DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOPHYSICAL PROSPECTING FOR IRON ORE AT PROSPECT NO. 6 MIDDLEBACK RANGE NORTH DISTRICT, SOUTH WEST AREA

by

B. E. Milton
Geophysicist

16th May, 1958

DEPARTMENT OF MINES

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B. E. MILTON
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ACCOMPANYING PLANS

Locality Plan 56-256
Gravity contours of Bouguer anomaly 58-128
Gravity profiles 58-129

Rept. Bk. No. 46/150
G.S. 997
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SUMMARY:

An uncompleted gravity survey over Prospect No. 6 suggests that there may be an association between the gravity anomalies and a massive limonite orebody. Further gravity work is recommended to enable greater confidence in interpretation.

INTRODUCTION

Geological investigations in the area revealed the presence of outcropping massive limonite on the western slopes of the North Middleback Range. To the West of the range is a flat sand covered plain in which no outcropping occurs.

A request was received from the Iron Exploration Section for a gravity survey to assist in interpreting the geology of the prospect and to determine the extent of the limonite bodies.

PREVIOUS GEOPHYSICAL WORK:

An aeromagnetic survey of the Middleback Range area was flown by Adastra Hunting Geophysics Ltd. in Feb-Mar. 1956. The computation and reduction of results was undertaken by the Geophysics Section of the Department of Mines. The magnetic intensity contour plan does not suggest that any large-scale anomalous features are associated with Prospect No. 6.

GEOLOGY:

The geology of the area is described in Bulletin No. 33, "The Geology and Iron Ore Resources of the Middleback Range Area." by K. R. Miles.

The area investigated consists of a sand covered plain to the West of the North Middleback Range and the lower slopes of the Range (drawing 56-256), which lie just above the presumed contact with the basement gneisses and granites. The rocks of

the North Middlebacks in this prospect are at the base of the Lower Middleback Haematite Quartzite Series, and consist mainly of schist and amphibolite with some haematite-quartzite and limonite.

METHODS USED:

A preliminary gravity traverse at 27200N was surveyed from 9700E to 12700E with stations at intervals of 100 feet using a Worden gravity meter W204. Two further lines at 27400N and 27000N were later investigated to extend the information of the anomalous portion of the 27200N line. A line at 26800N was established later by K. R. Seedsman, Geophysicist. The lines were tied by taking readings at 200 feet intervals along the line 11700E.

RESULTS:

The instrument readings were corrected for drift, latitude and elevation above an arbitrary datum, the combined free air and Bouguer correction factor being taken as 0.6 gravity units/foot. This corresponds to a mean density of approximately 2.67 gm/cc. which was assumed lacking any more precise estimate of the density. Insufficient data is available to calculate average densities to any high degree of accuracy, but an analysis of the results obtained would seem to indicate that a value of 2.67 gm/cc. is not sufficiently far from the real value to alter the gravity pattern significantly.

Drift was controlled very closely in view of previous experience at Prospect No. 5 where very small anomalies were associated with ore. Each of the lines 27000N, 27200N and 27400N was traversed twice, every second station being read a second time, and from these results a series of drift curves constructed.

The results are presented as contours of Bouguer anomaly (drawing No. 58-128)

INTERPRETATION

No attempt has been made to interpret the results in detail as more gravity readings should be made to extend

the area investigated. A gravity high at 26800N 11900E depends on the reading at a single station, and this value should be checked before the validity of this anomaly can be established. The presence or otherwise of this high value will influence the interpretation of the gravity pattern in this area. In view of this, the following attempts at interpretation should be regarded as tentative only.

The preliminary gravity line at 27200N extends over 3000 feet. From 9700E to about 11300E, that is, the section which coincides approximately with the sand covered plain, there is very little difference in the corrected gravity values in fact the total variation amounts to 0.2 milligal. It would appear that, in contrast to the situation at Prospect No. 5, there are no near surface variations in density below the sand cover to the West of the lower slopes of the Range, and that further gravity investigations in this area are not warranted.

The pattern over the prospect to the East of 11300E appears to be in good agreement with the known geology. A "nose" at 27200N to 27400N between 12300E and 12400E appears to be associated with haematite-quartzite outcropping. The suggestion of a gravity low which should be investigated more extensively, in the NE corner of the prospect may have its origin in a limonite body.

The most striking aspect of the pattern lies in the possible association between the gravity highs at about 27000N 12200E and 27200N 11600E. The larger anomaly appears to have a connection with massive limonite outcrops; the smaller anomaly, it is suggested, may represent an extension of this ore in a synclinal structure to the West under deeper cover. A profile through the section marked AA on the contour plan would seem to give weight to this interpretation. (See drawing no. 58-129). Included on this drawing is a profile of the same section taken from a plan of "residual" gravity contours, obtained by removing a regional effect from the Bouguer values.

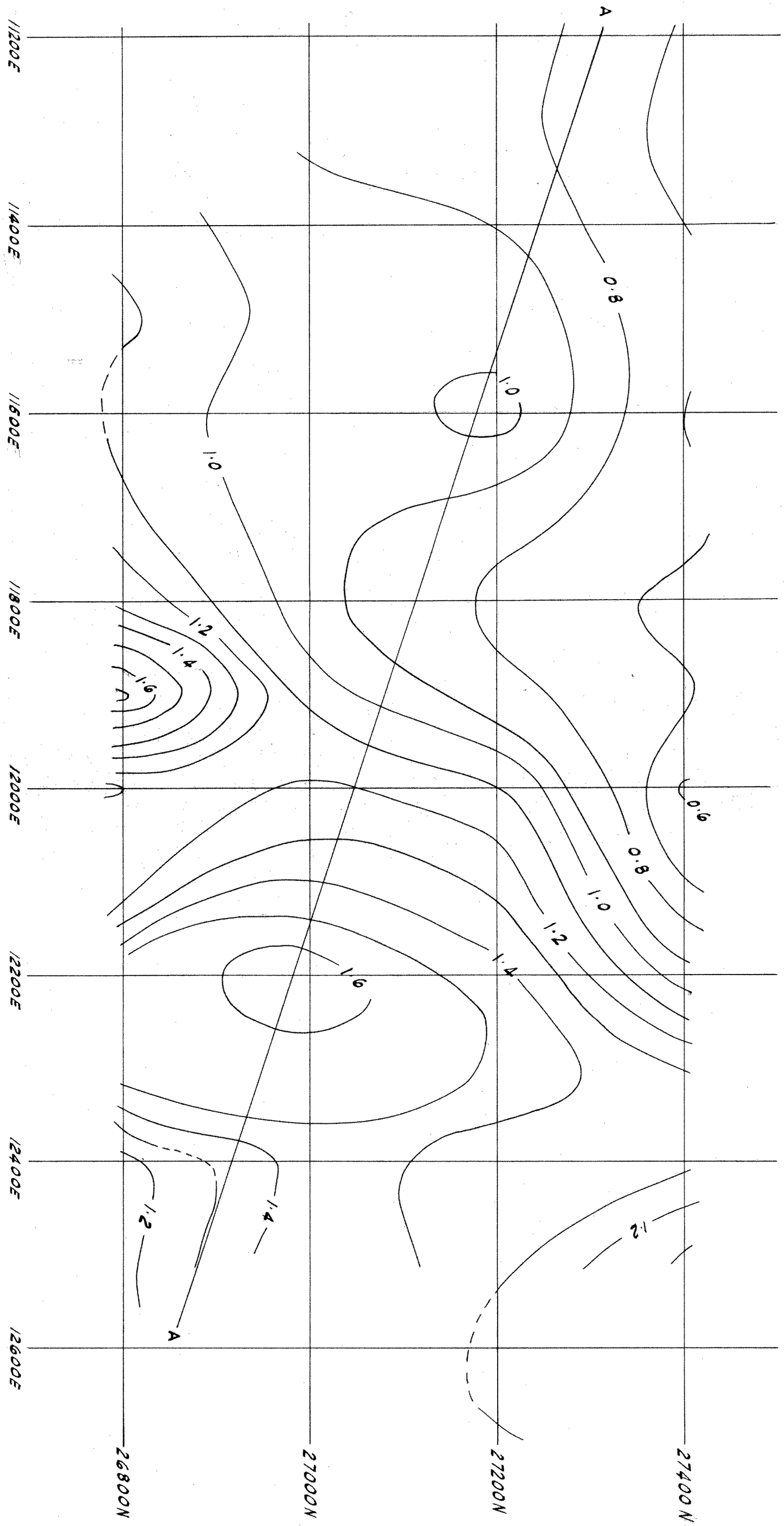
CONCLUSIONS AND RECOMMENDATIONS:

The gravity pattern established over part of Prospect No. 6 appears to be directly influenced by massive limonite ore. Further gravity work in this area is strongly recommended to establish a more confident relationship between the gravity pattern and the geology. In this context, it should be noted that the following stations have already been pegged and levelled.

27600N from 11700E to 12600E
26600N " 11400E " 12500E
26400N " 11400E " 12400E

B. E. MILTON
GEOPHYSICIST

BEM:CERF
16/5/58



SCALES:- 100' = 1" Contour interval 0·1 milligal.

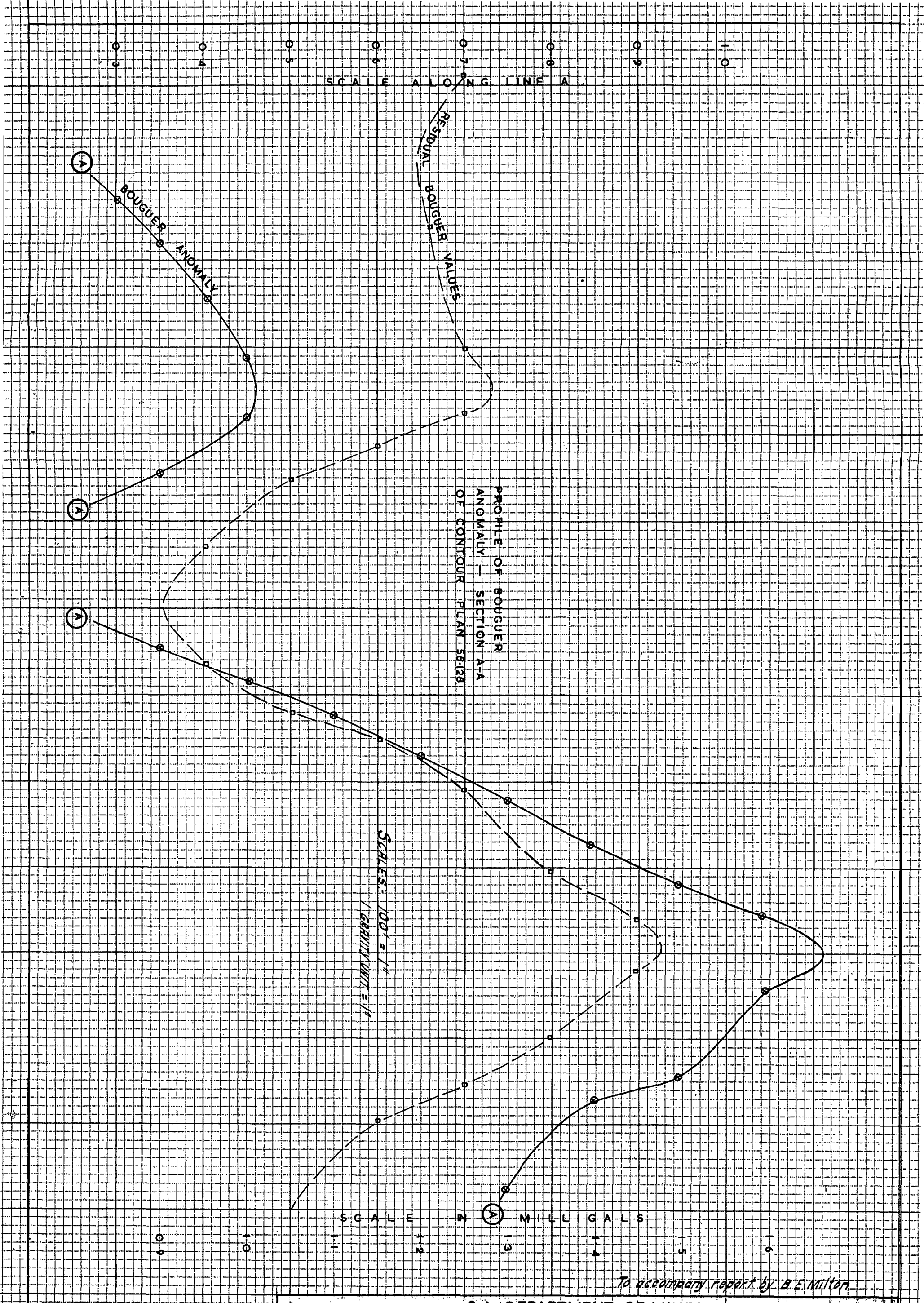
To accompany report by B.E.Milton

S.A. DEPARTMENT OF MINES

MIDDLEBACK RANGE NORTH DISTRICT
SOUTHWEST AREA PROSPECT No. 6
GRAVITY CONTOURS OF BOUGUER ANOMALY

No.	Amendment	Exd.	Date

Approved	Passed		Scale :
		Drn.	58—128
		Tcd. A.W.	DE
		Ckd.	
Director		Exd.	Date 18·6·58



To accompany report by B.E. Milton

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	MIDDLEBACK RANGE NORTH DISTRICT SOUTHWEST AREA PROSPECT No. 6	D.M.	Scale 100' = 1" 1 garty. unit = 1'
		Tcd. A.W.		Regd.	58-129 DE
		Ckd.			
Director		Exd.			Date 18-6-58

Corunna Hills

CORUNNA AREA

RACECOURSE AREA

IRON KNOB

Iron Knob

Iron Monarch

KATUNGA HILLS NORTH AREA

WEST KATUNGA AREA

KATUNGA HILLS EAST AREA

KATUNGA HILLS SOUTH AREA

NORTH PROSPECT

COOYERDOO HILLS AREA

SSE PROSPECT

Iron Knob District
(See Index to Plans – 57-11)

Eyre Highway

To Port Augusta

Iron Prince

IRON BARON

Iron Baron

CAMEL HILL AREA

Iron Baron South

Iron Queen

Iron Queen South

SOUTH QUEEN AREA

Mt. Middleback North

S.W. AREA

Iron Warrior

Kimba Gap

Kimba Road

Cooks North

Iron Count

Iron Chieftain

Lincoln Highway

Iron Knight North

IRON KNIGHT AREA (East strip)

Iron Knight South

COOKS GAP AREA

EAST FLANK AREA

WEST GAP AREA

Iron Duchess North

Iron Duchess

IRON DUKE - IRON DUCHESS AREA (West strip)

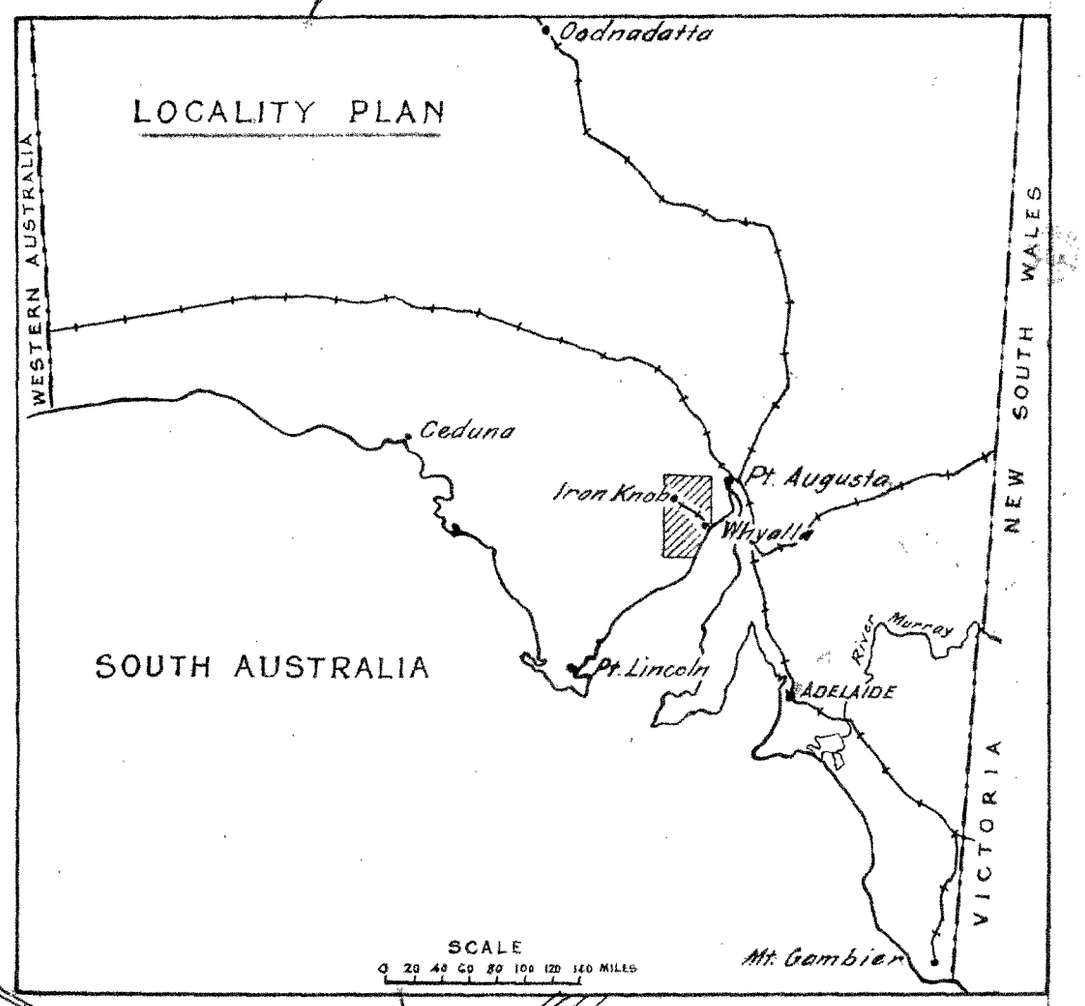
Iron Duke

Middleback Range North District
(For Plan and Section see 57-144)

Middleback Range South District
(For Plan and Sections see 56-263 & 56-264A)

WHYALLA

LOCALITY PLAN



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CONVENTIONS

Iron Ore	▲
B.H.P. Deposits	Iron Prince
D. of M. Prospects	RACECOURSE AREA
Railways	
Roads	
Tracks	

To accompany report by G.F. Whitten, Senior Geologist.

S.A. DEPARTMENT OF MINES

No.	Amendment	Exd.	Date

IRON KNOB, MIDDLEBACK RANGE (NORTH & SOUTH) DISTRICTS
IRON ORE PROSPECTS
DEPARTMENT OF MINES DRILLING AREAS

Approved	Passed		Scale : 4 Miles to 1"
		Drn.	56-256
		Trd R.R.	DE
		Ckd.	
Director		Exd.	Date 15-10-56