DEPARTMENT OF MINES
SOUTH AUSTRALIA

POST-MESOZOIC COVER ON AEROMAGNETIC ANOMALIES

WESTERN EYRE PENINSULA

by

J.F. Hayball
Geologist

IRON SECTION

GEOLOGICAL SURVEY

CONTENTS

APPENDICES

MAP REF.	TITLE	SCALE
58-395	Eyre Peninsula Iron Ore Prospects Geology and Locality Plan	1" = 16 miles

Rept. Bk. No. 47/148
G.S. No. 1210
D.M. 1210/58

27th November, 1958.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

POST-MESOZOIC COVER ON AEROMAGNETIC ANOMALIES

WESTERN EYRE PENINSULA

ABSTRACT:

The Airborne Magnetic Survey, Upper Eyre Peninsula (Sheet 2) - B.M.R. indicated sixteen magnetic anomalies of intensities $\geq$ 3000 gammas, approximately 1000 gammas above background. To give some indication of overburden depths at eight selected anomalous sites, a brief survey of the literature relating to the distribution of post-Mesozoic sediments was undertaken. Little information was obtained and a scout drilling programme is warranted to determine the cover depth.

1. INTRODUCTION

Following the inspection of eight magnetic anomalies by R.C.M. on 22/6/58 - 23/6/58 and G.F.W., J.E.W., and R.C.M. on 28/10/58 - 29/10/58 (DM 1210/58), recommendations were proposed to run gravity and magnetic traverses across these anomalies and subsequently drill promising areas verified by the traverses. The writer searched the bore records and literature relating to the relevant areas to ascertain the depth of the post-Mesozoic cover and hence give some indications to the costs involved in this geophysical exploration.

2. LOCATION

The area of primary interest is that covered by the Airborne Magnetic Survey, Upper Eyre Peninsula (Sheet 2) - B.M.R. bordered by latitudes 32°30' and 33°45' and longitudes 134'00' and 136'30'. The area comprises Counties Robinson and Le Hunte and part of Counties Bosanquet, Musgrave, Jervois, Buxton and Hore-Ruthven.

The eight anomalies of particular interest are located thus:

1.	Corvisart Anomalies (2)	Sec. 3a, 147-150, Hd. Ripon, Co. Robinson.
2.	Cungena Anomaly	Sec. 16, 17, Hd. Chandada, Co. Robinson
3.	Kopi Anomaly	Sec. 2, 3, 30, 32, 39-45, 47-49, Hd. Ulyerra Co. Musgrave.

4. Warramboo Anomaly	Sec. 19, Hd. Kappakoola Sec. 7-12, 24, 25, 29-31 Hd. Warramboo	Co. Le Hunte
5. Inkster Anomaly	Sec. 40, Hd. Carina.	Co. Robinson
6. Paney Anomaly	Sec. 3, Hd. Pildappa.	Co. Bosanquet
7. Paney Anomaly unnamed Hd.	extreme northeast of Co. Robinson.	

3. GEOLOGY

3.1. Regional Geology

The western extremities of the sheet reveal a vast extent of aeolianite (Pleistocene calcareous sands) which extends from the cliffs of the western section of Eyre Peninsula where it attains its maximum thickness (greater than 150') thinning inland easterly where thicknesses of up to 100 ft. (?) fill old river valleys. Further east the pertinent area is covered by Recent sands, clays and alluvium. Archaean granite protrudes as inliers sporadically scattered throughout the entire area. However the aeromagnetic anomalies suggest the presence of other rocks beneath the Post-Mesozoic cover.

3.2. Detailed Geology

The writer found it exceedingly difficult to obtain detailed information on the eight anomalous areas as the literature cited appeared to be extremely generalised but one bore record revealed some valuable information which is detailed as follows:-

3.2.1. Corvisart Anomalies (2) No bore record information is available but it is suggested that 100-200 ft. of aeolianite masks bedrock. The coastline area exposes the greatest thickness of the aeolianite on the Peninsula and as these two anomalies are "shore line" anomalies, substantial thicknesses of aeolianite are to be expected.

3.2.2. Cungena Anomaly - No bore record information available.

3.2.3. Kopi Anomaly - A bore sunk on section 3, Hd. Ulyerra encountered bedrock at 346' and was logged as follows:-

0	- 1'	Sand
1'	- 9'	Limestone.
9'	- 17'	Red sandy clay
17'	- 49'	Sand and ironstone
49'	- 70'	Indurated sand
70'	- 83'	Sand
83'	- 95'	Sandy clay
95'	- 118'	Clay and lignite
118'	- 143'	Sand and lignite
143'	- 188'	Ligneous sand
188'	- 195'	Sand
195'	- 225'	Ligneous sand
225'	- 232'	Purple clay
232'	- 326'	White pipeclay and quartz
326'	- 346'	Clay sand and quartz
346'	- 350'	Granite.

(Reference - Engineer in Chief's Department - Musgrave Bore - 1911)
It is therefore suggested that the Kopi Anomaly may be centered in a basin structure and hence considerable depths to bedrock could be expected.

3.2.4. Warramboo Anomaly
3.2.5. Inkster Anomaly
3.2.6. Paney Anomaly
3.2.7. Paney Anomaly

} No bore record information available.

As the Warramboo, Inkster and Paney areas are served by reticulated water, probably very little boring has been initiated and hence the lack of information.

3.3. Summary

Although no direct information has been obtained on most of the anomalous areas, extreme caution should be taken in assessing the depth of the overburden as Tertiary basins similar to those encountered at Cummins (bedrock 466' - Cummins Police Station bore) and Wanilla could well extend to the north. The writer considers that the aeolianite overburden would generally be shallow inland (0-100 ft.) but basin structures could reveal sediments of 300-500 ft. in thickness.

4. CONCLUSION:

Little detailed information of the thickness of the Post-Mesozoic cover could be gleaned from the literature. The references cited are of an extremely general nature and bear little relation to the anomalous areas. Consideration should be given to a field reconnaissance trip whereby some information might be obtained from the local residents. However, as most of the relevant areas are served by the Eyre Peninsula reticulation scheme, it is probable that little water boring has taken place. Scout drilling appears to be the only solution to the problem.

John F. Hayball.

John F. Hayball
Geologist
IRON SECTION

JFH:AGK
27/11/58

APPENDICES

1. References

1.1 4 mile military sheets (Regional Mapping Section)

MAP REFERENCE	UNIT OR ROCK	AUTHOR	PUBLICATION
Lincoln (4 mile sheet)			
I/53, 15	Deposits (Recent)	Ward, 1913 Eyre Peninsula	Geol. Survey of S.A. Bulletin No. 2
I/53, 11	Limestone (Recent)	Mawson, 1907 Eyre Peninsula	Trans. Royal Soc. of S.A. 31.
I/53, 11	Sediments (Tertiary)	Jack, 1951 Eyre Peninsula	Proc. A.I.M.M. Nos. 162-163
I/53, 11	Sediments (Tertiary, Upper-Recent)	Jack, 1914 Eyre Peninsula Wade, 1915 Eyre Peninsula	Geol. Survey of S.A. Bulletin No. 3. Geol. Survey of S.A. Bulletin No. 4
I/53, 11	Water	Jack, 1914 Eyre Peninsula Mawson, 1907 Wadella Springs, Cummins Jack, 1951, Eyre Peninsula.	
Kimba (4 mile sheet)			
I/53, 7, 800 Sheringa	Sandstone, Lake Hamilton Area	Wilson, 1947 Eyre Peninsula	Royal Geog. Soc. of Aust. S.A. Branch 48
I/53, 7.	Sediments (Tertiary)	Jack, 1951 " "	
I/53, 7	Sediments (Tertiary-Recent)	Jack, 1912 " "	Geol. Survey of S.A. Bulletin No. 1.
I/53, 7	Sediments (Tertiary-Upper-Recent)	Jack, 1914 " "	
I/53, 7, 800 Sheringa	Travertine	Wilson, 1947 " "	
I/53, 7	Water	Jack, 1912 " "	
Elliston (4 mile sheet)			
I/53, 6	Sandstone (Tertiary, Upper)	Segnit 1938 " "	Geol. Survey of S.A. Bulletin No. 17.
I/53, 6	Sandstone (Pleistocene)	Segnit 1938 " "	
I/53, 6	Sediments (Tertiary-Recent)	Jack 1912 " "	
I/53, 6	Travertine	Wilson 1947 " "	
I/53, 6	Water	Segnit 1938 " " Dridan 1938 " " Jack 1912 " "	Geol. Survey of S.A. Bulletin No. 17

Streaky Bay (4 mile sheet)			
I/53, 2	Sandstone (Tertiary -Upper)	Segnit 1938 Eyre Peninsula	
I/53, 2	Sandstone (Pleistocene)	Segnit 1938 " "	
I/53, 2	Sediments (Tertiary-Recent)	Jack 1912	
I/53, 2	Water	Segnit 1938 " "	
		Dridan 1938 " "	
		Jack 1912 " "	
Yardea (4 mile sheet)			
I/53, 3	Sediments (Tertiary-Recent)	Jack 1912 " "	
I/53, 3	Water	Dickinson 1942 Moonaree Station	Trans. Royal Soc. S.A. 661.1
		Jack 1912 Eyre Peninsula	
		Brown 1885 Gawler Range Area	Annual Report of the Gov. Geologist for S.A. 1.12.82-31.12.83
			Geol. Magazine New Series Decade 3.2
Childara (4 mile sheet)			
H53, 14	Sediments (Recent)	Brown 1894 South Australia	Report of Gov. Geologist for year ended June 30-1894: Parliamentary Paper (S.A.) 25, 1894.
H53, 14	Water	" " " "	

1.2 General

The Geology of South Australia (1958) - Eyre Peninsula
Tertiary and Pleistocene Deposits on Eyre Peninsula (N.H. Ludbrook) Report G.S. 980
Report on Groundwater Prospects (R.G. Shepherd) Report G.S. 1146
Section 16, Hd. Hambidge (Co. Musgrave.)

TO THE CHIEF GEOLOGIST:

POST-MESOZOIC COVER ON AEROMAGNETIC ANOMALIES
WESTERN EYRE PENINSULA

Herewith report on the above subject by J. F. Hayball, Geologist.

Mr. Hayball has searched the literature for general information on depth of cover on Western Eyre Peninsula and Boring Records for more specific information about cover over 8 anomalies.

Almost no detailed information is available. Local residents may be able to supply some information but as most water comes from the Eyre Peninsula reticulation scheme, it is probable that little water boring has taken place.

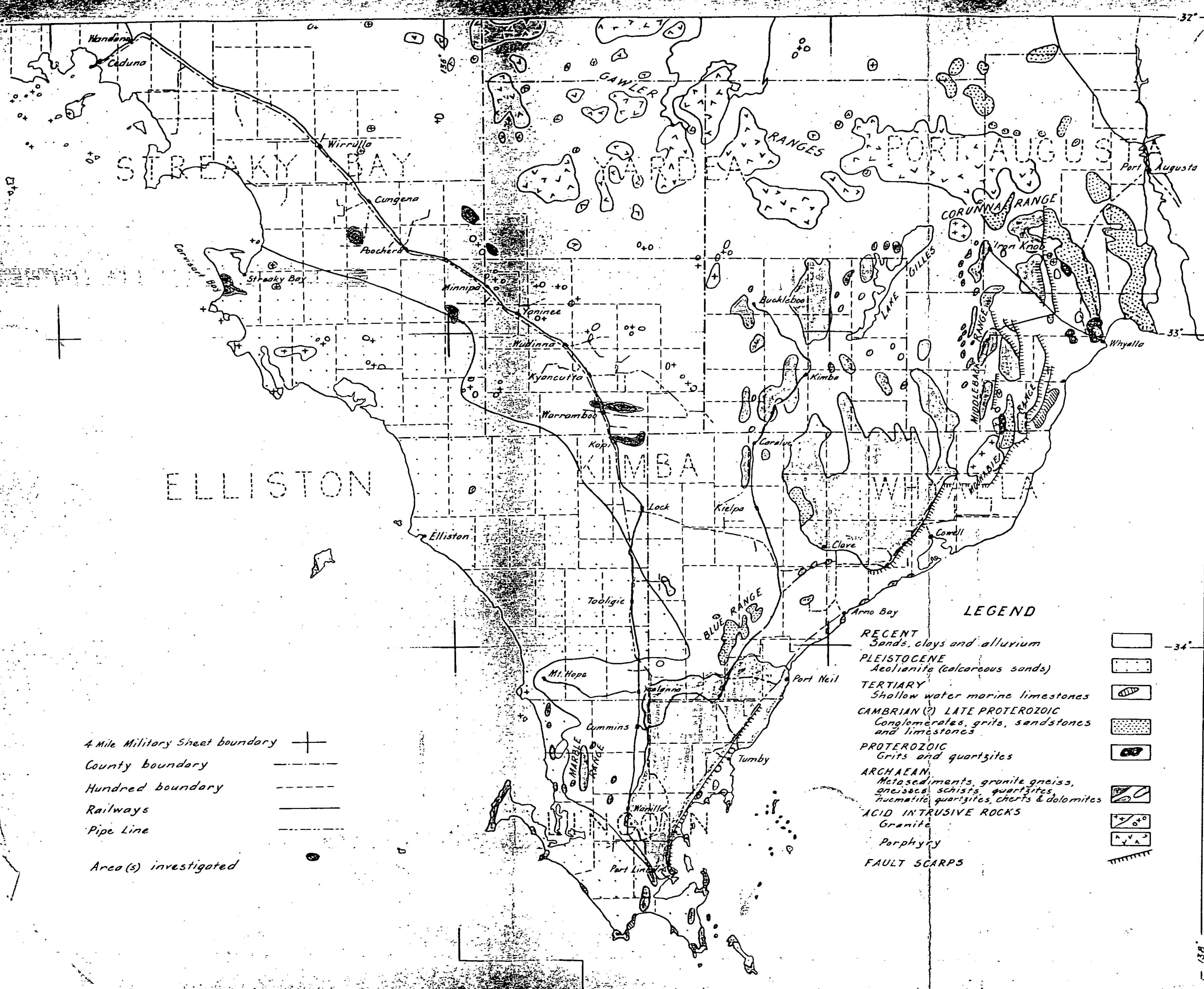
Mr. Hayball recommends scout drilling to determine thickness of cover. It is therefore recommended that the Conrad Stork machine be stationed on Eyre Peninsula and as soon as the peak of each anomaly is defined the machine be used to determine depth of cover. This would be an asset in interpreting the geophysical work and in locating deeper holes, either percussion or diamond.

It is recommended that an approval for £5000 be sought for intermittent use of the Conrad Stork machine on scout drilling on Eyre Peninsula.

Graham Whitten.

Graham Whitten
SENIOR GEOLOGIST
IRON SECTION

GFW:CERF
28/11/58


Ceduna
Wandana
Wirrulla
STREAKY BAY
YARDEA
GAWLER RANGES
PORT AUGUSTA
Port Augusta
CORUNNA RANGE
Iron Knob
LAKE GILLES
Buckleboo
Cungena
Poochera
Corvisart Bay
Streaky Bay
Minnipa
Yaninee
Wudinna
Kyancutta
Warramboo
Kopi
Kimba
MIDDLEBACK RANGE
Whyalla
Caralue
KIMBA
WHYALLA
MOONABIE RANGE
ELLISTON
Lock
Kielpa
Cleve
Cowell
Elliston
Tooligie
BLUE RANGE
Arno Bay
Mt. Hope
Yeelanna
Port Neil
Cummins
MARBLE RANGE
Tumby
Wanilla
LINCOLN
Port Lincoln
32°
33°
34°
136°
138°
LEGEND
RECENT
Sands, clays and alluvium
PLEISTOCENE
Aeolianite (calcareous sands)
TERTIARY
Shallow water marine limestones
CAMBRIAN (?) LATE PROTEROZOIC
Conglomerates, grits, sandstones and limestones
PROTEROZOIC
Grits and quartzites
ARCHAEAN
Metasediments, granite gneiss, gneisses, schists, quartzites, haematite quartzites, cherts & dolomites
ACID INTRUSIVE ROCKS
Granite
Porphyry
FAULT SCARPS
4 Mile Military Sheet boundary
County boundary
Hundred boundary
Railways
Pipe Line
Area(s) investigated

S.A. DEPARTMENT OF MINES

EYRE PENINSULA
IRON ORE PROSPECTS
GEOLOGICAL AND LOCALITY PLAN

16 Miles: 1"

58-395
DE

Date 28-11-58