Geophysical Report 1/57.
~~H.O.~~ R.B 44/54.
G.S.No. 6/69.
D.M.1335/55

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY.

GEOPHYSICAL SECTION.

GEOPHYSICAL PROSPECTING FOR IRON ORE AT COOYERDOO PROSPECT, IRON KNOB DISTRICT.

By

K.R. Seedsman,

(Geophysicist)

TO THE CHIEF GEOLOGIST:

GEOPHYSICAL PROSPECTING FOR IRON ORE

AT COOYERDOO PROSPECT, IRON KNOB DISTRICT

This minute accompanies a report with the above title written by K. R. Seedsman, Geophysicist.

A gravity survey was carried out over an area outlined by R. C. Mirams, Geologist from surface indications. The density information is confusing and a short drilling programme is recommended to assist with this problem and also to determine the nature of the anomalous rock. Further work after more accurate density determinations have been may assist in outlining the limonitic material.

SENIOR GEOPHYSICIST

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29.3.57.

DEPARTMENT OF MINES
SOUTH AUSTRALIA.

GEOPHYSICAL PROSPECTING FOR IRON ORE AT COOYERDOO PROSPECT, IRON KNOB DISTRICT.

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K.R. SEEDSMAN,

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Accompanying plans - Gravity Profiles 57 - 119

Locality Plan S 1436

DEPARTMENT OF MINES
SOUTH AUSTRALIA.

GEOPHYSICAL PROSPECTING FOR IRON ORE AT COOYERDOO PROSPECT, IRON KNOB DISTRICT.

SUMMARY.

Gravity anomalies on a sand covered plain south of Cooyerdoo Hill have been found to be higher than those over adjacent areas of outcropping haematite-Quartzite. Available density information is confusing, and a short programme of drilling is recommended to determine the nature of the anomalous rock.

INTRODUCTION.

Geological inspection of an area approximately one mile south of Cooyerdoo Hill revealed haematite in small, scattered outcrops and occurring in lateric and travertinous material close to the surface. (Minute of 2.8.56 by R.C. Mirams in DM.1335/55). Between nearby narrow outcrops of haematite-quartzite, trending north-south and approximately 2,000 feet apart, is a flat sandy plain where rock does not outcrop. Gravity traverses have been run in the area to obtain information on the type of rock present below the plain.

The prospect is located eight miles SSW from Iron Knob (Plan S1436) which was the base for the field work conducted from 21.11.56 to 26.11.56 by M.H. Parker (Geophysicist), and from 16.1.57 to 24.1.57 by the author.

PREVIOUS GEOPHYSICAL WORK.

An airborne magnetometer survey at 300 feet above ground level was made over the Middleback Ranges by Adastra Hunting Geophysics Ltd. on behalf of the Department in February-March, 1956. Results bearing on the present investigation will be referred to later in this report.

GEOLOGY

A geological plan of the area is at present being compiled by R.C. Mirams (Geologist, Mineral Resources Section). Occasional outcrops of haematite-quartzite and laterite occur on low rises south of Cooyerdoo Hill, itself formed of massive haematite-quartzite and interbedded schists. Between the N-S trending rises, rock is obscured by sand.

METHOD USED.

East-west lines of pegs at intervals of 100 feet were surveyed with theodolite and chain and levelled with a microptic level and staff. Gravity intervals were measured with worden gravity meter W204.

A combined free air and Bouguer correction factor of 0.56 gravity units per foot was used to obtain elevation corrections, corresponding to a mean density of 3 gm. per cubic centimetre for rocks above the arbitrary level datum. This figure was obtained by the profile method in the Katunga Hills, and the rock assemblage in the Cooyerdoo area was considered to be similar. Gravity values, corrected for elevation and latitude are presented as profiles in drawing 57-119. No topographic correction has been applied as it was considered that this would not significantly affect the results.

RESULTS AND CONCLUSIONS.

The most northerly traverse, 4400N, passes over outcropping haematite-quartzite at the southern end of Cooyerdoo Hill. A peak of the order of half milligal is obtained between 1700E and 2200E, and is thought to be due to the excess density of these rocks over the probably associated schists, over which the gravity value is low. The mean value rises towards the east where Archaean gneissic rocks are expected to occur. Fresh-looking samples of a granite rock comprising the surface float near 4400, 5000E were found to have a density of 2.6 gm. per cubic centimetre. Samples of haematite-quartzite from various parts of the area ranged from 3.1 to 3.5 in S.G. so unless obscured material interbedded with

the haematite-quartzites is of low density, the gravity rises to the east of this traverse must be a regional effect due probably to some deep-seated source.

The adjacent traverse, 4000N, crosses the hill lower down and sand and scree obscure the underlying rock. A gravity minimum is recorded suggesting that the haematite-quartzite has lensed out. The steady gravity increase towards the east is again encountered on this traverse.

Traverse 800N crosses two low rises, near 1300E and 3300E, on both of which dense haematite-quartzite outcrops. Gravity values, however, are low. To the east of 3500E the gravity profile rises in traverses 4000N and 4400N, and granitic material has been found at 60 feet in the borehole near 800N, 3500E. A rise in gravity values is found over the sandy depression between the two topographic rises mentioned above, and this persists on profiles 400N, 1200N, 1600N, 2000N, and 3000N, but appears to die out between 3000N and 3600N.

The total Intensity Aeromagnetic Map of the Middleback Ranges, Sheet No. 4, shows a magnetic anomaly of approximately 1300 gammas above general intensity centred about half a mile south of the southern-most gravity traverse. This is of much lower order than anomalies elsewhere in the Middleback Ranges where large quantities of haematite-quartzite are known to occur. There may be little haematite-quartzite in the area covered by the gravity survey.

A number of short bore holes have been sunk on surface showings of haematitic material, mostly penetrating weathered limonitic schists. The following specific gravities of sample from open tube cores have been measured;-

Hole	Co-ordinates	depth of Sample	S.G.
PSB 12B	797N, 990E	90 - 92 ft.	1.23
PSB 15	862N, 857E	10 - 11 ft.	1.77
PSB 16	881N, 763E	14 - 15 ft.	1.33

These values are very low despite an assayed iron content of material from PSB 12B of 43 per cent.

B.E. Milton (Geophysicist) has carried out statistical investigations into the mean density of the low hill near 3300E on the 800N line. Siegert's method of calculating the average density of a topographical feature (Geophysics, Vol.VII, 1942), gives the figure 2.0 ± 0.5 gm. per cubic centimetre. When it is realised that outcropping on the hill are several bands of haematite-quartzite of density approximately 3.3 gm. per cubic centimetre, it must be concluded that very low density rock, like that intersected in the bores above, must make up the bulk of the hill.

The relatively high gravity values between the minima on each of traverses 800N to 3000N could be caused by rock of normal density and no iron content if the low density rock is sufficiently extensive.

However, in the light of available information the occurrence of dense rock, haematite-quartzite or even ore, causing the gravity high must remain a possibility.

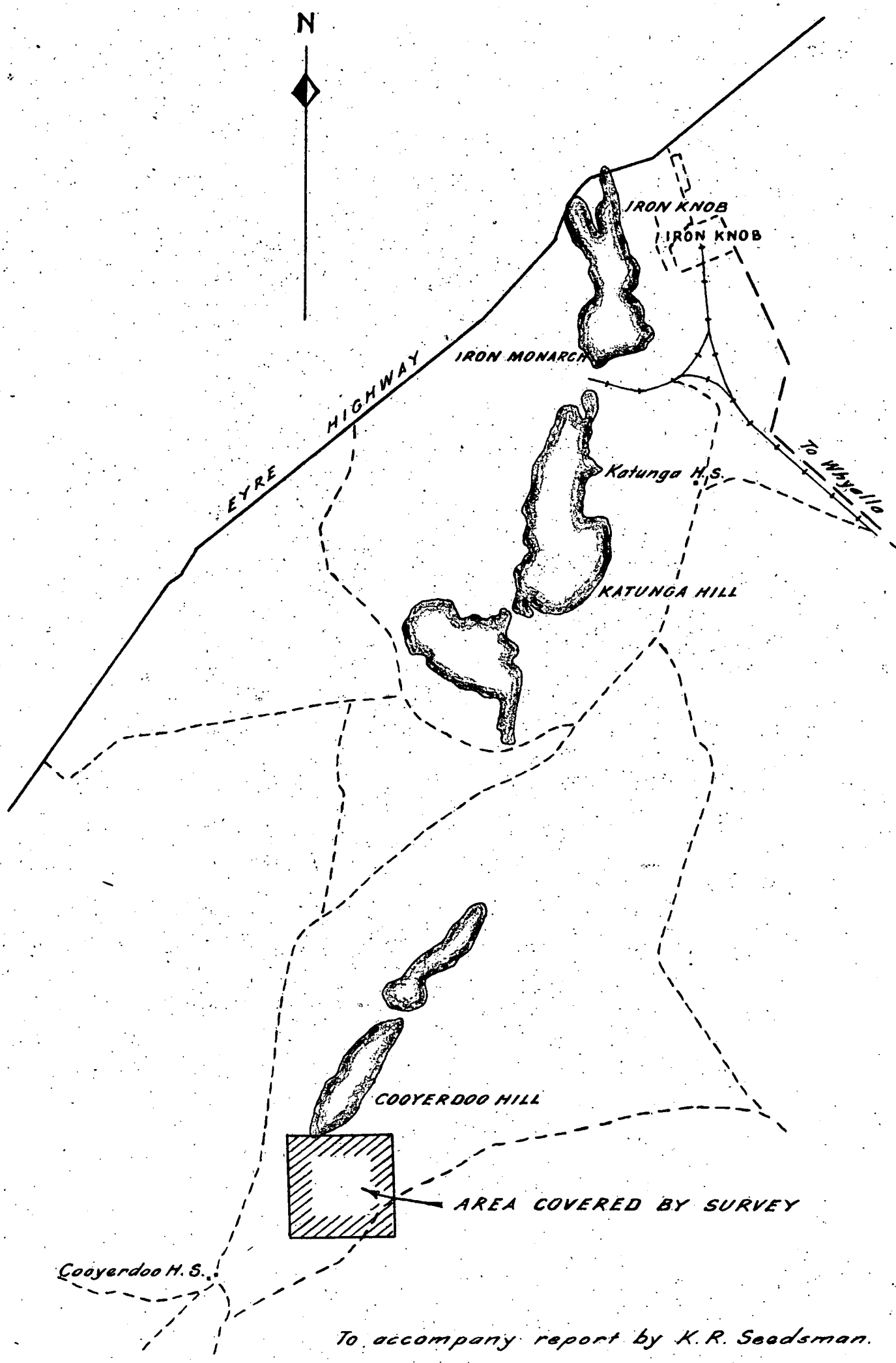
RECOMMENDATIONS.

To test the above conclusions and to obtain density values for more detailed information, three percussion holes should be drilled on the 1600N grid line, at 2100E, 2300E, and 3100E respectively. Open tube cores should be taken every ten feet to provide samples for density determination. Initially, a depth of 100 feet should be drilled, if the rock remains sufficiently soft. Considerations of the densities of the samples obtained will indicate whether further drilling is necessary.

Extended gravity work, interpreted with the aid of density information from the holes, may enable the extent of the high iron, limonitic material to be determined.

(K.R. Seedsman)

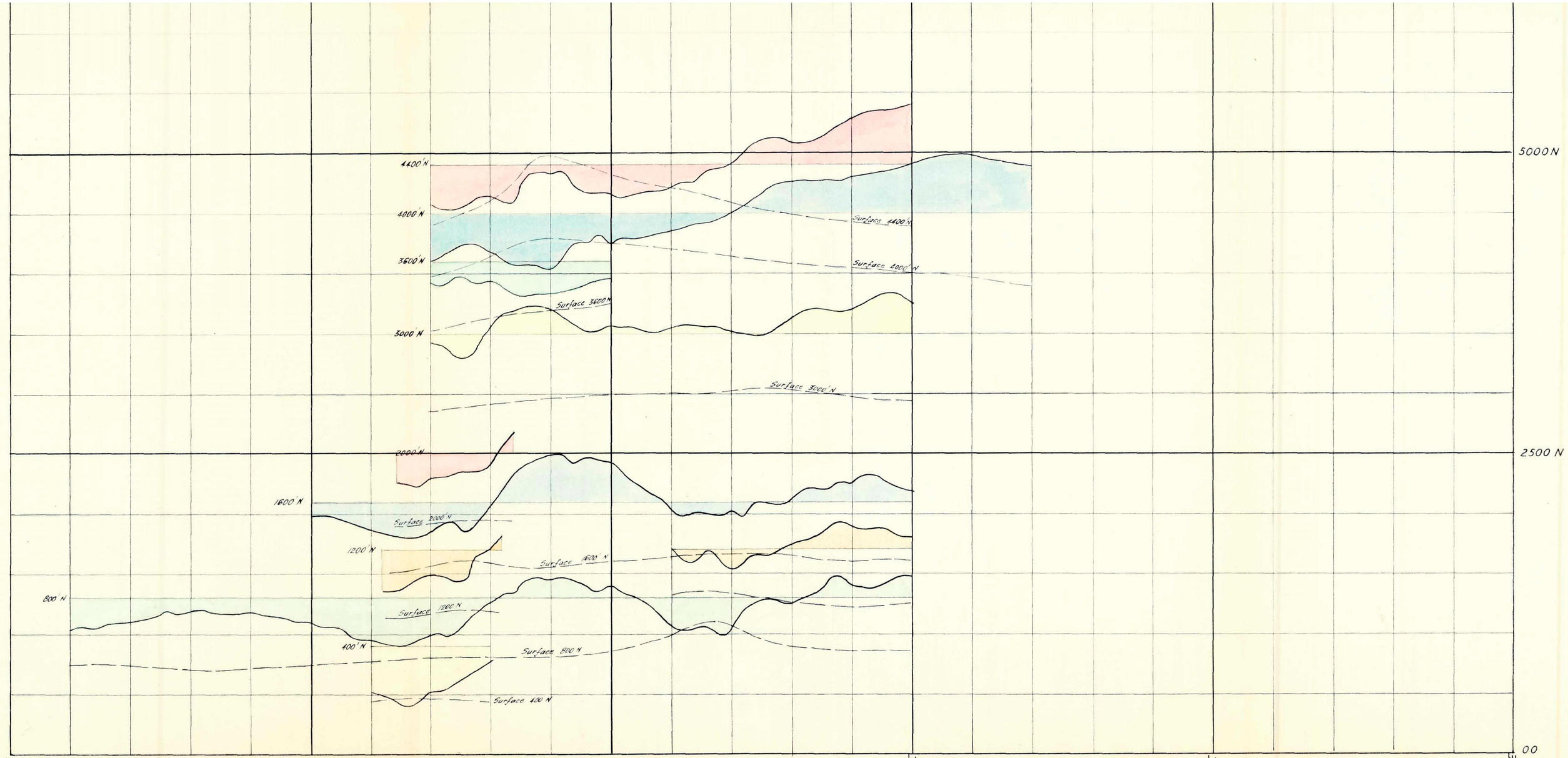
1/4/57 GEOPHYSICIST.



To accompany report by K.R. Seadsman.

S.A. DEPARTMENT OF MINES

Approved Director	Passed	Drn. Tcd. R.R. Ckd. Exd.	IRON KNOB DISTRICT COOYERDOO PROSPECT LOCALITY PLAN	D.M. Req.	Scale : 1 Mile to 1 in. S 1436 DE Date 15-3-57



57-119
DE
Date 25/2/57

VERTICAL SCALE: 1" = 1 milligal
NATURAL SURFACE: 1" = 100 feet

S. A. DEPT. OF MINES

IRON KNOB DISTRICT

COOYERDOO PROSPECT

GRAVITY PROFILES

No	Amendment	Exd	Date

Approved	Passed		Scale 500'to1"
		Drn	
		Tcd	
		Ckd	
Director	C.D.	Exd.	