly A) lies north-east of the southernmost hematite ridge; a single broad anomaly (Anomaly B), which could have a double source, lies north-east of the other two hematite ridges. The form of the anomalies suggests that their sources may lie between 200 and 400 ft below the surface; the anomalies could therefore be displaced horizontally from their sources. However, the observed anomalies are displaced a long way from the hematite ridges, especially as it is known that most of the hematite ridges in this region dip southward. Therefore the sources of the anomalies may be repetitions, rather than continuations, of the bodies that crop out. Magnetite bodies oxidised to hematite above the water table would constitute magnetic sources at a depth about the same as that estimated from the observed anomalies.

Anomaly B forms part of a pronounced magnetic 'ridge', which extends the full width of the survey area and seems to be associated with the hematite ridges. South of this 'ridge' the total magnetic intensity changes more rapidly, and may have a lower base level, than north of it; the 'ridge' may therefore indicate a fault contact, located on the southern slope of the 'ridge', between high-susceptibility rocks to the north and low-susceptibility rocks to the south. At the western edge of the survey area this magnetic 'ridge' coincides with hematite outcrops and there is a marked increase in its amplitude. It seems reasonable to associate an anomalous field of at least 100 gammas with these hematite outcrops. Anomalies of similar amplitude were recorded over all but the largest quartz-hematite-magnetite bodies during a detailed aeromagnetic survey of the Tennant Creek mineral field (Milsom & Finney, 1965). One form of hematite is quite strongly magnetic; this is rare, however, and the peaks on the magnetic 'ridge' are probably caused by primary magnetite below the water table.

In the Northern Territory, quartz-magnetite bodies are often associated with economic gold and base metal mineralisation. The hematite ridges may thus warrant further prospecting at depth. The most suitable site for diamond drilling would be in the west of the survey area, to test one or both of the hematite ridges that crop out near the centre of the magnetic 'ridge'.

4. REFERENCES

- | | | |
|-------------------------------|------|--|
| PACIFIC AMERICAN OIL COMPANY | 1963 | Airborne magnetometer survey over portion of OP 81, Ngalia Trough, NT. <u>Report on Commonwealth subsidised operation</u> (unpubl.). |
| MILSOM, J.S. and FINNEY, W.A. | 1965 | Tennant Creek detailed aeromagnetic survey, NT 1964. <u>Bur. Min. Resour. Aust. Rec. 1965/50</u> (unpubl.). |
| QUINLAN, T. | 1962 | An outline of the geology of the Alice Springs area. <u>C.S.I.R.O. Aust. Land Res. Ser. 6</u> , 129-146. |

STUART

BLUFF

RANGE

132° 33' Approx.

132° 36' Approx.

22° 46' Approx.

22° 46' Approx.

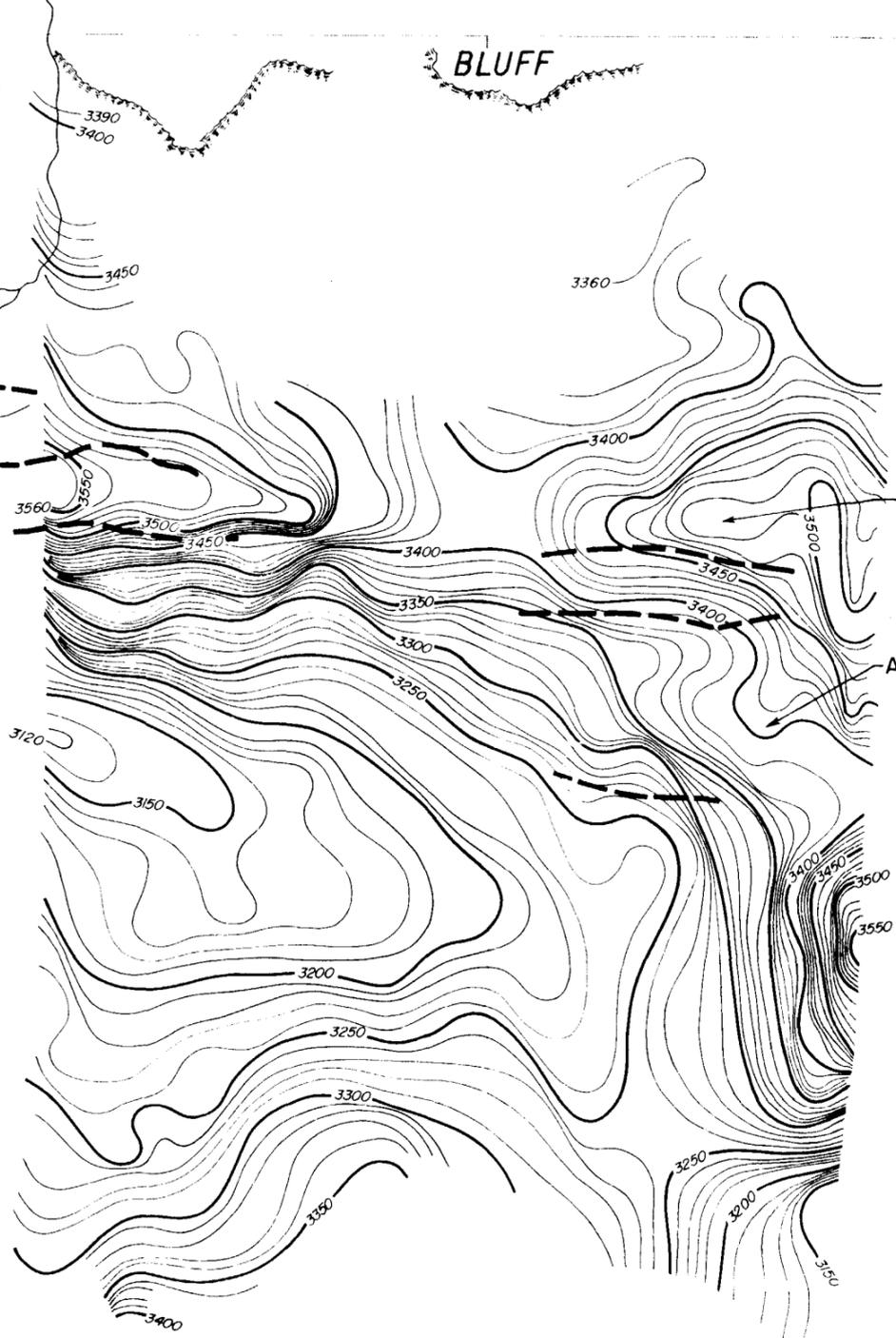
Yuendumu Native Settlement

22° 48' Approx.

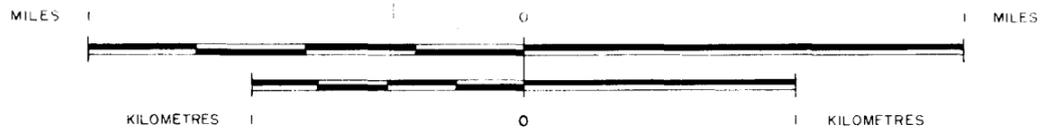
22° 48' Approx.

132° 33' Approx.

132° 36' Approx.

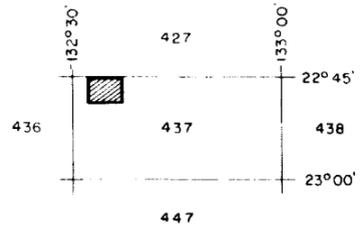


DETAILED AEROMAGNETIC SURVEY, NAPPERBY, NT 1964
TOTAL MAGNETIC INTENSITY CONTOURS



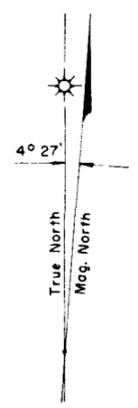
CONTOUR INTERVAL 10 GAMMAS

INDEX TO 1:63,360 MAP SERIES

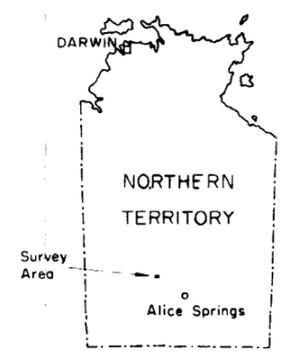


LEGEND

- Creek
- Road
- Escarpment
- Magnetic contours
- Haematite ridge



LOCATION DIAGRAM



NAPPERBY CREEK

APPENDIX

Operational Details

Survey specifications

Height : Nominally 280 ft above ground level for the aircraft and 250 ft above ground level for the detector (in towed bird assembly).

Line spacing : Approximately 3/20 mile.

Flight direction : North.

Sensitivity : 100 gammas full scale deflection

Equipment

Aircraft : Cessna 180

Magnetometer : MNS 1 nuclear magnetometer, reading total absolute magnetic field at one-second intervals, fiducial pulses occurring at eight-second intervals.

Recorder : Moseley. Chart six-inch rectilinear, chart speed four inches per minute.

Radio altimeter : AN/APN 1 with output to cockpit dial and limit light system, and to recorder.

Recorder for radio altimeter : TIC. Chart, six-inch curvilinear.

Camera : Modified Vinten with wide-angle (186°) lens. Single exposures on 35-mm film at eight-second intervals.

Personnel

BMR : J. Boyd, J. Milsom, S. Scherl.

TAA : First Officer G. Litchfield.