DEPARTMENT OF MINES
SOUTH AUSTRALIA

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IRON EXPLORATION SECTION

REPORT NO. 2

on

SAMPLING TECHNIQUES & DRILL LOGS

for the

NARRAMBOO AEROMAGNETIC ANOMALY

CENTRAL EYRE PENINSULA

May to November, 1961

by

G. R. Heath
Geologist

PART I

Rept. Bk. No. 54/19
G.S. No. 2235
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1st February, 1962.

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ABSTRACT

The initial test programme at Warramboo has been completed after drilling 13,163'. Techniques have been developed for drilling, sampling and logging the materials encountered. The majority of holes intersected granitised metasediments containing an average of about 20% iron oxides.

Further testing based on the techniques described should result in a rapid and relatively economical evaluation of the anomaly.

1. INTRODUCTION

The Warramboo Anomaly is an aeromagnetic anomaly lying in central Eyre Peninsula (see Figure S 2999). It is elongate and asymmetrical being about 15 miles east-west by 2-3 miles north-south.

The initial test programme, as well as identifying the sub-surface material producing the anomaly, developed drilling and sampling techniques applicable in other areas.

This report describes techniques developed during the first phase of exploratory drilling from May to November, 1961. Drill logs and assay results are appended.

A brief history of the project and a review of the geophysical investigations which preceded the drilling programme are contained in Report No. 1 on "Drilling of the Warramboo Aeromagnetic Anomaly Central Eyre Peninsula", by Graham Whitten, Senior Geologist.

In addition, Whitten's report contains a general discussion of drilling results up to 19th August, 1961.

Geologically, the area consists of somewhat granitised Archaean metasediments overlain by unconsolidated sands and clays, which are capped by sheet kunkar.

The topography is gently undulating with a prominent system of superimposed sand dunes trending at about 120°. The dunes range up to 30 feet in height by several miles in length.

The only surface indications of bedrock are small patches of scattered ferruginous and manganiferous float.

The lack of pre-Cainozoic outcrops resulted in drill sites being selected on the basis of ground geophysical data.

However, the presence of relict martite in limonitic float near 58000N, 67000E gave this area first priority in the drilling programme, while the subsequent discovery of manganiferous nodules near 56000N, 58000E made this area an obvious choice for early detailed testing.

2. DRILLING PROGRAMME

(a) Summary

Type of drill	Rotary	Diamond	Auger	Percussion
Model	Failing WW 1	Mindrill F25	Gemcodrill	Ruston Bucyrus M22 and self propelled rig constructed by Department of Mines (plant No. 10)
Drilling commenced	8/5/61	28/6/61	8/6/61	14/7/61
" concluded	4/9/61	1/11/61	5/9/61	31/8/61
&No. Sites drilled	31	4	89	9
Footage drilled	5300'	1819'	5446'	598'
" per hole	156'	455'	61'	66'
" per week	311'	101'	418'	85'
Cost per foot	£1. 9. 7.	£3. 19. 3.	£0. 6. 3.	£2. 1. 6.

& Does not include duplicate holes drilled for technical reasons.

(b) Rotary Drill

The plant used for rotary drilling was a new Failing model WW 1, combined rotary-percussion drill, which was also able to take short diamond drill cores. This plant was used to drill holes to fresh bedrock.

The fact that the rig was new and was operating at depths of less than 300 ft. resulted in a negligible amount of lost time due to mechanical breakdown. During the closing stages of the programme however, the mud pump gave trouble due to internal abrasion (see discussion later) and the motor developed a leak between the water circuit and the sump. These faults developed too late to affect the first test programme, but will have to be rectified before drilling recommences.

Daily footages of up to 180 ft. were achieved under optimum conditions.

Tungsten carbide faced finger bits proved most successful for drilling unconsolidated material or weathered bedrock, while tricone roller bits were used to penetrate kunkar and fresher bedrock.

As the WW 1 was the first plant of its type to be used by the Department for mineral exploration in this state, a certain amount of experimentation in drilling and sampling techniques was necessary to obtain optimum results.

The drillers' task was made more difficult by the lack of an operator's manual for the plant.

Two major problems were encountered during rotary drilling.

1. Interruption of mud circulation. The plant was fitted with a 2½" centrifugal pump to maintain the mud flow while drilling. Although the large capacity of this pump was an advantage in a number of cases, the ease with which the flow could be stopped by soft clay plugging the bit (without producing any significant increase in back pressure) more than discounted this factor.

A piston pump would overcome the problem, as well as eliminating the priming difficulty experienced with the centrifugal pump.

2. Abrasive mud. The recirculated mud contained a large proportion of suspended quartz, and, as the hole entered less weathered bedrock, garnet and

iron oxides as well. This highly abrasive mixture cut through brass fittings in a matter of days.

While it would probably be difficult or impossible to reduce the amount of abrasive material in suspension, the problem could be reduced by using specially hardened or rubber lined fittings at points of maximum wear (e.g. gate valves, pump vanes etc.).

Percussion drilling with the WW 1 was fairly straightforward at depths of less than 150'. At greater depths, however, the drilling action of the 2¾" tools was effectively damped by the drilling mud which filled and supported the rotary drill holes.

This produced malfunctioning of the hydraulic lifting ram, as well as making it difficult for the driller to tell when the tools were at the bottom of the hole.

Apart from the slow turntable speed (which could possibly be improved by fitting later models with an overdrive), the WW 1 worked well as a diamond drill in fresh bedrock.

The cost per foot of diamond drilling at the bottom of a rotary hole (about #9) was excessive, largely due to vibration damage and scouring of bits. It may be possible to reduce this cost by using smaller coring equipment and stabilising the core barrel and bit in the bottom of the hole.

An attempt was made to core semi-consolidated material using NMS equipment (split inner core barrel, bottom discharge bits), but the space between inner and outer barrels was repeatedly blocked by sand sized material carried down in the drilling mud.

This problem was reduced to some extent by drilling with water instead of mud.

However, once the mud had been flushed out of the hole, the walls tended to collapse.

(c) <u>Diamond Drill</u>

In cases where rotary drill holes penetrated material warranting further study at depth, or where they did not penetrate far enough to obtain the information sought, a diamond drill was used to obtain the desired information.

The principal factors contributing to the success of the diamond drilling programme were:

i. A new Mindrill F 25 plant was used, resulting in a minimum amount of lost time due to mechanical breakdowns.

ii. The plant was under the control of an experienced and competent driller with the expert services of an overseer available throughout the period of intensive drilling.

iii. Holes were drilled vertically in fresh rock from the bottom of rotary holes, thus bypassing the difficulties normally encountered when diamond drilling through overburden or decomposed rock.

(d) Auger Drill

The Gemcodrill had the highest penetration rate of the plants used (over 200 ft. per day being achieved on several occasions).

However, the plant was unable to penetrate the shallow subsurface kunker-limonite in many cases and only penetrated it with great difficulty in a number of others. This type of drilling was probably responsible for the frequent mechanical breakdowns suffered by the plant.

Further testing is required to determine whether the plant can be modified to handle tough drilling at shallow depth without suffering mechanical damage.

(e) Percussion Drill

Two plants were used during the percussion drilling programme. In each case continuous open tube sampling was employed as far as possible.

Initially a small self-propelled rig (percussion drill No. 10), constructed by the Department, was used. At Coffin Bay, drilling dry lime sands, it had been very effective. At Harramboo, however, it could not handle the drilling conditions encountered.

It was stopped by flowing water-saturated quartz sand in the first three holes, at depths of 25' or less; its general rate of drilling was slow; and it was not powerful enough to pull casing when a hole had been completed. The plant was withdrawn after drilling seven holes.

The last two holes were drilled with a much heavier Ruston Bucyrus W 22 drill. This plant was quite successful, but being equipped for

undisturbed sampling was handicapped by a lack of correct equipment during the early stages.

3. COLLECTION & PREPARATION OF SAMPLES

(a) Failing NW 1

1. Rotary Cuttings

All mud returned during rotary drilling was directed, by means of a special collar fitting (Figure 5 3008), through a 12 mesh sieve and a settling tank. It then passed through two excavated sumps before being pumped back down the hole.

Settling tanks were made by cutting a 44 gallon drum into thirds (normal to drum axis) and welding 4" overflow pipes and handles on to the resulting tubs.

In this way, all the plus 12 mesh cuttings and a large proportion of the minus 12 mesh cuttings were retained for examination and assay.

At 10' intervals, drilling was stopped and the hole was flushed out for 5 minutes. The tank and sieve were then emptied on to rubber mats and washed out.

The sample was reduced to any desired size by cone and quartering and a 3 oz. jar full was retained for reference purposes. When a hole was in iron formation, an additional sample bag of cuttings was retained for possible assay.

Representative portions of the plus and minus 12 mesh fractions were washed free of mud and clay. The coarse fraction was cleaned by repeated agitation and washing in a 1" x 3" diameter tobacco tin with 16 mesh covered openings at each end, while the fine fraction was cleaned by repeated agitation followed by decantation of the clay suspension. In each case 1/4" ball bearings were added to the cuttings to help break up lumps of clay.

The clay free cuttings were dried on a small kerosene pressure stove, and stored in 3" x 1" diameter plastic phials ready for microscope logging.

(ii) Percussion Cores

The only precaution necessary before taking a percussion open tube sample with the WW 1 was to flush the hole thoroughly with drilling mud to remove rotary cuttings, the settling of which could block the lower 2'-3' of the hole.

Open tube samples were taken at 20' intervals during normal rotary drilling (10' intervals where the mud return was zero). The fact that rotary drilling rods were 20'6" long caused some confusion to drillers unaccustomed to the rig.

(iii) Diamond Drill Cores

When the penetration rate of the rotary drill, using a tricone roller bit, fell below 4 ft. per hour, a diamond drill core was taken. A 5' NK casing barrel fitted with 3½" special coring bits was used on the rotary drill rods.

Precautions were similar to those employed for percussion coring: the hole was thoroughly flushed with drilling mud to remove cuttings which would otherwise settle to the bottom of the hole. Diamond drilling was not successful first thing in the morning, as fine cuttings and debris from the sides of the hole filled the bottom 3'-5' of the hole overnight.

A nominal core recovery of 60% was specified before the driller could stop a hole on his own initiative. However, this figure was varied by the geologist on the site according to the nature of the core and the information required.

(b) Gemcodrill

(i) Auger Cuttings

Sampling cuttings from the Gemcodrill was technically much simpler than sampling rotary cuttings; the driller was able to collect all samples without assistance.

At the end of each 6' drilling run, the flights were spun in the hole to clear it as far as possible and a representative sample from the 6' interval was bagged for microscope logging.

Cuttings were not washed in most cases due to pressure of other work. However, since auger cuttings, unlike rotary cuttings, were not impregnated with drilling mud, the mineral content of unwashed cuttings could generally be determined without difficulty.

The standard of samples obtained throughout the area was quite variable.

In hard or compact layers (e.g. sheet kunker or limonite-silica impregnated material) cuttings were reduced to a fine powder by the grinding action of the bit. This powder was very difficult to interpret.

Under nearly dry, soft conditions, cuttings were brought to the surface as 1" diameter "marbles", which retained some structure (e.g. lamination) and could be logged rapidly. Unfortunately, such conditions were the exception rather than the rule.

When drilling below the water table (about R.L. 450') samples were churned into a slurry in which all structure was destroyed and samples from individual runs were severely contaminated by material from higher in the sequence. Like the powder from the hard layers, this slurry was very difficult to interpret; such features as the overburden-bedrock contact being almost impossible to identify.

(ii) Auger Cores

In addition to the normal flights, a number of devices were used with the Gemco to take samples from the bottom of the hole. They were:

(1) Core barrel in bottom auger flight. To obtain this type of sample, a special bit cut an annular hole, the central cylinder of material being forced up into the barrel. This corer took a fairly good sample under optimum conditions (soft, damp material), but would not core moderately hard bands or sandy clays below the water table.

Furthermore, the flights had to be removed to extract the core, and this greatly slowed the rate of drilling (the chief advantage of the Gemco). Also, in wet conditions, the hole usually collapsed before the flights could be replaced.

(2) Post hole digger type sampler. This device was virtually a post hole digger which could be lowered to the bottom of the hole on NX diamond drill rods.

The sample consisted of cuttings compressed in the body of the sampler to form a solid core. Although this core provided material from a known depth, it yielded no more structural information than the auger cuttings. In addition, it suffered from the same disadvantages as (1).

(3) Hollow flights allowing cores to be taken with the flights down the hole.

The hollow auger flights did not arrive at Warrambee until the closing stages of the initial drilling programme. A trial hole (WA 89) was drilled at 60600N, 67150E during which several percussion open tube samples were taken through the hollow flights. Providing care was taken to avoid hard bands, the samples were quite satisfactory.

Other samplers which could be used with these hollow flights, to obtain samples from specific depths, are AX diamond drill equipment and small post hole diggers.

The hollow flights overcome most of the disadvantages of (1) above, but the equipment requires further testing to determine its effectiveness under variable conditions.

(c) Hindrill F25 - Diamond Drill Cores

The F25 diamond drill obtained very good samples, core recovery ranging from 73% in WD 1 to 93% in WD 3.

Standard drilling procedures were employed throughout the test programme, and no serious difficulties arose from a technical point of view.

(d) Percussion Drills - Core Samples

Open tube cores from both the percussion plants were of high standard, although some distortion of bedding occurred in wet clayey sequences.

The cores were split lengthwise normal to the bedding, while still damp, so as to expedite later structural studies.

4. SAMPLE LOGGING TECHNIQUE

(a) Cuttings

The plus and minus 12 mesh rotary cutting fractions which had been washed free of clay and mud, and dried, were logged seperately, with the aid of a binocular microscope.

Supplementary equipment consisted of an alnico magnet (to test for magnetite and magnetic martite), a plastic container of 1:1 hydrochloric acid (to test for carbonate material), and a small mapping pen with a circular 1/25" flow hole (the point being used to test mineral hardness, and the hole to estimate mineral grain size).

The microscope was set up on the long-range tanks in the rear of a Land Rover or Jeep. This gave a working area which was firm, well lit, and protected from the weather. A Holden utility was unsuitable for use as a field laboratory.

Working conditions and lack of time precluded the use of polarized light equipment, refractive index liquids etc., to identify minerals more accurately.

The features recorded for each sample were:

(i) Mineral species, associations and grain size characteristics. As well as identifying minerals wherever possible, an attempt was made to sub-classify minerals (e.g. felspars into orthoclase and plagioclase, garnet into pink and orange varieties and so on).

The mineral associations and grain size limits are tabulated in the section on DETAILED GEOLOGY.

(ii) Proportions of principal constituents. All mineral estimates were made visually (there being insufficient time for grain counts). The technique was largely a matter of getting a representative sample fraction, spreading it out evenly in the field of view, coupled with constant practice. The diagram from Shvetsov (in Terry and Chilingar, Journal of Sedimentary Petrology volume 25 No. 3, pages 230-233, Sept. 1955) was quite helpful.

The significance of mineral estimates is discussed in the next section (DISCUSSION OF LOG RESULTS). However, the many factors influencing visual mineral estimates (grain size, difficulty of obtaining a representative sample and personal bias, to name a few) will probably make it difficult

to estimate iron oxides to better than plus or minus 5%, even after prolonged practice.

Unwashed cuttings from WR 24 and WR 25 were submitted to Australian Mineral Development Laboratories for assay for acid soluble iron, manganese and insoluble matter. The assay results are appended to this report.

Auger cuttings were logged microscopically in the same way as rotary cuttings, but the logs are generally less complete due to the absence of core samples (which acted as controls in rotary holes).

(b) Cores

Percussion core samples were split, as described above, and logged macroscopically and microscopically in the same way as rotary cuttings. In addition, structural characteristics (attitude of bedding to core axis etc.) were also recorded.

As well as providing structural information, the geological logs of core samples from rotary holes formed an accurate framework which could be filled in using the information obtained from rotary cuttings.

Selected core samples were split and assayed for acid soluble iron, manganese, and insoluble matter. The assay results are appended to this report.

A number of cores consisted of light yellow-brown clay sized material.

This was logged as clay, usually containing a very small proportion of visible iron oxides.

In a number of cases, however, assay results suggested that much of the material was earthy limonite. Re-examination of the cores concerned suggests that iron-rich earthy limonite and iron-poor limonitic clay cannot be distinguished optically using the equipment available. This fact should be kept in mind when evaluating iron oxide estimates in percussion core logs.

Diamond drill core was logged in detail, as it provides the only information on fresh bedrock. The following features have been or will be determined for diamond drill core:

i. Recovery and condition of core.

ii. Attitude of bedding to core axis at 5° or 10° intervals.

iii. Degree of magnetism.

iv. Geology (macro in WD 1-4 micro as well in WD1-2)
Degree of granitisation.
Minerals present and proportions of principal constituents.
Unusual textural features.

v. Assay (AMDL).

vi. Specific gravity (Geophysics Section).

vii. Petrology of selected specimens (AMDL).

viii. Magnetic susceptibility (Geophysics Section).

5. DISCUSSION OF LOG RESULTS

(a) MR1-31 Core Samples

Comparison of acid soluble iron content (determined by assay) and estimated iron content (determined microscopically).

General Notes

(i) Since the cores taken from rotary holes were all 1°-5° long and in general were taken at 10° or 20° intervals, they have been given equal weight in frequency distribution graphs.

On statistical grounds, samples should be the same size and randomly arranged. In practice, however, other factors (e.g. the uneven distribution of drill holes over the anomaly) make an accurate statistical appraisal impossible at present and unlikely at any exploratory stage.

(ii) During microscope logging, the iron oxide content of each sample was estimated visually.

For purposes of comparison, these estimates have been multiplied by a factor of 0.7 to give the "estimated iron content". If all the iron had been present as haematite or martite, this factor would be accurate to within 0.1% (Fe_2O_3 containing 69.93% iron).

The most common iron oxide mineral in the MR1-31 cores is martite, with lesser magnetite (containing approximately 72.5% iron) and limonite (containing approximately 60-63% iron). Thus, as limonite and magnetite tend to cancel one another, the use of an alternate conversion factor does not

appear to be justified.

(iii) Just before this report was issued, six mistakes were discovered in the figures for acid soluble iron contents of core samples. These errors have been corrected in APPENDIX C, but not in Graphs 1-6. Their presence results in slight modifications to graphs in the + 30% iron content and error range, but does not appreciably affect the major portion of graphs on which the results in this section are based.

Graph 1 (Figure S 3000) is a cumulative curve showing the frequency distribution of errors in the estimated iron content. The median point of this curve occurs at an error value of -2% (i.e. for all samples compared, the mean estimated iron content is 2% lower than the mean acid soluble iron content).

This curve can also be used to obtain reliability figures for various proportions of the total number of samples.

Thus if x = "estimated iron content"

for x + 3.4%; 50% of estimates are within ± 3.4% of acid soluble iron content.

x + 3.7%; 60% " " " " ± 4.7% " " " " "

x + 4.2%; 70% " " " " ± 6.7% " " " " "

x + 4.5%; 80% " " " " ± 9.6% " " " " "

x + 5.5%; 90% " " " " ± 13.3% " " " " "

In Graph 2 (Figure S 3001), the data of graph 1 are plotted as histograms. These illustrate more clearly, the dominance of small errors over large ones, (e.g. 50 out of 131 estimates are within 2% of the corresponding assay value) as well as showing that underestimates are more common than overestimates.

Graphs 3 and 4 (Figures S3002-3) illustrate the distribution of errors in estimated iron content at various iron contents (acid soluble in 3, estimated in 4).

Both these graphs show the dominance of underestimates over overestimates regardless of the grade of the sample. In addition, the contours in graph 4 suggest that overestimates are more common when the estimated iron content is higher than 20%. However, this trend is not pronounced enough to justify the use of special correction factors when considering "estimated iron content" values.

(b) Comparison of rotary core and sludge samples.

All available cores and cuttings from MR 24 and MR 25 were assayed for acid soluble iron by A.M.D.L. The following table summarises the results, and includes the estimated iron contents for comparison.

MR 24

Footage	Type of Sample	Acid soluble iron	Estimated iron content	Difference
40'-41'	Core	25.3%	20%	- 5%
50'-60'	-12 mesh	19.1	45	+ 26
"	+12 mesh	17.5	60	+ 43
60'-61'	Core	18.1	15	- 3
60'-70'	-12 mesh	21.4	60	+ 39
"	+12 mesh	18.6	30	+ 12
70'-80'	-12 mesh	17.6	60	+ 43
"	+12 mesh	16.3	30	+ 14
80'-81'	Core	16.7	10	- 7
80'-90'	- 12 mesh	17.9	50	+ 32
"	+12 mesh	16.7	30	+ 14
90'-100'	-12 mesh	18.4	50	+ 32
"	+12 mesh	20.4	30	+ 10
100'-101'	Core	14.1	7	- 7
100'-110'	-12 mesh	16.2	30	+ 14
110'-120'	-12 mesh	13.2	30	+ 17
120'-121'	Core	14.8	14	- 1
120'-130'	-12 mesh	13.8	20	+ 6
"	+12 mesh	14.3	15	+ 1
130'-140'	-12 mesh	12.5	10	- 2½
"	+12 mesh	13.0	7	- 6
140'-141'	Core	33.7	20	- 14
140'-150'	-12 mesh	13.6	20	+ 7
150'-160'	-12 mesh	15.3	7	- 8
160'-170'	-12 mesh	10.8	7	- 4
174'-179'	Diamond drill core	18.6	20	+ 1½
179'	END OF HOLE			

N.B. Core = Percussion open tube core sample

-12 mesh) = Unwashed fine and coarse rotary cuttings.
+12 mesh)

MR 25

Footage	Type of Sample	Acid soluble iron	Estimated iron content	Difference
30'-40'	-12 mesh	33.8%	60%	+ 26%
40'-50'	-12 mesh	30.0	55	+ 25
50'-60'	-12 mesh	20.5	45	+ 15
60'-61'	Core	23.6	15	- 8
70'-80'	-12 mesh	29.0	60	+ 31
"	+12 mesh	10.9	30	+ 19
80'-81'	Core	15.1	5	- 10
80'-90'	-12 mesh	24.6	50	+ 25
90'-100'	-12 mesh	16.0	50	+ 34
100'-101'	Core	12.0	0	- 12
100'-110'	-12 mesh	22.9	30	+ 7
110'-120'	-12 mesh	15.5	50	+ 35
120'-121'	Core	7.9	10	+ 2
130'-140'	-12 mesh	14.3	10	- 4
140'-141'	.Core	16.5	15	- 1½
140'-150'	-12 mesh	13.7	20	+ 7
150'-160'	-12 mesh	16.6	7	- 10
160'-161'	Core	20.0	20	0
160'-170'	-12 mesh	13.5	7	- 6½
170'-178'	-12 mesh	28.3	40	+ 12
174'-178'	Diamond drill core	10.2	15	+ 5
178'	END OF HOLE			

N.B. Core = Percussion open tube core sample.

-12 mesh) = Unwashed fine and coarse rotary cuttings.
+12 mesh)

The tabulated figures show that the acid soluble iron contents of cores and adjacent cuttings are very similar.

Thus in MR 24, from 60'-81', the average acid soluble iron content of cuttings is 18.5%, and of cores is 17.4%. From 80'-101', cuttings contain 18.3% acid soluble iron while cores contain 15.4%.

Hence, despite the fact that unwashed cuttings contain a certain amount of drilling mud, their assay results seem to give a reasonably true picture of the grade of material intersected.

The difference between the acid soluble iron contents of equivalent plus and minus 12 mesh fractions is slight, the coarser fraction generally containing less iron.

In contrast to the assay results, the estimated iron contents of adjacent cores and cuttings show very little agreement.

Since the estimated iron content of cuttings is determined from clay free samples, the errors must be introduced during washing.

The principal iron bearing minerals, magnetite and martite, usually occur as crystals less than 1/50" diameter. During washing of the samples these crystals will readily pass through a 16 mesh sieve with the clay fraction, unless present in composite fragments, thus tending to reduce the iron oxide content of washed cuttings.

In general however, this trend is strongly outweighed by the fact that many samples contain up to 90% clay (as distinct from drilling mud). When this is removed, an initial iron content of 5% becomes 50% in the washed sample.

Bearing in mind the rate at which samples must be logged, and the fact that sample preparation and logging are carried out by different people, there does not seem to be any way of increasing the quantitative accuracy of cutting estimates. In particular, it should be noted that unskilled labour was used for sample preparation.

The chief value of these samples is to provide qualitative information (e.g. appearance of different minerals) on the sequences between core samples.

The detailed logging of rotary cuttings does not appear to be justified in sequences where core samples are close together. However, in the semi-consolidated material which is too hard for percussion tube sampling and too incoherent for diamond drilling, the judicious use of composite fragments from rotary cuttings should result in a fairly reliable log, once the field geologist has become accustomed to the variety of metasediments likely to be encountered in the area.

Although the subdivision into plus and minus 12 mesh fractions does not appear to be significant from an analytical point of view, it does facilitate microscope logging. The coarse fraction contains composites and

debris from the sides of the hole, while the fine fraction contains fragments of all minerals present.

Micas are rare in cutting samples, as the flakes, with their large surface area per unit volume, are readily carried out of the settling tank by the circulating drilling mud.

(c) Grade Distribution of Samples Assayed.

Graph 5 (Figure S 3004) is a cumulative curve showing the relation between the acid soluble iron content and the number of assays containing less than a certain percentage iron.

From this graph, the mean acid soluble iron content for all samples assayed is 14.3%.

25% of the samples assayed contained						0 - 7.3%	iron
"	"	"	"	"	"	7.3 - 14.3%	"
"	"	"	"	"	"	14.3 - 21.1%	"
"	"	"	"	"	"	21.1 - 47.3%	"

Only 8% of samples contained more than 30% iron.

The graph is virtually a straight line in the 0-25% iron range, showing a uniform grade distribution for 85% of the samples. At higher grades, however the number of occurrences falls off very rapidly.

Graphs 6A and 6B (Figure S 3005) present the same data as Graph 5, but in the form of 1% and 3% grouping histograms. Graphs 6C and 6D are similar, but the groups are based on estimated iron content, instead of acid soluble iron.

Although the assays do not show a marked concentration at any particular grade, there are two quite well defined groupings. These are 0-9% and 12-25 (approx.) % iron. In addition, the 1% groupings show some concentration in the 0-9%, 10-16% and possibly 19 or 20-23% ranges.

Additional assays are necessary to show whether these are natural and significant groupings or whether the gaps have simply resulted from a statistically inadequate number of determinations (as the cumulative curve seems to indicate).

6. DETAILED GEOLOGY

(a) Geology Determined from Surface Exposures

The dominant topographical feature of the Warrambee area is the sand dune system. The dunes may be as much as several miles long, 200-300 feet wide and 30 feet high. They are covered in fairly thick scrub and do not tend to migrate unless cleared of vegetation. The average trend of the system is about 120°. Dunes consist of virtually pure, rounded, well sorted, medium to fine grained quartz sand.

West of the 61000E line, the main anomaly coincides with a series of low hills (less than 200 feet high). Drilling has shown these to be basement highs, but the only unusual surface features are scattered hard black manganiferous nodules around 57000N 44000E and 56000N 58000E.

The interdunal areas are characterised by clayey soils grading to clay pans in the lowest areas. Drainage is internal, and the water table fluctuates about the clay pan level during the year.

Most of these clay pans consist of red-brown or black foetid clays, but in rare cases, they contain silicified areas (which form pseudo-outcrops of desert sandstone type material).

Limonitic quartz sandstone (fine grained quartz sand in limonite matrix) occurs at 10 localities adjacent to clay pans. Each of these localities overlies iron formation, or coincides with a "peak" in the aeromagnetic anomaly. However, as Johns (Geological Survey Bulletin 37) reports laterites south-east of Warrambee, it would be unwise to use these occurrences as criteria for iron formation beyond the area covered by the anomaly without first examining their mode of occurrence.

Surface limonite float in the area around 58000N, 67000E, contains bands of relict martite crystals. This martite is the only surface material in the area which can definitely be related to the underlying bedrock.

(b) Geology Determined from Drill Hole Intersections

(i) Overburden

Kunkar is essentially a sub-surface feature (usually being covered by 1-4 ft. of sandy soil), but as a result of deflation it is exposed at the surface in many areas.

In well drained areas it generally forms a compact continuous sheet 1 ft. to 15 ft. thick, with a clearly defined upper surface and a diffuse lower surface (e.g. overlying the basement highs in Secs. 12 and 24, Bd. Warramboo). These areas are usually more than 20'-25' above the water table.

Friable and nodular variants are most common over thick porous overburden sequences or near the water table.

The kunkar is usually off-white to light brown in colour, but contains dark bands in some areas (due to manganiferous oxides over parts of the anomaly, and organic material (?) elsewhere).

It is frequently underlain by limonite (usually associated with cherty silica), in the more elevated areas.

This limonite is usually dispersed or nodular in form, but where it directly overlies iron formation, it tends to occur as an extremely hard and compact layer.

East of 66000E, drill holes to the north and south of the anomaly intersected very impure gypsum (possibly averaging 30%) ranging from 2 ft. to 16 ft. and averaging about 9 ft. in thickness. The gypsum bearing material is usually covered by less than 4 feet of soil.

The gypsum grades from scattered crystals near the surface to thin bands (less than 6 inches thick) of impure rock gypsum, interbedded with sandy clay, near the base.

Apart from forming the sand dunes, pure quartz sand is a common sub-surface material. It is the dominant constituent of sequences up to 90' thick (e.g. WR 5) in the area south of the anomaly between 64000E and 67000E. This area may be an old valley filled with wind blown sands, or it may be an infilled lake. The sand is usually unconsolidated, but occasional thin bands have been cemented by precipitated silica to form very hard and resistant orthoquartzites. The grain size is usually 1/50" - 1/100" (i.e. about 1/2 - 1/8 mm, or medium to fine grained sand on the Wentworth scale).

The only material commonly associated with the pure quartz sands is light grey to grey, homogeneous, structureless clay.

In a number of drill holes, red-brown and yellow-brown, mottled, laminated and banded clays were intersected. These clays form sequences less

than 25 feet thick, which closely resemble the Pleistocene clays along the coast south of Adelaide (e.g. Hallet's Cove).

(ii) Bedrock

The degree of metamorphism, absence of fossils and regional geological history all suggest that bedrock is of Archaean age.

In most samples, despite a certain amount of mobilization, bedding is obvious and well preserved. The identification of rounded zircons in a number of petrologically examined specimens confirms the sedimentary origin of this material.

The minerals identified in bedrock samples tend to occur in three fairly well defined groups. These groups have characteristic grain size limits and tend to differ texturally. They are:

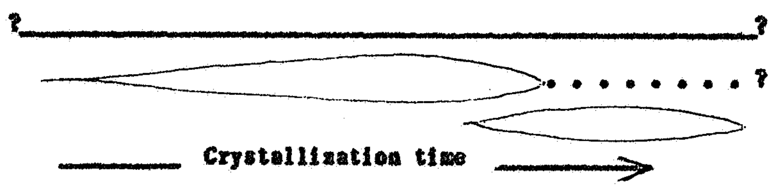
	Group 1	Group 2	Group 3
Mineral species	quartz grey felspar yellow-orange garnet magnetite-martite biotite tremolite Rare epidote sillimanite pyrite sphene	Quartz orthoclase calcite epidote hornblende Rare sillimanite tourmaline red-brown garnet tremolite Very rare muscovite Group 1 minerals	epidote calcite quartz-orthoclase tourmaline Rare hornblende muscovite magnetite
Usual grain size	1/250" - 1/50"	1/20" - 1"	up to 2"
Texture	Hypidiomorphic, minerals concentrated in original sedimentary bands.	Granoblastic to allotriomorphic, usually discordant masses, but concordant aggregates also common.	Allotriomorphic to pegmatitic or veined. Veins usually contain less than three minerals.
Possible source volume of parent material	Within 1"	Within 3'	Mobile constituents may have migrated through distances of the order of 3' - 1 mile

Relative period of formation

Group 1

Group 2

Group 3 (particularly discordant quartz-orthoclase)



Most of the minerals present in the metasediments are characteristic of the sillimanite-almandine sub-facies of the almandine-amphibolite facies

However, the partial alteration of biotite to chlorite, and of hornblende to epidote and actinolite suggests that some retrograde metamorphism has taken place.

This sub-facies is characterised by the occurrence of perimagmatic processes. Thus, at Warramboo, the development of metasomatic quartz-orthoclase masses has produced effects ranging from slight deformation of bedding, through ptygmatic folding to complete destruction of bedding (giving igneous looking granites and pegmatites in a few cases).

Iron formation has been intersected in the majority of "on anomaly" holes.

The two dominant mineral associations are quartz-felspar-magnetite-biotite, and garnet-magnetite with lesser quartz-biotite-sillimanite-felspar. In the former association, the proportions of biotite and magnetite tend to vary inversely, resulting in all variants from granitic metasediment ("granite") to itabirite.

(c) Weathering Profile

Figure S 3006 is a generalised and somewhat idealised profile through the material above fresh bedrock. Seven distinct zones have been recognised to date. They are:

(1) Kunkar layer. Mentioned in section on "Overburden".

(2, 3) Zones of limonite and silica impregnation. These have been mentioned earlier ("Overburden"). They are generally closely associated.

Clay formed by the breakdown of bedrock minerals changes in appearance from the surface to fresh rock. Although the change is gradational, it is possible to recognise:

(4) Structureless clay near the surface. This is homogeneous in appearance, and the only clue to its origin is the presence of relict beds containing varying amounts of martite.

(5) Flaky clay at greater depths. Some of the clay in this zone is pseudomorphic after expanded micas, so that its origin is obvious. Most, however, has probably developed from felspars, whose crystal shape is not well

preserved by the naturally flaky clay minerals.

(6) Fine grained pyrite was intersected below the water table in many holes The pyrite crystals were generally less than 1/1000" diameter but ranged up to 1/20" pyritohedrons in rare cases. The crystals were usually dispersed but nodules up to 3/4" diameter were obtained from several holes, and in one sample, the pyrite had cemented a wind blown sand to form an irregularly lithified pyritic quartz sandstone.

(7) Calcareous nodules characterise the deepest recognisable zone. The nodules are compact and frequently occur to within a few feet of fresh bedrock. They are usually 1/50" - 1/20" diameter, but range up to 3/4" in rare cases. The larger ones have produced considerable bedding distortion, as well as incorporating magnetite and martite from the pre-existing rock.

The order of appearance of the most common minerals is shown on the right hand side of the profile (Figure S 3006). The principal systematic exceptions are:

(i) In cases where the pyrite zone is deeper than usual, garnet invariably appears before biotite, and in two cases, it appeared before any primary mineral except quartz. In addition, epidote is rare and sillimanite is invariably absent from the pyrite zone when it extends to their normal depth of occurrence.

(ii) In cases where the zone of calcareous nodules is slightly deeper than usual, sillimanite appears before epidote.

(d) Structural Geology

Although mobilisation has resulted in deformation and even destruction of bedding in some sequences, the majority of bedding planes intersected showed a dip of 30^{0}-60^{0}.

There is no direct evidence available at present, to indicate the direction of dip. Palaeomagnetic studies (in progress) may elucidate the problem.

Indirect evidence suggests a southerly dip. The main evidence being

(i) The manganiferous float around 56000N 58000E is on the north edge of anomalous material (i.e. at the projected position of outcrop of a south dipping sequence).

(ii) WD 1 (67000E) (on the north edge of an anomaly-producing iron rich sequence) passed out of continuous iron formation at 116°, whereas WD 2 (58000E) (on the south edge of the same sequence, 9000' east) did not pass out of iron formation until 886°.

7. CONCLUSIONS

(a) The initial drilling programme at Warramboo has shown that with suitable equipment and adequate supervision, drill hole samples of a high standard can be obtained at a relatively low cost.

(b) For fast, detailed reconnaissance drilling, the Failing WW 1 has proved outstanding. This plant will be even better when the diamond drilling technique is perfected.

(c) The Gemcodrill, used with hollow flights and bottom sampling devices, should be successful as a fill-in drill supplementing the WW 1. However, the factors causing mechanical breakdowns in hard material at shallow depth must be identified and eliminated.

(d) Sampling and logging techniques for the conditions and rock types encountered have achieved a high degree of efficiency. More detailed logging is not feasible unless the field staff is increased or more sophisticated equipment is used. Similarly, any marked increase in drilling efficiency will make the field geologist's task very difficult.

If the drilling schedule is arranged so that no more than two drills are operating at one time, the geologist will be able to prepare complete logs without causing a bottleneck in the exploration programme.

(e) Detailed logs of rotary cuttings are unnecessary and to some extent misleading in sequences where adequate core samples are available.

Where core samples cannot be obtained, detailed cutting logs provide the only geological information (over considerable sequences in some cases). If the limitations of these logs are kept in mind, they should be adequate for profile construction, etc.

The accuracy of cutting logs is generally influenced more by the personal bias of the geologist than is the accuracy of core logs. Consequently, experience in microscope logging is important if meaningful cutting logs are to be obtained.

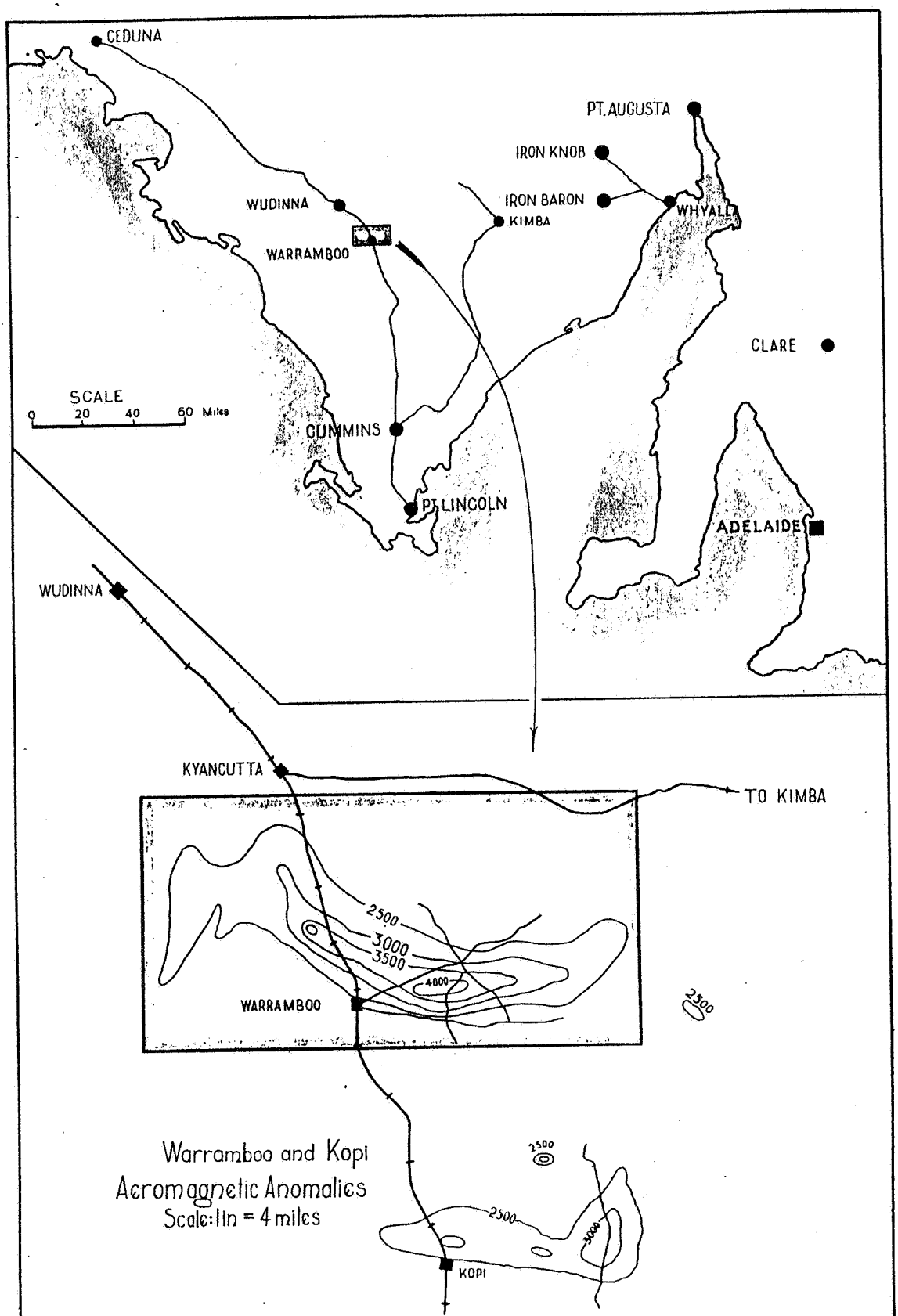
(f) Comparison of assay results for core samples with field logs shows a close correlation. This justifies the rather quantitative logging techniques used during the investigation.

(g) Assays to date show an average iron content of 14.3% (Graph 5), this is equivalent to an iron oxide content of about 20%. Since the iron oxide in fresh rock is mainly magnetite in the 1/250" - 1/50" grain size range, the iron is particularly amenable to magnetic concentration.

(h) The success of the programme to date suggests that a future pattern of exploration based on the systematic application of techniques described in this report, has the greatest chance of discovering economically exploitable ore bodies.

G. R. Heath
Geologist
IRON SECTION

GRH:AGK
1/2/62



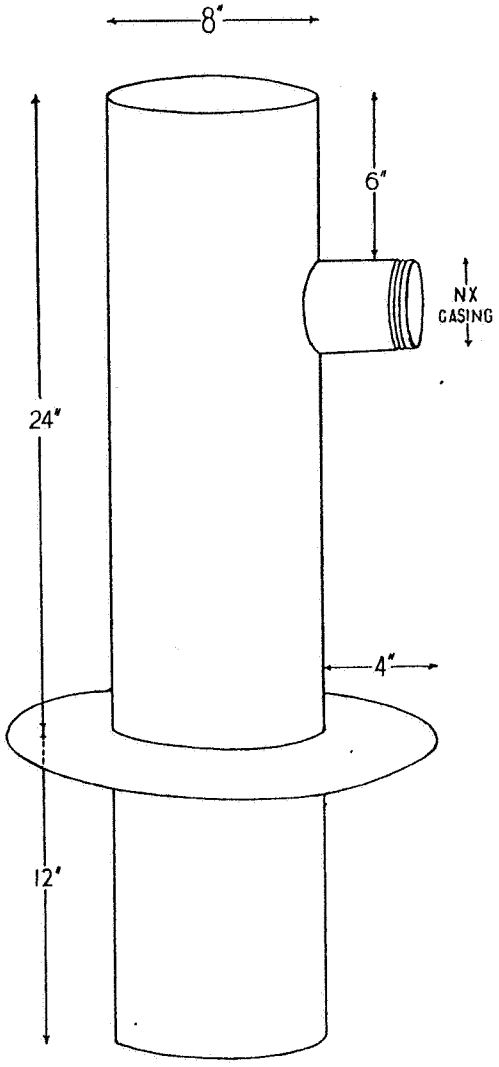
Warramboo and Kopi
Aeromagnetic Anomalies
Scale: 1in = 4 miles

To accompany report by G.R. Heath

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn. G.R.H.	WARRAMBOO AEROMAGNETIC ANOMALY	D.M.	Scale As shown
		Tcd. G.M.		Req.	S 2999
		Ckd. R.R.	LOCALITY PLAN		Dn+1
Director		Exd.			Date 5·1·62

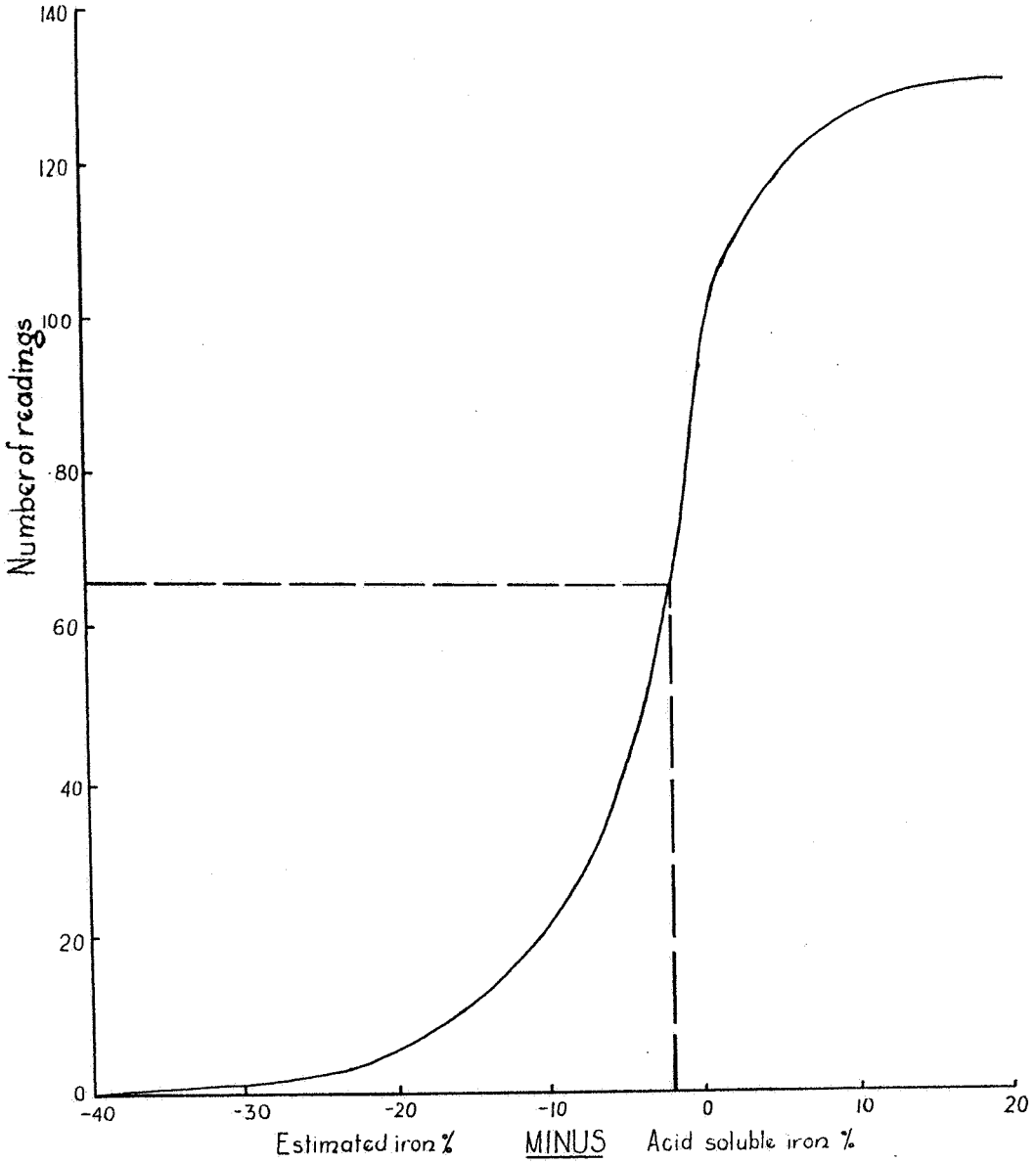
200—2·61 3805



To accompany report by G.R.Heath

S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn.	WARRAMBOO ANOMALY	D.M.	Scale —
		Tcd. G.M.	Collar fitting for rotary drill holes	Req.	S 3008
		Ckd. R.R.			Dh 13
Director		Exd.	(After M.Obst & G.Whitten)		Date 2·2·62

GRAPH 1

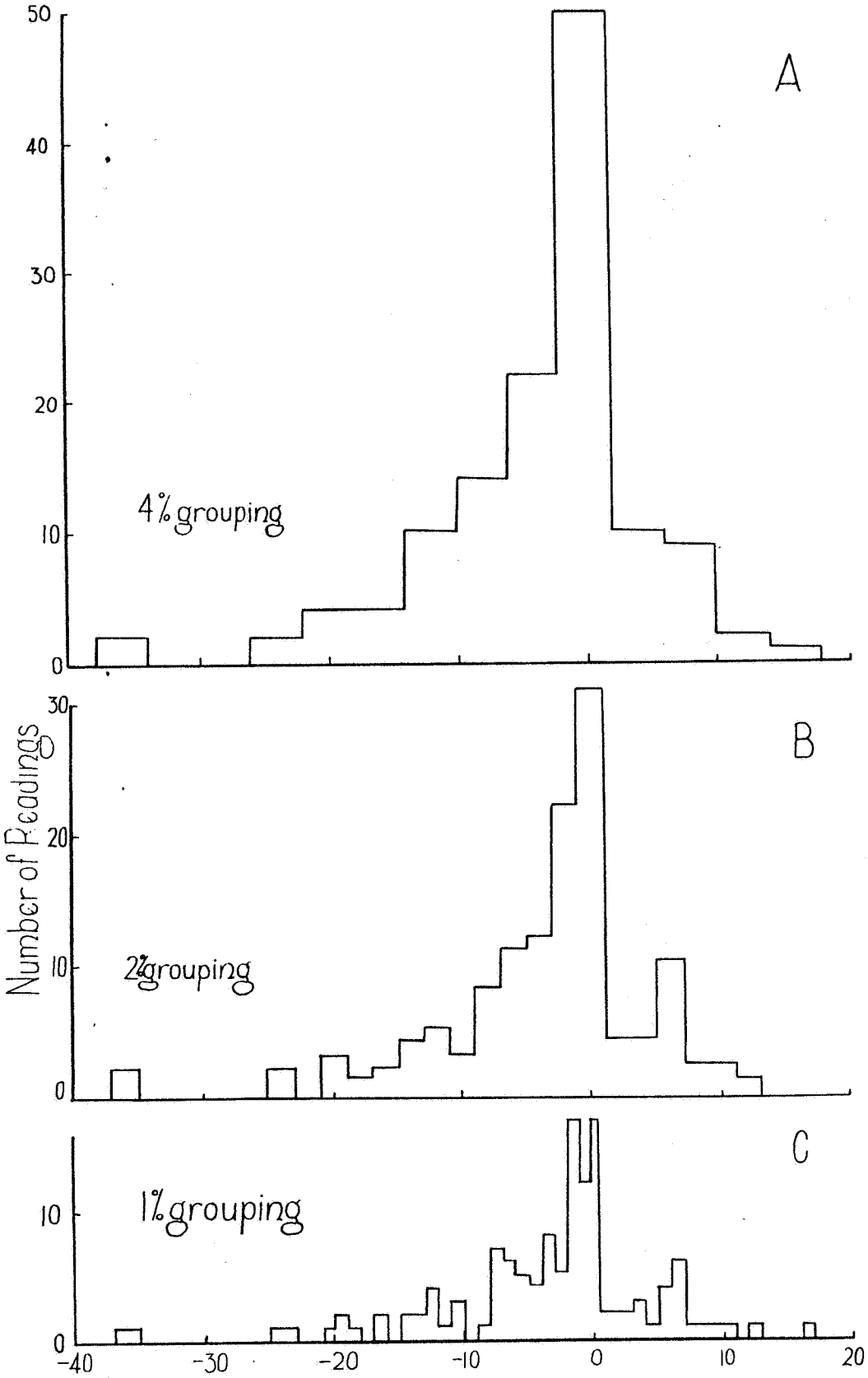


WR1–31 cores

To accompany report by G.R.Heath

S.A. DEPARTMENT OF MINES					
Approved Director	Passed	Drn. Tcd. G.M. Ckd. R.R Exd.	WARRAMBOO ANOMALY Frequency distribution of errors in estimated iron content Cumulative curve of readings	D.M. Req.	Scale S 3000 Dh13 Date 30·1·62

GRAPH 2



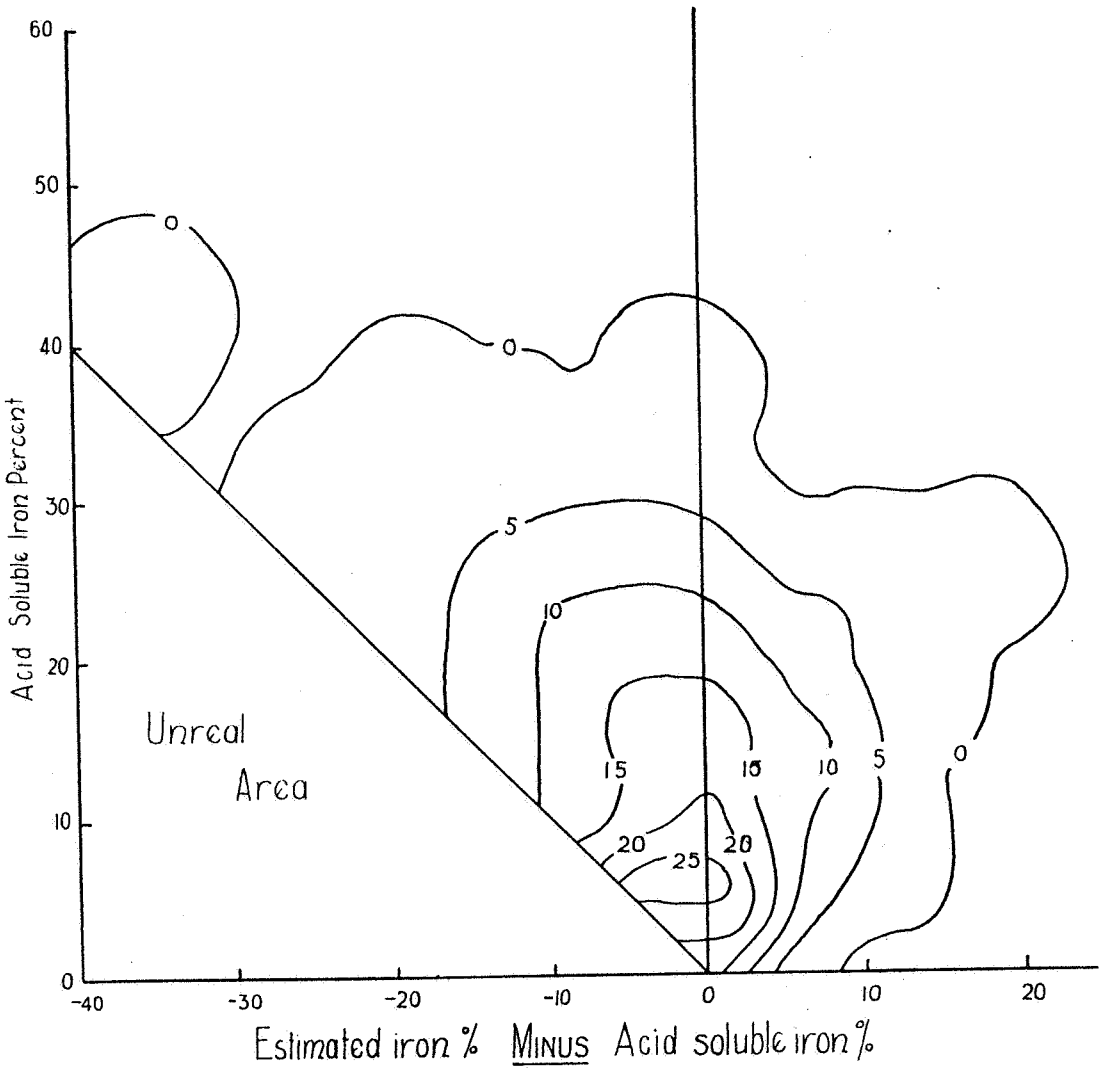
WR 1– 31 CORES

TO ACCOMPANY REPORT BY G.R.HEATH

S.A. DEPARTMENT OF MINES

Approved	Passed	Drn.	WARRAMBOO ANOMALY	D.M.	Scale
Director		Tcd. G.M. Ckd. R.R. Exd.	Frequency distributions of errors in estimated iron contents Histograms at 1,2,4% groupings	Reg.	S 3001 Dh 13 Date 30·1621

GRAPH 3



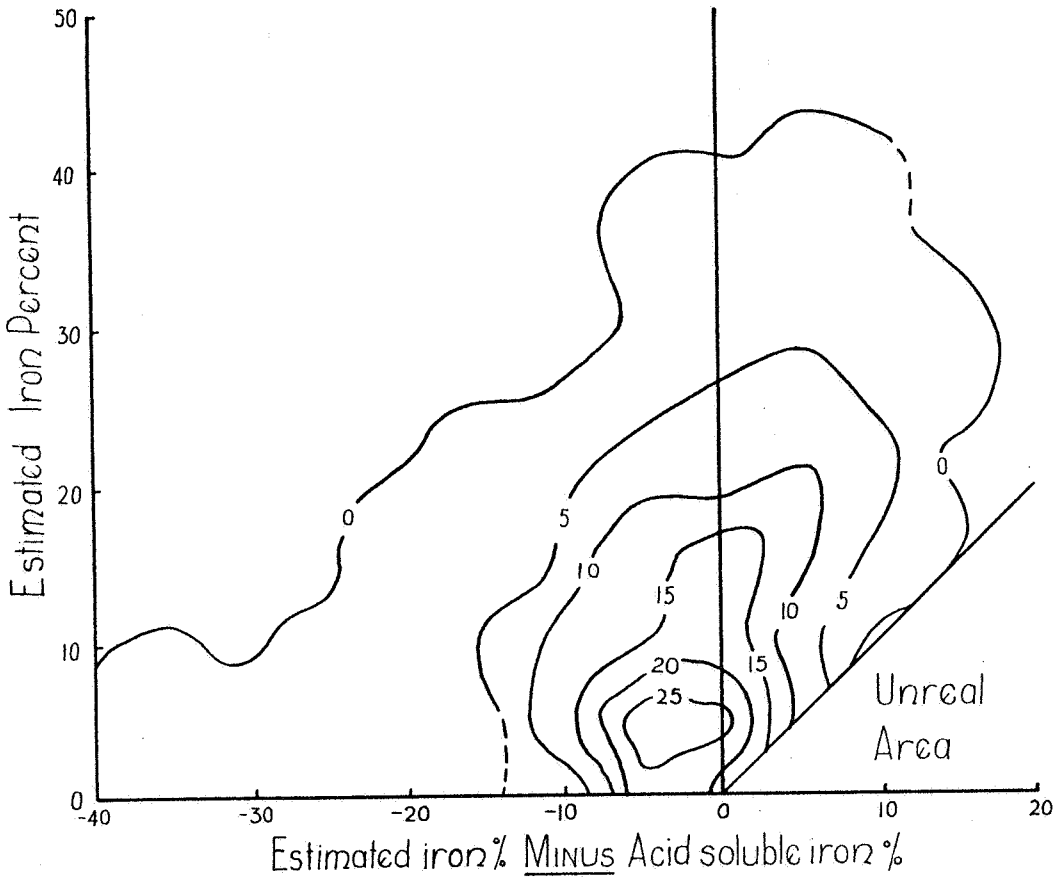
Contours at 0,5,10,15,20,25 percent of readings per square inch

WR1—31 cores

To accompany report by GR Heath

S.A. DEPARTMENT OF MINES					
Approved Director	Passed	Drn. Tcd. G.M. Ckd. R.R. Exd.	WARRAMBOO ANOMALY Relation of acid soluble iron content to error in estimated iron content Based on 126 readings	D.M. Req.	Scale S3002 Dh13 Date

GRAPH 4



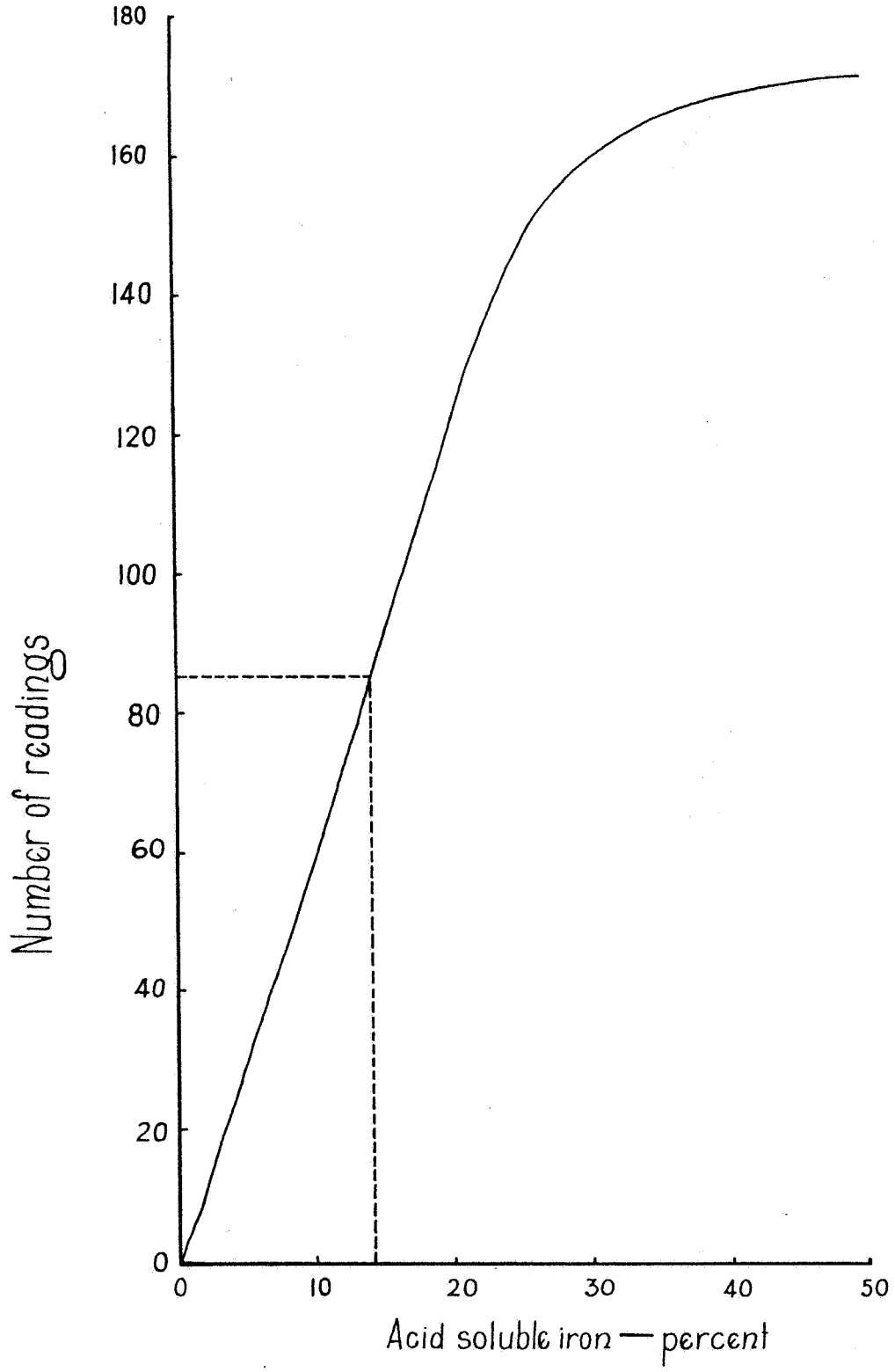
Contours at 0,5,10,15,20,25 percent of reading per square inch

WRI—31 cores

To accompany report by G.R.Heath

S.A. DEPARTMENT OF MINES					
Approved Director	Passed	Drn. Tcd. G.M. Ckd. R.R. Exd.	WARRAMBOO ANOMALY Relation of estimated iron content to error in estimated iron content. BASED ON 126 READINGS	D.M. Req.	Scale S 3003 Dh13 Date 30·1·62

GRAPH 5

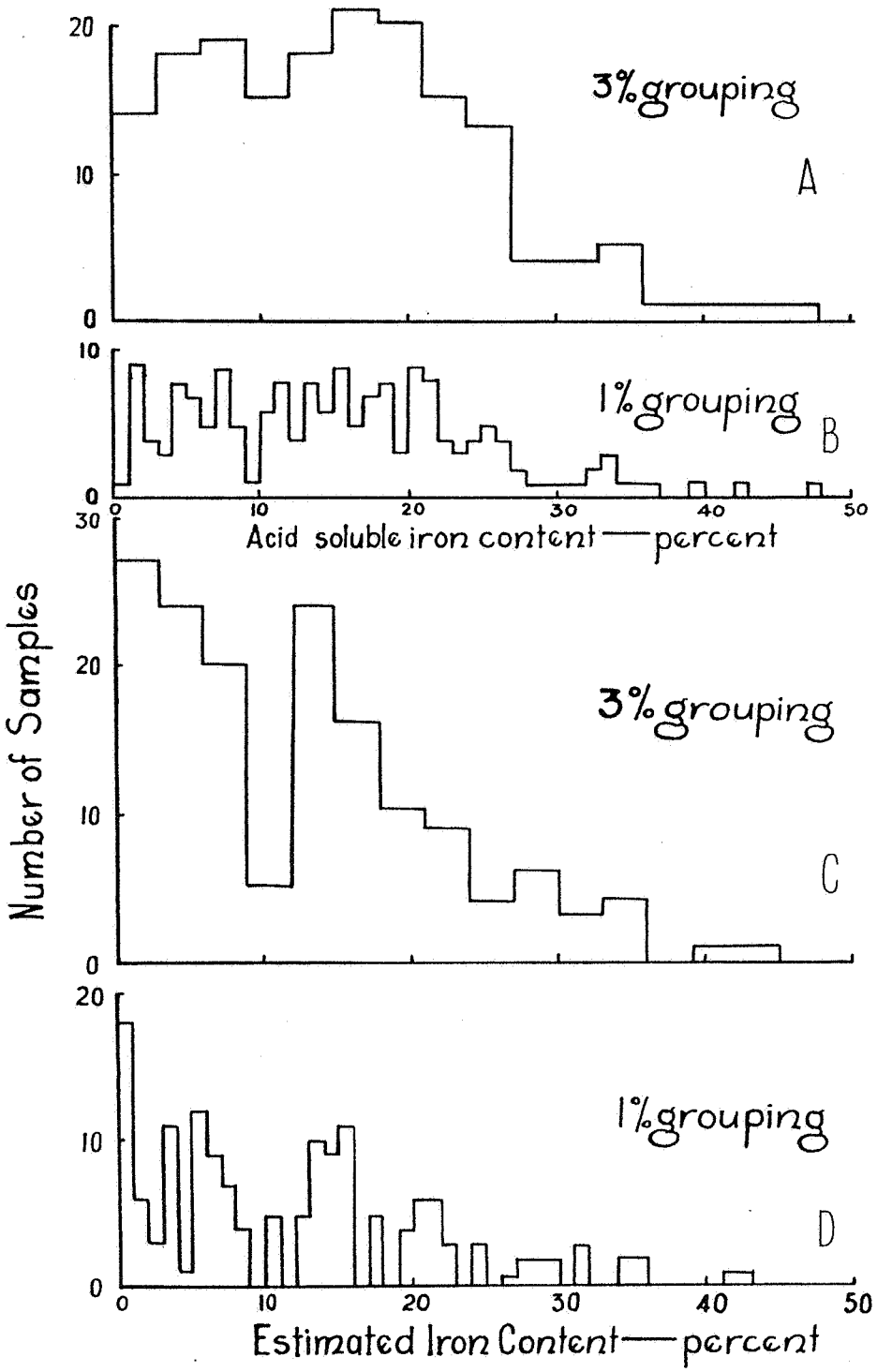


WR1—31 cores

To accompany report by G.R.Heath

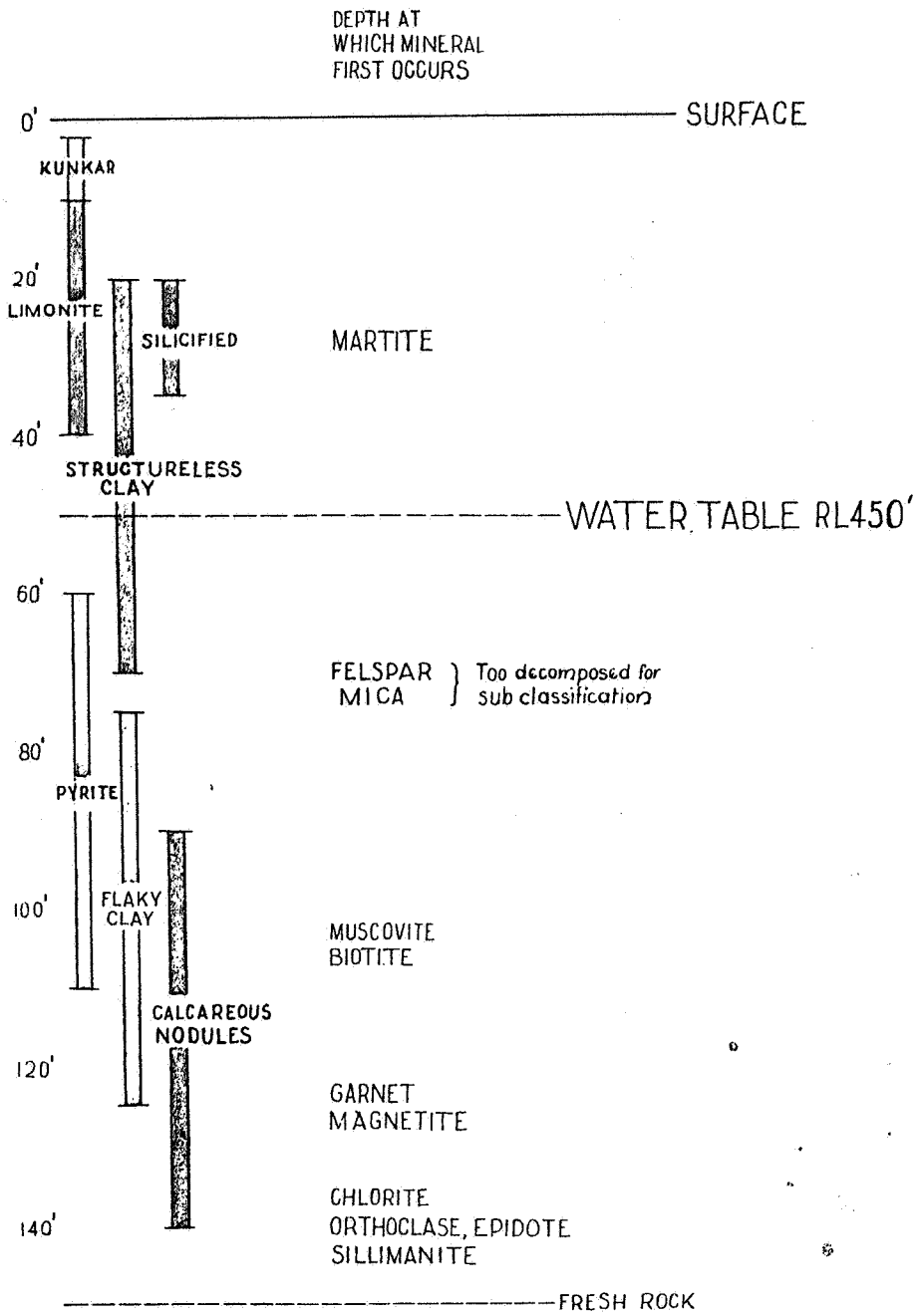
S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn.	WARRAMBOO ANOMALY	D.M.	Scale
		Tcd. G.M.	Frequency distribution of assays for acid soluble iron	Req.	S 3004
		Ckd. R.A.			Dh13
Director		Exd.	Cumulative Curve		Date 30·1·62

GRAPH 6



WRI—31 cores and cuttings To accompany report by G.A.Heath

S.A. DEPARTMENT OF MINES					
Approved	Passed	Drn.	WARRAMBOO ANOMALY	D.M.	Scale
		Tcd. G.M.	Frequency distribution of samples with respect to iron content.	Req.	S 3005
		Ckd. K.A.			Dh 13
Director		Exd.	Histograms at 1&3% groupings		Date 30·1·62.



To accompany report by G.R. Heath

S.A. DEPARTMENT OF MINES					
Approved Director	Passed	Drn. Tcd. G.M. Ckd. R.R Exd.	WARRAMBOO ANOMALY Generalised and somewhat idealised weathering profile.	D.M. Req.	Scale 20'vert. to 1" S 3006 Dh 13 Date 30 1 62

TO THE DEPUTY DIRECTOR:

Report No. 2 on

SAMPLING TECHNIQUES & DRILL LOGS

for the

WARRAMBOO AEROMAGNETIC ANOMALY

MAY TO NOVEMBER 1961

Herewith the above report.

Mr. Heath has given a very detailed and complete description of field operations during the first exploration phase.

1. DRILLING

Drilling both from the cost angle and from the geological point of view was the most efficient of any similar project carried out by the Iron Exploration Section. Of the plants, the Failing WW1 rotary plant (at £1/9/7 per foot) and a F25 (E1000) Mindrill Diamond Drill (at £3/19/3) were outstanding, due partly to new plants, partly to keen drillers and partly to the full time supervision of a competent drilling overseer and a resident geologist.

2. SAMPLE LOGGING TECHNIQUES

Sample logging techniques based on those used by the Iron Ore Company of Canada and tested previously by myself in the core shed on drill samples from Western Eyre Peninsula were used in the field by Mr. Heath. They were applied carefully and after modification where necessary gave very reliable results as checked against A.M.D.L's analytical results. The description of techniques used and the discussion of logging results is a very important part of the report.

3. DISCUSSION OF LOG RESULTS

Unfortunately in comparing grades Mr. Heath compares "Volume percent as Estimated" against "Weight percent as Assayed". While his results are generally correct some modification in detail is necessary; moreover as iron minerals have an S.G. approaching twice the S.G. of country rock the modification correction is not linear.

Attached Graph S 3169 shows the S.G.'s of mixtures from pure quartz (S.G. 2.65) to pure iron oxide 5.1 (haematite 5.1, magnetite 5.2) and demonstrates how the weight percent varies to approximately twice the volume percent.

Graph S 3170 shows how the curve (z) produced by plotting estimated iron percent (based on volumes alone) against estimated iron percent (corrected for S.G.) deviates from a 45° line, the curves on the X and Y axes being the correction factors not used

by Mr. Heath. The average correction for 0-35% iron, i.e. 0-50% iron oxides, is 7-8% but the correction is not linear.

Graph S 3171 shows histograms at 1, 2 and 4% groupings for rotary holes in the groupings WR 1-10, WR 11-20, WR 21-31. While the sample population is too small for exhaustive analysis the results for Holes WR 1-10 suggest a wide range of errors with over-estimates predominating the average over-estimate being + 4%. For Holes WR 11-20, there is a decided peak at "0" (that is, zero error in estimation) although the average error is still + 1%. For Holes 21-30 the range of error is less and the average error is + 0.66%. However, there are two peaks. While the reason for this has not yet been determined it may be related to two types of "ore".

As no assay results were available while field work was in progress the results quoted show an increase in accuracy with experience.

Graph S 3172, a histogram for all holes WR1-31 shows the peak as zero error. However, there is a pronounced positive skewness, the average being + 1.5%. An inspection of this curve shows that approximately three-quarters of the estimates lie in the range of -5% +10% error and that over 40% lie between -2% and +6% error.

Graph S 3173, contouring acid soluble iron percent against errors also indicates the positive skewness.

It is thought that when volume percent versus weight percent is taken into consideration in estimating grade the skewness will be reduced and may be removed if the field officer has assay results available with which to compare his estimates.

A range of error of 15% (that is, $\pm$ 7½%) for three-quarters of estimates and of $\pm$ 4% for 40% of estimates is thought to be very satisfactory for a field estimate, without analytical checks, and possibly all that can be achieved without unnecessarily elaborate equipment. Bearing in mind that the statistical analysis of an inadequate population can do no more than indicate trends, Mr. Heath has achieved a very high standard of logging.

4. COMPARISON RESULTS OF DIFFERENT SAMPLES

Some surprising results are achieved.

Adjacent core, +12 mesh unwashed cuttings and -12 mesh unwashed cuttings gave similar assay results while visual estimates for core and washed +12 and -12 mesh cuttings show little agreement.

Where core samples are frequent detailed logging of cuttings appears unnecessary except that it does give experience on sample logging techniques which may be needed for holes where core is not obtained.

5. DETAILED GEOLOGY

Dominant mineral associations, details of weathering profile and overburden are summarised and will provide a useful background for future work.

Structure is indefinite but may be elucidated by a re-assessment of later geophysical results.

6. GENERAL

6.1 A future drilling programme should utilise a Failing WW1 and an F25 (E1000) diamond drill.

6.2 Sample logging should be carried on in the field but be confined mainly to core with only sufficient sludge logging to give experience for occasions when core is not available.

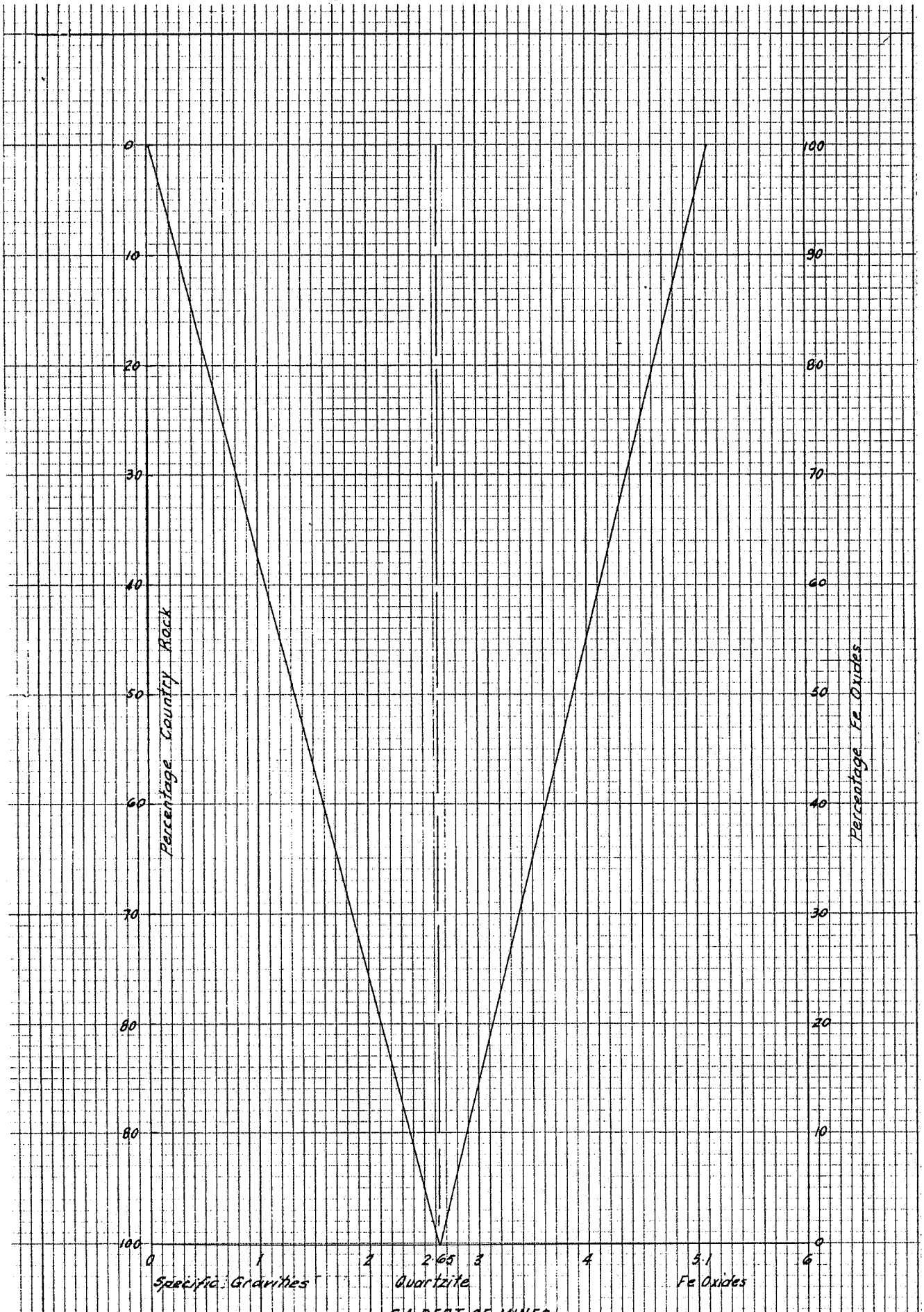
6.3 An office appraisal of geophysical results obtained since testing stopped will now be initiated.

6.4 Because this report lists the first results of an unusually detailed and, as it turns out, successful approach to drillhole logging it is suggested that this report be published in a Mining Review. If this principal be approved the report should be returned to the Senior Geologist, Iron Exploration Section for modification as outlined above.

6.5 The Appendices attached to this report are filed in DM 664B/6:

G. F. Whitten
Senior Geologist
IRON EXPLORATION SECTION

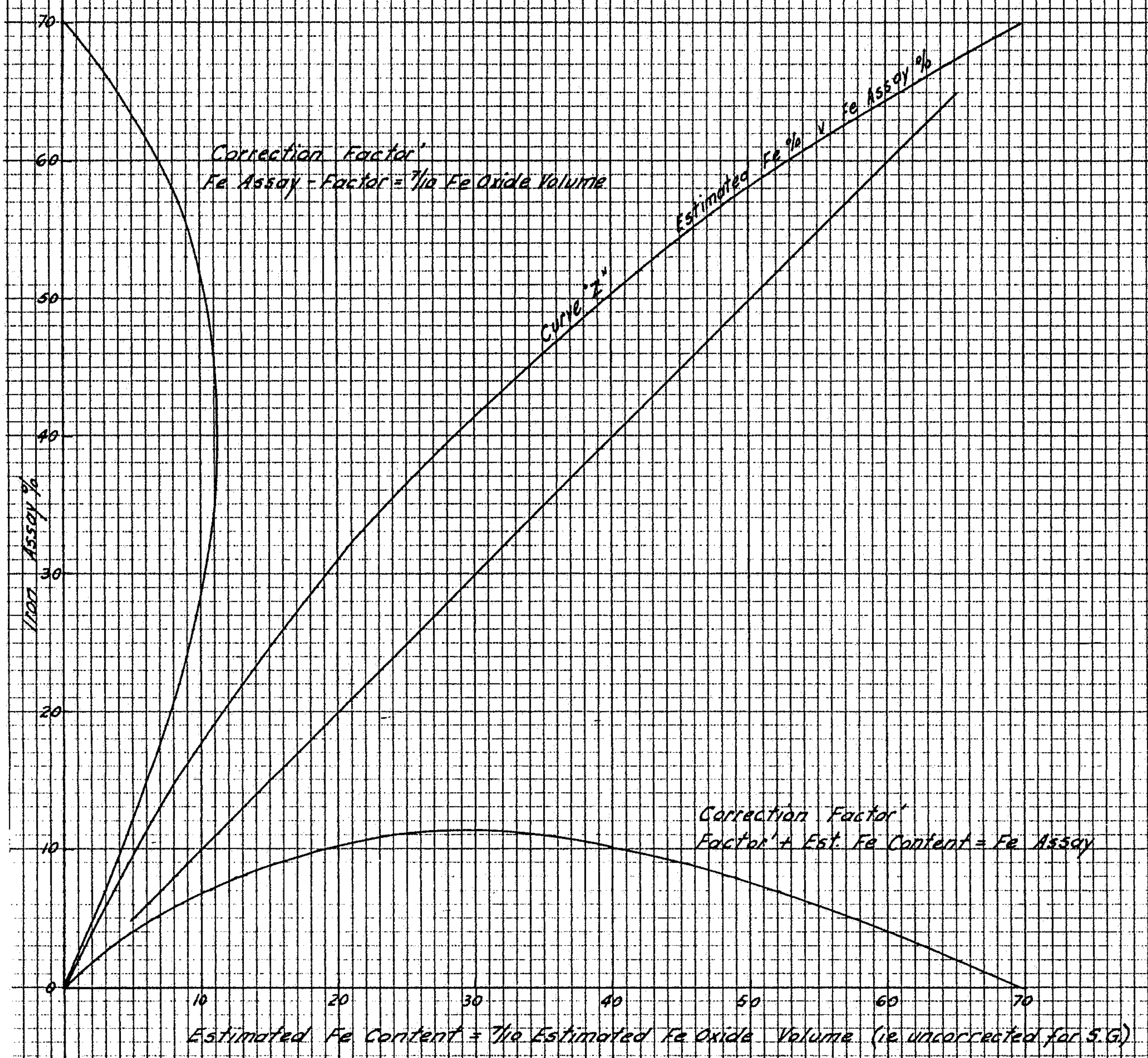
GFW:AGK
21/6/62



S.A. DEPT. OF MINES
WARRAMBOO ANOMALY
SPECIFIC GRAVITIES OF MIXED ROCKS
FROM 100% COUNTRY ROCK S.G. 2·65
TO 100% Fe OXIDE S.G. 5·1

5316.9
Dh 13
14·6·62

To accompany report by G.F. Whitten A.W.

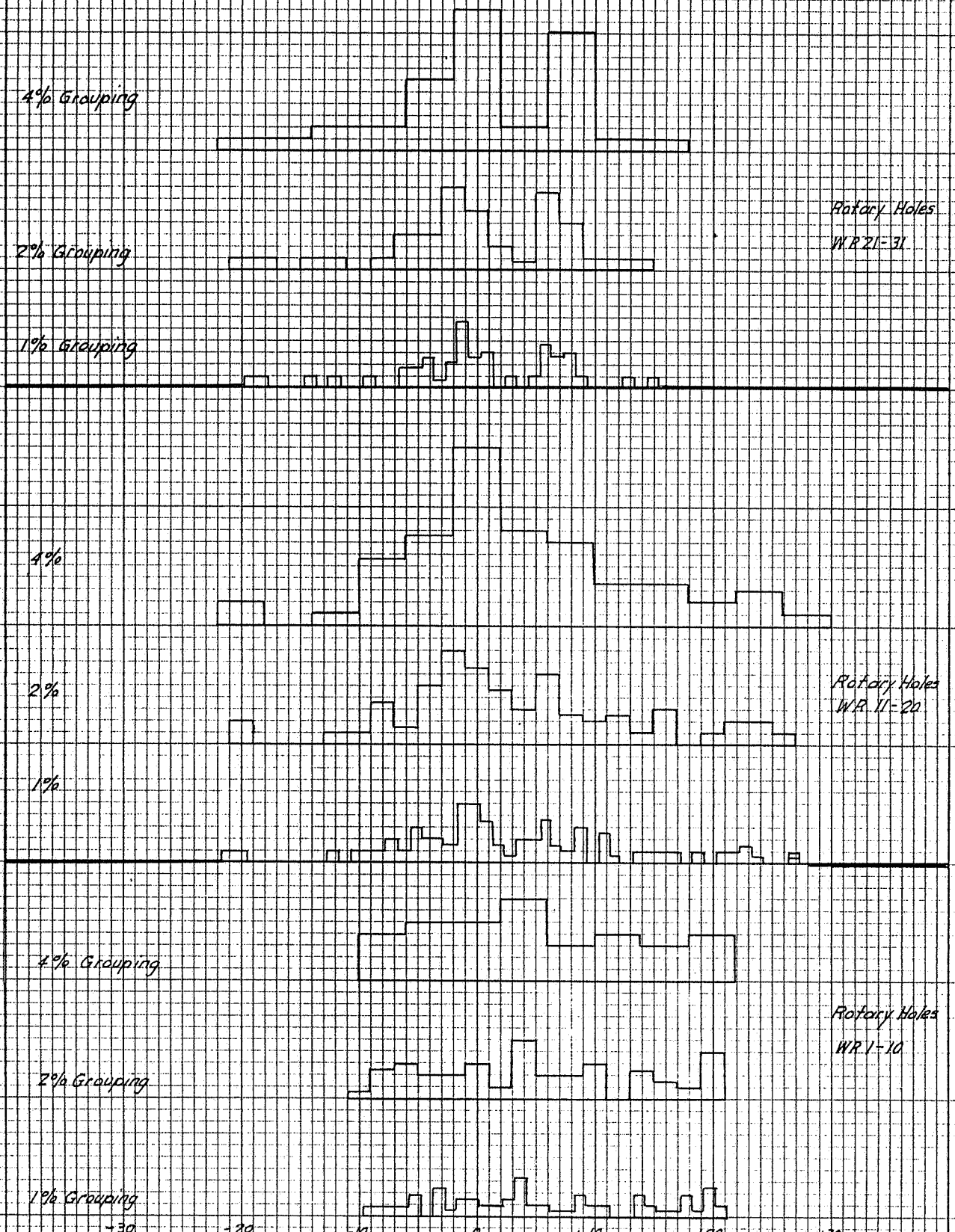


S.A. DEPT. OF MINES
WARRAMBOO ANOMALY
CORRECTION FACTORS -
ESTIMATED IRON CONTENT (ie. Vol. %)
VERSUS IRON ASSAY (ie. Wt. %)

53170
Dh13
14-6-62

To accompany report by G.F. Whitten.

A.W.



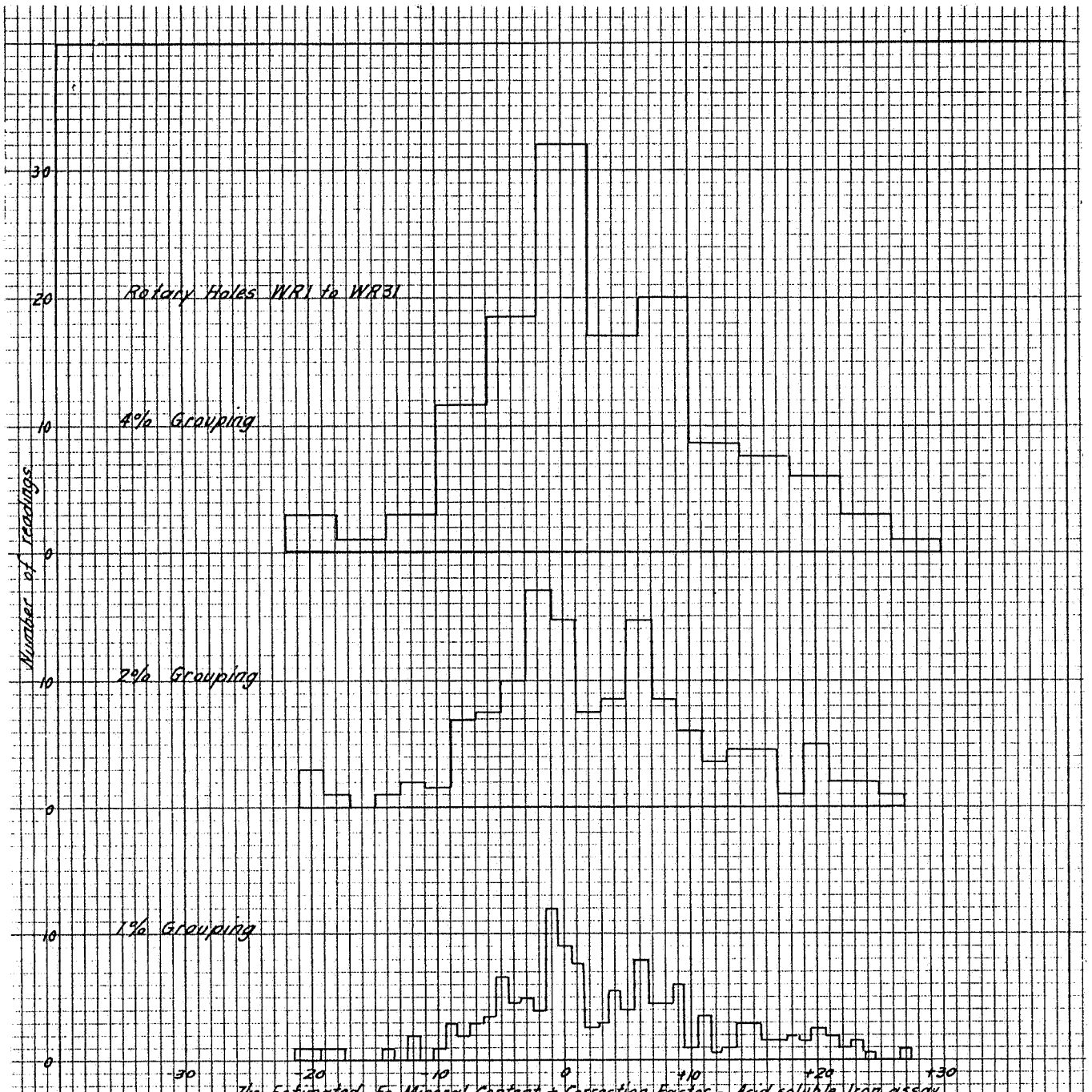
S.A. DEPT OF MINES
WARRAMBOO ANOMALY WRs 1-31
FREQUENCY DISTRIBUTION OF ERRORS IN ESTIMATED IRON CONTENT (Vol %)
ADJUSTED FOR EFFECT OF S.G. (i.e Wt %)

S3171
DH 13
14-6-67

N.B. Refer notes on drawing 53172

To accompany report by G.F. Whitten

A.W.



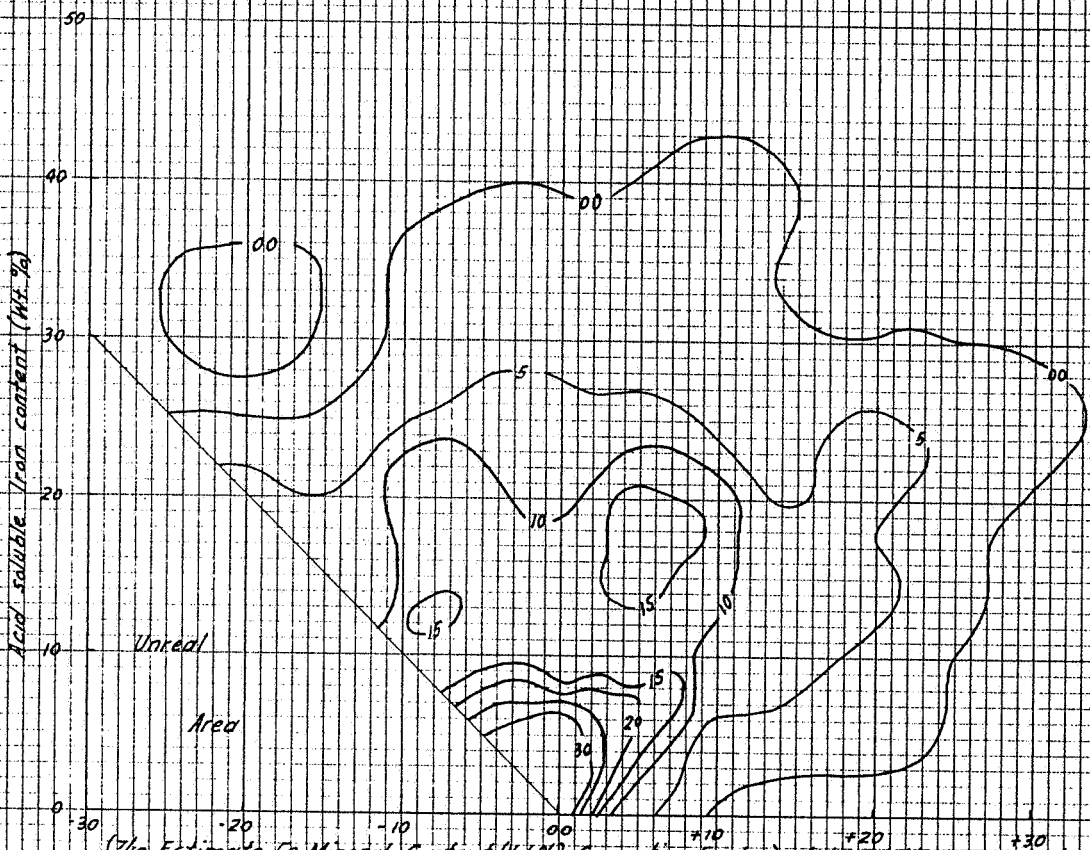
N.B.

1. Estimated Iron mineral content = Volume % from Microscopic Examination.
2. Magnetite, Martite and Hematite contain approx 70% (i.e. % by) Iron.
3. Correction Factor adjusts for S.G. of Iron minerals.
   Magnetite, Martite and Hematite average 5.1
   Quartz, Orthoclase, Albite and Anorthite, average 2.65
4. Acid soluble Iron assay (weight %) from Australian Mineral Development Laboratories.

S.A. DEPT. OF MINES
WARRAMBOO ANOMALY WR's 1-31
FREQUENCY DISTRIBUTION OF ERRORS IN ESTIMATED
IRON CONTENT (i.e Vol. %)
ADJUSTED FOR EFFECT OF S.G. (i.e Wt. %)

S3172
Dec 13
14.6.62

To accompany report by G.E. Whitten



Contours at 0, 5, 10 - 30% per sq. inch.
Read for ½ sq. inch.
W.R.I.-31 Cores

S.A. DEPT. OF MINES
WARRAMBOO ANOMALY
RELATION OF ACID SOLUBLE IRON CONTENT (Wt. %)
TO ERROR IN ESTIMATED Fe CONTENT (Vol. %) + CORRECTION FACTOR

5.3173
DF.13
14.6.62.
To accompany report by G.F. Whitten. A.W.

DEPARTMENT OF MINES
SOUTH AUSTRALIA

GEOLOGICAL SURVEY

IRON EXPLORATION SECTION

REPORT NO. 2

ON

SAMPLING TECHNIQUES & DRILL LOGS

for the

MARIANNA AEROMAGNETIC ANOMALY

CENTRAL EYRE PENINSULA

May to November, 1961

by

G. R. Heath
Geologist

PART II

Dept. Bk. No. 54/19
G.S. No. 2235
D.E. 664/61

1st February, 1962.

APPENDIX A

SPECIAL EQUIPMENT

(a) Sampling gear

Hydraulic core pusher for use with BW 1

8" casing collar fitting for rotary drill holes (see figure S 3000)

4 Heavy 12 mesh sieves, 24" x 18" x 3".

4 Settling tanks, 1/3 of 44 gallon drums (cut across axes) fitted with 4" outlet spouts.

4 Smooth surfaced rubber mats, 4' x 2', (for cone and quartering samples).

Sample bags (up to 200 per week).

(b) Preparation and storage of samples

4 Round tobacco tins with ends replaced by 16 mesh gauze (for washing + 12 mesh samples).

2 Small drink shakers for disaggregating clays in - 12 mesh samples.

1 Aladdin 2 burner pressure kerosene stove, (for drying samples).

8" x 16" steel plate (16 gauge) to fit top of kerosene stove.

12 each of 4" x 4" and 7" x 7" tin dishes for drying washed cuttings.

3 oz. glass jars for unwashed reference cutting samples (metal caps during transport, to be replaced with plastic caps for storage).

NK core boxes for storing glass jars.

3" x 1" plastic phials with caps, for storing washed cutting samples.

AX core boxes for storing plastic phials.

1" masking tape for labelling phials and jars.

Black ink pencils.

1 large knife for splitting percussion core.

(c) Logging gear

Reichert binocular microscope (no. 251,657) and accessories.

Mapping pen with 1/25" flow hole (for testing hardnesses and estimating grain size).

Leakproof container of 1:1 hydrochloric acid.

Small alnico magnet with calibrated board (to determine magnetic deflection

Transparent protractor.

2" paint brush (for d aaping diamond drill core).

Foolscap size duplicate books with spare carbon paper.

(d) Sundry equipment

2" x 2" x 42" yellow top pegs for marking drill holes.

2" x 2" galvanised tags and 3/4" galvanised clouts to attach tags to pegs.

1 Set of metal punches for marking drill hole numbers on tags.

APPENDIX B

DRILL HOLE LOGS.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA. 1

Project: Warramboo Aeromagnetic Anomaly — M.M. 664/61

Sec. 25 — Hd. Warramboo — Co. Le Hunte — Bore Ser. No. 651/61

Collar Coords 58000N, 67150E — R.L. 457.3' — Grid Warramboo

Vertical — Depth 81' — Plan Ref.

Date Bore Commenced 6.6.61 — Completed 8.6.61 — Driller S. Deane

Bore Logged by G.R. Heath — On 9.6.61 — Miner D. of M.

OBJECT: To test "lows" adjacent to magnetic and gravity "highs".

RESULT: Metasediment containing up to 5% martite intersected 12'-81'

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	6'	Dark brown very sandy loam, with abundant crystalline gypsum.
6'	12'	Light yellow-brown slightly clayey quartz sand, grain size about 1/100".
		Water Table 7'-8'.
12'	18'	Pink and white mottled fairly sandy coherent clay. 2-5% martite. Metasediment.
18'	42'	Laminated somewhat flaky yellow-brown clay, containing up to 1/10" quartz fragments and very fine black flecks (less than 1/500") of martite (5%).
42'	78'	Light grey very sticky flaky puggy clay containing a few 1/100" quartz grains, and 5% fine grained martite.
78'	81'	Dark green decomposed quartz-epidote rock, with minor biotite, and 5% fine grained martite.
81'		END OF HOLE (Auger stalls)
General:		An initial hole was drilled to 42', but when the flights were withdrawn to try coring, the hole caved in and filled to the water table (7'-8').

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. WA 2

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 58700N. 67150E	R.L. 456.4'	Grid Warramboo
Vertical	Depth 77'	Plan Ref.
Date Bore Commenced 9.6.61	Completed 9.6.61	Driller S. Donne
Bore Logged By G.R. Heath	On 9.6.61, 13.6.61	Hirer D. of M.

OBJECT: To test "lows" adjacent to gravity and magnetic "highs".

RESULT: Metasediment with accessory martite intersected from 12'-77'.

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	6'	Yellow-brown fine grained slightly clayey quartz sand, containing abundant crystalline gypsum.
6'	12'	Yellow-brown sand similar to 0'-6', but more clay and less gypsum. minor limonite.
12'	18'	Light yellow-brown very sandy somewhat flaky clay. (quartz mainly 1/50" but up to 1/10"). Metasediment.
18'	60'	Off-white to very pale, very soft flaky and sticky clay containing 30-50% angular fine quartz sand. Extremel rare martite.
60'	77'	Clay similar to 18'-60', but stiffer, more sandy and somewhat darker in colour. Colour darkens and sand increases with depth. At 77' light to medium grey. Darker colour due to some grey quartz, and a very small percentage of less than 1/500" pyrite. Contain a few garnet, epidote and felspar grains.
	77'	END OF HOLE. (Drill not powerful enough to penetrate further - even with tungsten carbide bit).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 3

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 651/61
Collar Coords 58600N, 67150E	R.L. 455.4'	Grid Warrambee
Vertical	Depth 71'	Plan Ref.
Date Bore Commenced 9.6.61	Completed 10.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 10.6.61, 13.6.61	Hirer D. of M.

OBJECT: To test flank of gravity and magnetic "highs".

RESULT: Metasediment containing less than 2% martite intersected from 12'-71'.

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	6'	Yellow-brown to brown slightly clayey fine quartz sand. Gypsum rare.
6'	12'	Yellow-brown clayey sand, clay increasing with depth. Sand almost all less than 1/50" quartz.
12'	18'	Fawn very sandy somewhat flaky clay. Contains 1 or 2% martite. Metasediment.
18'	36'	Light fawn fluid sandy flaky clay. Sand mostly less than 1/50" quartz with few black flecks.
36'	66'	Very light grey sandy fluid clay. Sand mostly less than 1/50" greyish quartz with a few black flecks (mica or iron oxides) and rare garnet grains.
66'	71'	Grey very sandy clay, coherent. Sand mainly less than 1/20", but some quartz fragments up to 1/10". Clay free sample, quartz less than 95%, garnet 1 or 2%, pyrite 1 or 2%, minor epidote and felspar.
71'		END OF HOLE (Too hard for drill to penetrate).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 4

Project: Warramboo Aeromagnetic Anomaly		D.M. 604/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 58500N, 67150E	R.L. 453.3'	Grid Warramboo
Vertical	Depth 74'	Plan Ref.
Date Bore Commenced 10.6.61	Completed 10.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 12.6.61, 13.6.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Metasediment, 2.5'-74'. Martite 5%, 66'-74'.

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	2'	Brown very sandy loam.
2'	2.5'	Off-white to pale brown kunkar, with fairly abundant fine quartz grains.
2.5'	12'	Off-white and pale fawn somewhat sandy mottled flaky clay (fine quartz sand), contains 1% fine martite. Metasediment.
12'	18'	Pale fawn sandy and somewhat micaceous mottled clay. Sand mainly less than 1/20" quartz, with minor pyrite.
18'	66'	Yellow-brown fairly sandy flaky clay, colour becoming darker towards the base. Sand predominantly less than 1/20" quartz. Martite 1 or 2%, rare garnet near the bas
66'	72'	Purple and dark grey-green sandy and micaceous clay (decomposed bedrock). Quartz and quartz-felspar about 80%, biotite 15%, martite about 5% of clay-free fraction.
72'	74'	Dark purplish-brown clay (40%) containing abundant quartz-felspar and garnet, lesser biotite and about 5% martite.
74'		END OF HOLE (Too hard for drill to penetrate).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 5

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 58400N, 67150E	R.L. 451.2'	Grid Warramboo
Vertical	Depth 46.5'	Plan Ref.
Date Bore Commenced 10.6.61	Completed 12.6.61	Driller S. Donne
Bore Logged by G. R. Heath	On 13.6.61	Hirer D. of M.

OBJECT: To test magnetic "peak" coincident with gravity "high".

Result: Metasediment containing up to 35% martite intersected from 6'-46.5'.

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	6'	Yellow-brown and occasionally red-brown very sandy clay. Sand mainly less than 1/50" quartz, with some limonite-martite in red-brown areas.
6'	12'	White and light reddish mottled slightly sandy flaky lime clay with 2-5% fine grained limonite-martite. Metasediment.
12'	18'	Slightly reddish-brown fairly sandy clay. Clay free fraction (60% of rock), 50% quartz, 50% limonite-martite (½ martite).
18'	36'	Yellow-brown sandy rather fluid sticky clay, becoming darker in colour towards the base. Clay free fraction (50% of rock), 60% quartz, 10% felspar, 30% martite.
36'	42'	Dark yellow-brown very sandy coherent clay, with some purplish areas. Clay free fraction (75% of rock), 50% quartz, 50% martite, minor felspar.
42'	46.5'	Dark purplish-brown very sandy tough flaky clay. Very tough drilling (about 1 hour with tungsten carbide bit). Clay free fraction (60% of rock) 35% quartz, 5% felspar, 60% martite.
46.5'		END OF HOLE (Auger unable to penetrate fresher bedrock).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 6.

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warramboo — Co. Le Hunte — Bore Ser.No. 651/61

Collar Coords. 5630ON, 67150W — R.L. 451.0' — Grid Warramboo

Vertical — Depth 61' — Plan Ref.

Date Bore Commenced 12.6.61 — Completed 13.6.61 — Driller S. Donne

Bore Logged by G.R. Heath — On 13.6.61 — Miner D. of M.

OBJECT: To test flank of magnetic "peak" coincident with gravity "high".

RESULT: Metasediment intersected 9'-61' (5-15% martite from 6'-54').

LOG Comprises Geological Log

From	To	Description GEOLOGICAL LOG
0	4'	Yellowish-brown very sandy clay with limonite nodules and light grey clay towards the bottom.
4'	7.5'	Abundant rubbly ironstone up to 1" diameter.
7.5'	9'	Very hard (over one hour's drilling) limonite impregnated zone.
6'	12'	Reddish-brown and light grey fairly sandy coherent flaky clay, containing about 5% martite-limonite fragments. Metasediment.
12'	36'	Reddish-brown fairly sandy fluid sticky flaky clay containing about 10-15% martite and 40% quartz.
36'	54'	Yellowish brown fairly sandy fluid sticky clay. Contains about 55" quartz, 5-10% martite.
54'	60'	Somewhat greyish yellow-brown sandy to very sandy sticky clay. Contains 50% quartz, 10% felspar with mica and rare garnet.
60'	61'	Grey very micaceous clay (decomposed schist). Hard drilling. Contains about 55% mica, 10% garnet, 5% felspar, 30% quartz with accessory iron oxides.
61'		END OF HOLE (Auger unable to penetrate fresher rock).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 7

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 58200N, 67150E	R.L. 450.8'	Grid Warrambee
Vertical	Depth 84'	Plan Ref.
Date Bore Commenced 13.6.61	Completed 14.6.61	Driller S. Donne
Bore Logged by G.H. Heath	On 14.6.61, 15.6.61	Hirer D. of M.

OBJECT: To test trough in magnetic "high" associated with gravity "high".

RESULT: Metasediment intersected 0'-84' (10-25% martite from 12'-84').

Log Comprises Macro and Microscopic geological logs.

From	To	Description GEOLOGICAL LOG
0	6'	Reddish-brown and white fairly sandy clay containing abundant limonite pebbles up to 1½" diameter. No obvious martite. Probably metasediment.
6'	12'	Yellow-brown, white and occasionally red-brown fairly sandy mottled flaky clay.
12'	18'	Yellow-brown and greyish-green fairly sandy clay. Contains 15-20% less than 1/50" martite.
18'	36'	Decomposed quartz-felspar-martite-biotite rock. Beds less than ¼", usually 1/10" thick. Grain size (except quartz-felspar) about 1/100". Martite content 10-20%.
36'	78'	Yellow-brown sandy, very fluid sticky clay. Colour changes gradually to greyish yellow-brown towards the base. Contains 15-25% martite with quartz and rare felspar and garnet crystals.
78'	84'	Purplish brown very sandy clay. Clay free fraction contains 60% quartz, 15% garnet, 15% martite, 10% biotite.
84'		END OF HOLE (Auger unable to penetrate fresher bedrock

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. A 9.

Project: Warramboo Aeromagnetic Anomaly		D.S. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 58100N, 67150E	R.L. 450.5'	Grid Warramboo
Vertical	Depth 91'	Plan Ref.
Date Bore Commenced 14.6.61	Completed 15.6.61	Driller S. Deane
Bore Logged by G.R. Heath	On 15.6.61, 21.6961	Hirer D. of M.

OBJECT: To test trough in magnetic "high" associated with gravity "high".

RESULT: Metasediment containing 5-30%, usually 10-20% martite, intersected 6'-90'.

LOG Comprises Macro and microscopic geological log

From	To	Description GEOLOGICAL LOG
0	6'	Off-white, dark brown and dark yellow-brown very sandy and somewhat limey clay.
6'	16'	Tube sample obtained with "post hole digger" bit. Off-white, red-brown and yellow-brown mottled and laminated fairly sandy clays. Limonite nodules up to 2" diameter are abundant to about 10'. Sand is mainly quartz with lesser (5%) limonite-martite. Metasediment.
16'	18'	Thinly laminated clay as 6'-16', martite (5%) tends to occur in less than 1/16" laminae.
18'	24'	Yellow-brown very sandy clay. Sand (60%) appears to be ¾, less than 1/50" quartz and ¼ martite.
24'	30'	Multicoloured laminated clay. Quartz and martite (10%) fairly abundant.
30'	72'	Red-brown changing gradually to dirty-red-brown at about 60', fluid very sticky, fairly sandy clay. Sand mainly quartz and martite. Quartz (angular) 70%, decomposed felspar 5%, martite 25%, minor garnet. Grain size about 1/100".
72'	84'	Dirty yellow brown fairly fluid clay. Sandy to very sandy Quartz (angular, 1/3 stained pink or yellow) 45%, decomposed felspar 15%, martite 40%, of clay free fraction (75% of rock).
84'	91'	Purplish brown sandy stiff micaceous clay. Quartz-felspar (decomposed) 65%, martite 15%, garnet 15%, biotite 5%, of clay free fraction (80% of rock).
91'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 9

Project:	Warramboo Aeromagnetic Anomaly		O.M. 664/61
Sec. 25	Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords	58000N, 67150E	R.L. 450.1'	Grid Warramboo
Vertical		Depth 93.7'	Plan Ref.
Date Bore Commenced	15.6.61	Completed 16.6.61	Driller S. Donne
Bore Logged by	G.R. Heath	On 21.6.61	Hirer D. of M.

OBJECT: To test gravity "peak" associated with trough in magnetic "high".

RESULT: Metasediment containing up to 30% martite intersected 12'-93.7'.

LOG Comprises Macro and microscopic geological log

From	To	Description GEOLOGICAL LOG
0	6'	Light grey clay containing up to 2" limonite fragments.
6'	12'	Light yellow-brown clay containing fairly abundant limonite grains and fragments, and quartz grains.
12'	42'	Red-brown fluid and sticky fairly to very sandy clay 36'-42'. Clay free material: 60% angular quartz, (½ iron stained), 30% martite (almost non-magnetic), 10% limonite, a few flakes of mica.
42'	84'	Greyish yellow-brown fluid sticky very sandy clay. 42'-4 clay free sample. Quartz (angular, 1/50" - 1/100", 1/3 stained pink) 50%, martite (non-magnetic) 45%, limonite 5%. Rare mica flakes.
84'	91'	Red-brown laminated very sandy clay. Clay free sample. Quartz (angular, 1/20" - 1/100", ¼ stained red and yellow) 70%, martite 30%, minor decomposed felspar (?), and limonite.
91'	92.5'	Purplish-brown to yellow-brown sandy and somewhat micaceous clay.
92.5'	93.5'	Yellow-brown (khaki) sandy and very micaceous clay. Quartz (angular, rarely stained, 1/50" - 1/25") 75%, martite (slightly magnetic) 15%, decomposed felspar (?) 5%, biotite 5%. Clay free composition.
93.5'	93.7'	Purple-brown rather structureless sandy clay. Quartz (angular, 1/25"-1/50") 60%, slightly weathered felspar 20%, martite (as 92.5'-93.5') 20%. A few mica flakes. Clay free sample.
93.7'		END OF HOLE (Due to harder drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 10

Project:	Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25	Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords	58000N, 67000E	R.L. 450.8'	Grid Warramboo
Vertical		Depth 70'	Plan Ref.
Date Bore Commenced	24.6.61	Completed 29.6.61	Driller S. Donne
Bore Logged by	G.E. Heath	On 30.6.61	Hirer D. of M.

OBJECT: To test gravity "peak" associated with trough in magnetic "high".

RESULT: Metasediment containing 15-30% martite intersected 0'-70'.

LOG Comprises Macro and microscopic geological log.

From	To	GEOLOGICAL LOG Description
0	6'	Off-white and red brown clay containing abundant limonite (and minor martite) fragments and minor quartz.
6'	54'	Red-brown to yellow-brown sandy fluid clay, colour becomes duller at depth. Clay free fraction: 18'-24', 50%, quartz (¼ iron stained), 30% limonite, 20% martite. 48'-54': quartz (angular, 1/50", 1/10 stained) 60%, martite 40%, minor limonite and decomposed felspar. Metasediment.
54'	66'	Fairly stiff sandy yellow-brown clay. Clay free fraction: 60% (angular, 1/25"-1/50", minor staining) quartz, 40% martite, minor decomposed mica and felspar.
66'	70'	Grey, yellow-brown and red-brown bedded (less than ¼" beds) very sandy stiff cohesive clay. Clay free fraction: quartz (1/50", angular, clean) 80%, martite (crystals, very slightly magnetic) 20%, minor felspar and mica (decomposed).
70'		END OF HOLE (Auger stalls due to harder drilling).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 11

PROJECT: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 57900N, 67000E	R.L. 450.1'	Grid Warrambee
Vertical	Depth 10'	Plan Ref.:
Date Bore Commenced 16.6.61	Completed 16.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 23.6.61	Miner D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: White clay containing abundant limonite (and martite) intersected from 0'-10'.

LOG Comprises: Macro and microscopic geological log

From	To	Description GEOLOGICAL LOG
0	10'	Off-white to light grey clay, containing abundant limonite pebbles and grains, and very minor quartz. Some limonite pebbles contain bands of relict martite.
	10'	END OF HOLE. Unable to penetrate hard band of limonite impregnated material (hit red-hot).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. W.A. 19

Project: Warrambee Aeromagnetic Anomaly — D.M. 604/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 651/6

Collar Coords 5710ON. 67000E — R.L. 453.2' — Grid Warrambee

Vertical — Depth 114' — Plan Ref.

Date Bore commenced 19.6.61 — Completed 20.6.61 — Driller S. Doane

Bore Logged by G.B. Heath — On 23.6.61, 26.6.61 — Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Light grey clay overlain by quartz sand intersected from 102-114'

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Red-brown to yellow brown slightly clayey Sand. Abundant gypsum, minor quartz.
6'	12'	Red-brown very fine grained somewhat clayey quartz-gypsum sandstone.
12'	18'	Light red-brown somewhat clayey fine sand.
18'	24'	Very light grey slightly sandy cohesive homogeneous clay.
24'	66'	Light yellowish brown, becoming greyish with depth, somewhat clayey sand. Fluid. Clay free fraction: virtually pure, poorly sorted, 1/300" - 1/10", usually 1/50" - 1/100", quartz sand, with extremely rare martite and pyrite grains.
66'	102'	Light grey fairly fluid, fairly clayey sand. Clay free fraction virtually pure angular quartz (mainly 1/50", but up to ¼" diameter) with less than 1% pyrite (becomin slightly more abundant near the base) and very rare martite grains.
102'	114'	Light grey, fairly stiff and cohesive, very sandy clay. Clay free fraction 98% quartz (angular, up to ¼", usually 1/20-1/50", very poor sorting), 1 or 2% very fine grained pyrite (up to ¼" fragments).
114'		END OF HOLE - limit of flights.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 20

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 661/61
Collar Coords 57000N, 67000E	R.L. 454.1'	Grid Warramboo
Vertical	Depth 108'	Plan Ref.
Date Bore Commenced 18.6.61	Completed 18.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 23.6.61, 26.6.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Light grey clay (decomposed metasediment ?) overlain by quartz sand intersected from 60' - 108'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	6'	Yellow-brown to red-brown somewhat clayey sand. Abundant gypsum, minor quartz.
6'	12'	Red-brown very sandy clay, containing abundant gypsum and minor quartz.
12'	60'	Light yellowish brown somewhat clayey sand, becoming grey towards the base. Fluid. Clay free fraction: Quartz (mean grain size about 1/100", angular to sub-angular, fairly well sorted, a few stained grains near the top) 99%, minor white decomposed felspar and less than 1/200 martite grains, a few limonite grains near the top.
60'	96'	Light grey very sandy somewhat fluid clay. Clay increase with depth. Clay free fraction: quartz (angular, poorl sorted, about 1/50") 99%, minor pyrite and decomposed felspar, very rare martite, epidote, biotite and garnet flakes.
96'	108'	Light grey, homogeneous, stiff, cohesive, very sandy clay Clay free fraction: quartz (Mainly angular, 1/30" - 1/100") 99%, small off-white decomposed felspar grains possibly 1%, a few pyrite grains.
108'		END OF HOLE - Auger stalls (due to drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 51

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 56900N, 67000E	R.L. 453.7'	Grid Warramboo
Vertical	Depth 90'	Plan Ref.
Date Bore commenced 17.6.61	Completed 17.6.61	Driller S. Deane
Bore Logged by G.R. Heath	On 20.6.61	Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Grey sandy clay overlain by quartz sand, intersected from 60'-90'.

LOG Comprises Macro and Microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Yellow-brown somewhat clayey sand containing abundant selenite (up to ½" crystals) and quartz.
6'	12'	Red-brown clayey sand (gypsum and quartz).
12'	18'	Light red-brown very sandy fluid clay (clayey sand). Mainly fine quartz sand.
18'	24'	Light grey somewhat sandy, very plastic clay.
M 24'	60'	Yellowish-grey slightly clayey fine grained quartz sand. (Quartz 1/100", angular) 98%, martite 1%, decomposed felspar or tremolite 1%, minor limonite.
M 60'	90'	Grey very sandy clay. Proportion of clay increases fairly sharply at about 72' and remains constant to 90'. Clay free samples: quartz 90%, (angular, grain size about 1/5 - 1/25", grains possibly greyer than 24'-60'), decomposed felspar 1%, martite (very rare pyrite) 1% (non magnetic)
90'		END OF HOLE. Auger stalls - no indication of hard drilling.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 22.

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 661/61
Collar Coords 56800N, 67000E	R.L. 453.4'	Grid Warramboo
Vertical	Depth 114'	Plan Ref.
Date Bore commenced 23.6.61	Completed 23.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 24.6.61, 26.6.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Grey clay overlain by quartz sand intersected from 90' - 114'.

LOG Comprises Macro & Microscopic geological log

From	To	Description DETAILED LOG
0	6'	Light yellow-brown and brown slightly clayey sand. Abundant gypsum. Minor quartz.
6'	12'	Red-brown and yellow-brown very sandy clay. Abundant gypsum. minor quartz.
12'	18'	Very light brown somewhat clayey fine quartz sand. Fluid.
18'	24'	Very light grey-brown somewhat clayey fluid fine quartz sand.
24'	30'	Light grey stiff sandy to very sandy clay.
30'	90'	Brown slightly clayey sand, colour becomes lighter at depth Fluid. Clay free fraction (84'-90'): quartz (mainly angular, with a few sub-rounded grains, average size 1/50" - 1/100"), more than 99%, pyrite (up to 1/20") and rare martite (1/200") less than 1%.
90'	96'	Fluid grey-brown very sandy clay. Clay free fraction: Quartz (angular to sub-rounded, 1/100", poorly sorted) more than 99%, martite (1/200") and occasional pyrite (less than 1/20") less than 1%.
96'	114'	Stiff "blue"-grey cohesive very sandy clay. Clay free fraction: quartz (mostly angular, 1/20" - 1/50", a few inclusions) 97%, white somewhat decomposed felspar 2%, pyrite 1%, minor martite.
114'		END OF HOLE. (Limit of flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 23

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords 56700N, 67000E	R.L. 453.5'	Grid Warramboo
Vertical	Depth 114'	Plan Ref.
Date Bore Commenced 23.6.61	Completed 23.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 23.6.61	Miner D. of M.

OBJECT: To test "lows" adjacent to gravity and magnetic "highs".

RESULT: Light grey sandy clay overlain by quartz sand intersected from 84'-114'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Red-brown to yellow-brown somewhat clayey sand. Abundant gypsum, minor quartz.
6'	12'	Red-brown and very light greyish-yellow clayey quartz gyps sand.
12'	84'	Very slightly to slightly clayey sand. Colour changes are gradual, but vary from: 12'-18' light greyish-pink 24'-30' very light grey 36'-42' light yellowish-grey 42'-54' brown 78'-84' greyish yellow-brown Clay free sample: Quartz (almost all angular, 1/100") more than 99%, a few less than 1/200" grains of martite and minor pyrite towards the base. A few felspar grains at about 80'.
84'	96'	Fluid light grey very sandy clay. Clay free fines: Quartz (a few grey grains, up to ¼", usually 1/50" - 1/100") 98%, white somewhat decomposed felspar 1%, grains of very fine pyrite 1%, a few martite grains.
96'	114'	Stiff grey homogeneous very sandy clay. Clay free sample Quartz (1/50" - 1/100", angular) 75%, white felspar 24%, a few very fine grained, up to ¼" pyrite fragments 1%.
114'		END OF HOLE (Limit of flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 24

Project:	Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25	Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords.	56600N, 67000E	R.L. 453.5'	Grid Warramboo
Vertical		Depth 102'	Plan Ref.
Date Bore commenced	22.6.61	Completed 22.6.61	Driller S. Donne
Bore Logged by	G.R. Heath	On 23.6.61	Hirer D. of M.

OBJECT: To test "lows" adjacent to gravity and magnetic "highs".

RESULT: Light grey sandy clay overlain by quartz sand intersected from 90' - 102'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Reddish-brown somewhat clayey sand, containing abundant gypsum and lesser quartz.
6'	12'	Very light yellow-brown 1/50" slightly clayey quartz-gypsum sand.
12'	18'	Light red-brown clayey fine quartz sand.
18'	66'	Light grey slightly clayey sand; colour gradually darkening and changing to grey-brown. Clay free fraction: Quartz (1/30" - 1/60", mainly angular) 99%, minor less than 1/200" martite, a few decomposed white felspar grains near the top, and extremely rare fine grained pyrite.
66'	90'	No cuttings returned, probably similar to 18' - 66'.
90'	102'	Light grey, stiff, very coherent, very sandy clay. Clay free fraction: Quartz (mainly 1/50" - 1/100", up to ¼", a few light grey grains) 99%, a few very fine grained (less than 1/500") pyrite fragments up to ¼" diameter.
102'		END OF HOLE. Auger stalls, (due to drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. W 15

Project: Warramboo Aeromagnetic Anomaly — **D.E.** 664/61

Sec. 25 **Hd.** Warramboo — **Co.** Le Hunte — **Bore Ser. No.** 651/61

Collar Coords. 56500N, 67000E — **R.L.** 453.5' — **Grid** Warramboo

Vertical — **Depth** 114' — **Plan Ref.**

Date Bore Commenced 21.6.61 — **Completed** 21.6.61 — **Driller** S. Deane

Bore Logged by G.B. Heath — **ON** 22, 23.6.61 — **Hirer** D. of M.

OBJECT: To test "lows" adjacent to gravity and magnetic "highs".

RESULT: Light grey clay, overlain by quartz sand, intersected from 102' - 114'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Yellow-brown slightly clayey sand, consists of gypsum and lesser quartz.
6'	16'	Clay containing abundant crystalline gypsum and minor variable quartz. Small band of rock gypsum at 9.5'. Colour: 6'-10' grey to yellow-brown; 10'-11.5' red-brown and off-white; 11.5'-14' light grey; 14'-16' red-brown and grey.
16'	24'	Grey to greyish yellow-brown slightly clayey quartz sand. Grain size about 1/100".
24'	30'	Light grey slightly sandy clay.
30'	84'	Greyish yellow-brown very slightly clayey sand. 72' - 84': clay free sample more than 99% clean angular to sub-rounded 1/50" - 1/100" quartz, with less than 1% non-magnetic martite (less than 1/200" grains).
84'	102'	No cutting return, probably sand as 30' - 84'.
102'	114'	Light grey to grey, stiff, very sandy clay. Clay free sample: 1/30" - 1/50" quartz (as 72' - 84') 80-85%, white, somewhat decomposed felspar 15%, one or 2% pyrite (up to 1/10" grains of less than 1/500" crystals) and less than 1% martite (as 72' - 84').
	114'	END OF HOLE.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 26

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 651/61
Collar Coords. 56400N, 67000E	R.L. 453.5'	Grid Warramboo
Vertical	Depth 48'	Plan Ref.
Date Bore Commenced 20.6.61	Completed 20.6.61	Driller S. Donne
Bore Logged by G.R. Heath	On 20.6.61	Hirer D. of M.

OBJECT: To test "lows" adjacent to gravity and magnetic "highs".

RESULT: Light grey sandy clay overlain by quartz sand intersected from 24' - 42'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	6'	Light yellow-brown to brown slightly clayey loam, containing abundant gypsum and quartz sand.
6'	12'	Light yellow-brown changing to brick-red clay, containing abundant crystalline gypsum and quartz sand.
N 12'	18'	Red-brown very sandy fluid clay (or clayey sand). Clay free fraction: Quartz (1/5 iron stained, generally angular, 1/80") 75%, decomposed felspar or [illegible]lite 15-20%, limonite 5-7%, rare gypsum.
18'	24'	Dull red-brown fairly clayey medium to fine grained quartz sand.
24'	30'	Light-grey very sandy clay. Coherent, but no visible structure.
N 30'	42'	Light grey, becoming darker and browner towards base, slightly clayey fluid sand. Clay free fraction 100% quartz with very rare less than 1/200" iron oxide grains. Quartz generally fairly angular, mean grain size 1/50" - 1/100" (commonly 1/10" - 1/250").
48'		END OF HOLE. No return of cuttings after caving at about 42' (several cubic feet of sand from this level).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 27

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 00502/
Collar Coords 55200N, 58000E	R.L. 523.4'	Grid Warramboo
Vertical	Depth 30'	Plan Ref.
Date Bore Commenced 30.6.61	Completed 30.6.61	Driller S. Donne
Bore Logged by G.E. Heath	On 1.7.61	Miner D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies.

RESULT: Limonite impregnated metasediment intersected from 2.5' - 36'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	0.5'	Light brown sandy clay loam.
0.5'	2.5'	Sheet kunker, containing minor quartz and limonite.
2.5'	36'	Massive and nodular limonite and limonite impregnated metasediment. Primary iron oxides (martite) rare.
	36'	END OF HOLE (Drilling too hard for auger to penetrate).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 28

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. DD 502/61
Collar Coords 55300N, 58000E	R.L. 528.4'	Grid Warrambee
Vertical	Depth 13.8'	Plan Ref.
Date Bore Commenced 6.7.61	Completed 6.7.61	Driller S. Doane
Bore Logged by G.R. Heath	On 15.7.61	Hirer D. of M.

OBJECT: To test "peak" in gravity anomaly associated with magnetic anomaly.

RESULT: Limonite impregnated metasediment intersected from 4' - 13.8'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Sandy and limey loam, with scattered kunkar nodules.
2'	4'	Light yellow-brown sheet kunkar, containing abundant limonite nodules and scattered quartz grains.
4'	13.8'	Off-white and yellow-brown decomposed metasediment. Grain size about 1/50". Quartz, limonite and rarely martite are recognisable minerals present. The rock contains abundant limonite, nodular near the top, becoming more dispersed towards the base.
	13.8'	END OF HOLE. (Limonite impregnated material too hard and compact for drill to penetrate.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. GA 29

Project: Warrambee Aeromagnetic Anomaly			D.M. 664/61
Sec. 24	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. GD 502/
Collar Coords. 56400N, 58000E		R.L. 548.6'	Grid Warrambee
Vertical		Depth 69'	Plan Ref.
Date Bore Commenced 6.7.61		Completed 7.7.61	Driller S. Doane
Bore Logged by G.R. Heath		On 15.7.61	Hirer D. of M.

OBJECT: To test material adjacent to gravity and magnetic anomalies

RESULT: Decomposed metasediment (no iron oxides) intersected from 6'-69'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1.5'	Light brown sandy loam.
1.5'	6'	Off-white and light yellow-brown sheet and nodular kunker, containing 5-10% scattered quartz grains.
6'	54'	Off-white and light red-brown mottled and laminated clays (decomposed bedrock). Laminae usually about 1/20" thick. Grain size 1/20" - 1/50". Quartz is the only recognisable mineral near the surface, but decomposed felspar and mica occur near the base. Some limonite impregnation.
54'	69'	Light red-brown and yellow-brown laminated decomposed metasediment. Contains 50% quartz, 35% decomposed felspar 15% somewhat decomposed biotite. Beds about 1/15" thick, grain size about 1/50".
69'		END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 30

Project: Warramboo Aeromagnetic Anomoly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 00 502/6
Collar Coords 56,300N, 58000E	R.L. 552.2'	Grid Warramboo
Vertical	Depth 47'	Plan Ref.
Date Bore commenced 7.7.61	Completed 8.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 15.7.61	Hirer D. of M.

OBJECT: To test material adjacent to gravity and magnetic anomalies.

RESULT: Decomposed metasediment (no iron oxides) intersected from 12'-47'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Sandy loam.
2'	12'	Nodular and sheet kunkar, containing scattered quartz grains. Somewhat more friable towards the base.
12'	18'	Off-white and light yellow-brown decomposed metasediment. Contains 60%, 1/30" quartz grains, with 40% decomposed felspar and mica. Beds about 1/10" thick.
18'	36'	Off-white and light red-brown mottled sandy clay (decompos metasediment). Contains 1/50" - 1/10" quartz (about 50% with decomposed felspar and mica.
36'	47'	Light yellow-brown and very light red-brown laminated decomposed metasediment. Contains 40% quartz, 30% decomposed felspar, 30% decomposed biotite.
47'		END OF HOLE Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. MA 31

Project: Warramboo Aeromagnetic Anomaly			D.M. 664/61
Sec. 24	Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 00502/6
Collar Coords 56200N, 58000E		R.L. 555.9'	Grid Warramboo
Vertical		Depth 43.5'	Plan Ref.
Date Bore Commenced 8.7.61		Completed 8.7.61	Driller S. Donne
Bore Logged by G.S. Heath		On 15.7.61	Hirer D. of M.

OBJECT: To test material adjacent to gravity and magnetic anomalies.

RESULT: Decomposed metasediment (no iron oxides) intersected from 12'-43.5'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	1.5'	Light brown sandy loam.
1.5'	12'	Off-white to very light yellow-brown sheet, nodular and friable kunkar, containing scattered quartz grains, and rare, less than ¼" diameter, limonite - dull black iron oxide nodules.
12'	18'	Very light red-brown (pink) clay rock, consisting of 90% decomposed felspar and mica, and 10% quartz. Probably metasediment. Grain size about 1/50". Minor dispersed limonite.
18'	24'	Very light mauve clay rock. Similar in appearance to 12'-18', but containing 40-50% quartz.
24'	30'	Very light red-brown decomposed metasediment, similar to 12'-18', but contains 30-40% quartz. Beds 1/10" thick.
30'	36'	Light yellow-grey and red-brown laminated decomposed metasediment. Consists of alternating 1/20" beds of quartz - decomposed felspar, and biotite rich rock. Grain size about 1/30".
36'	43.5'	Yellow-brown and red-brown, very sandy (40%) clay. Grain size 1/50". Bedding obscure. Consists of 40% quartz, 60% decomposed and limonite stained felspar and mica.
43.5'		END OF HOLE Auger stalls (due to hard drilling and drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. aA 32

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 24 Hd. Warramboo Co. Le Hunte Bore Ser.No. 502/62

Collar Coords. 56100N, 58000E R.L. 557.1' Grid Warramboo

Vertical Depth: 61.3' Plan Ref.

Date Bore Commenced 9/7/61 Completed 9/7/61 Driller S. Donne

Bore Logged by G. S. Heath On 15/7/61 Hirer D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 20-30% manganiferous oxides intersected from 6'-21'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	2'	Light brown sandy loam.
2'	6'	Off-white to light yellow-brown sheet and nodular kunkar, containing about 5% black, less than ¼" iron oxide nodules, and scattered quartz.
6'	21'	Dark brown and red-brown clay containing about 60%, 1/20" - 1/50" quartz, and 20-30% dull black manganiferous oxide grains.
21'	61.3'	Dull multicoloured decomposed metasediments. Principal constituents are quartz, white felspar and biotite, with iron oxides up to 5% of some beds, quartz-orthoclase (probably metasomatic) common near 50', and green amphibole present near the base. Grain size 1/20" - 1/50". Bedding mainly obscure, but occasionally 1/16" beds present.
	61.3'	END OF HOLE Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 33

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 502/62
Collar Coords: 56000N, 58000E	R.L. 556.3'	Grid Warramboo
Vertical	Depth 39'	Plan Ref.
Date Bore Commenced 9/7/61	Completed 10/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 15/7/61	Hirer D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing over 20% martite and manganese oxides intersected from 12'-39'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	12'	Light yellow-brown and dark dirty grey rock. Upper part is sheet and nodular kunkar containing 30-50% dull black iron oxides. Kunkar is replaced by quartz towards the base, and some martite is present. Grain size of iron oxides is about 1/100".
12'	30'	Various shades of light brown decomposed metasediment, consisting of 20% opaque oxides (possibly ½ martite and ½ manganiferous) 30% quartz, and the remainder decomposed felspar and mica. Coarse fragments of vein quartz occur near the top. Grain size generally 1/50" - 1/200", although quartz crystals frequently up to 1/20" diameter.
30'	39'	Dark, fairly dull grey iron rich rock. Grain size about 1/100", contains 50-60% oxides (mainly manganiferous) averaging about 75-80%. Quartz and minor decomposed felspar and biotite are other constituents. Bedding mainly obscure, but 1/20"-1/5" in some fragments.
	39'	END OF HOLE Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 34

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 502/62
Collar Coords: 55900N, 58000E	R.L. 587.5'	Grid Warrambee
Vertical	Depth 62'	Plan Ref.
Date Bore Commenced 10/7/61	Completed 10/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 15/7/61	Hirer D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 20% martite and earthy manganese oxides below 42', intersected from 6'-62'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	2'	Light brown sandy loam.
2'	6'	Light yellow-brown and dirty grey sheet and nodular kunkar, containing 15% iron oxides (mostly soft and dull) and a similar amount of quartz.
6'	42'	Off-white, grey and various shades of brown mottled and laminated decomposed metasediment. Grain size 1/50" - 1/100". Consists of 5-30% (average 20%) iron oxides (mainly martite), 35% quartz (up to 1/10" crystals), and the remainder decomposed mica and felspar (including some orthoclase in irregular lenses). Beds mainly 1/20" - 1/5" thick.
42'	62'	Off-white and grey decomposed metasediment, containing about 20% martite, 30% quartz and 50% decomposed felspar, with abundant (probably 50-60% of cuttings) dull black manganiferous oxides (partly earthy, partly compact crystalline) containing about 20 - 30% quartz. Bedding obscure in metasediment, and not detectable in iron oxide. Grain size 1/20" (iron oxide) to 1/100" (martite in metasediment). Iron oxide content increases towards the base.
	62'	END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. WA 35

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warramboo — Co. Le Hunte — Bore Ser.No. 502/62

Collar Coords. 55000N, 58000E — R.L. 556.6' — Grid Warramboo

Vertical — Depth 54.7' — Plan Ref.

Date Bore commenced 11.7.61 — Completed 11.7.61 — Driller S. Bonne

Bore Logged by G.R. Heath — On 15.7.61 — Hirer D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies

RESULT: Decomposed metasediment containing 15-20% martite intersected from 6' - 54.7'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	6'	Light yellow-brown sheet and nodular kunkar containing about 10% dull black iron oxides and 10% quartz.
6'	36'	Light multicoloured decomposed metasediments, consisting of less than 5% to 35% (averaging about 15%) martite, 50% quartz and 35% decomposed mica and felspar. Grain size mainly 1/40" - 1/200". Bedding not well defined in most cuttings, but a few show 1/16" beds. Secondary limonite occurs irregularly throughout the sequence.
36'	54.7'	Off-white and brown laminated decomposed metasediment, containing 20% martite (some limonite) 30-40% quartz and decomposed felspar and biotite, interbedded with dirty grey friable material (1/100" grain size) containing 60% (?) dull manganiferous oxides. Bedding about 1/16" - ⅛" in metasediments, and up to 2" in the iron oxide.
54.7'		END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. A 36

Project: Karramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Karramboo — Co. Le Hunte — Bore Ser.No. 50c/62

Collar Coords. 55700N, 58000E — R.L. 551.9' — Grid Karramboo

Vertical — Depth 60' — Plan Ref.

Date Bore commenced 11.7.61 — Completed 12.7.61 — Driller S. Donne

Bore Logged by G.R. Heath — On 15.7.61 — Hirer D. of M.

OBJECT: To test material on flank of gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 20-25% martite intersected from 6'-60'.

LOG Comprises : Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Light yellow-brown sand grading into limey sand with fairly abundant yellow-brown kunkar nodules, which contain scattered (5%) limonite nodules.
6'	60'	Off-white and light yellow - and red-brown decomposed metasediment. Consists of 5-50% martite (average 20-25%) 30% quartz, and the remainder decomposed felspar and mica. Limonite is abundant near the top of the sequence (as nodules, and impregnating metasediment). Grain size 1/50" - 1/100". Bedding 1/32" - ¼", usually about 1/10" 1/20" thick. Colour of powdered rock changes from pink to light fawn at 42'.
	60'	END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. A 37

Project: Narramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Narramboo	Co. Le Hunte	Bore Ser.No. 60L/6
Collar Coords 55600N, 58000E	R.L. 547.3'	Grid Narramboo
Vertical	Depth 40.5'	Plan Ref.
Date Bore Commenced 12.7.61	Completed 12.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 15.7.61	Diver D. of M.

OBJECT: To test peak on magnetic anomaly associated with gravity anomaly.

RESULT: Decomposed metasediment containing 10-15% martite intersected from 6' - 40.5'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	6'	Fine grained yellow-brown quartz sand.
6'	40.5'	Off-white and yellow - and red-brown mottled and laminated decomposed metasediment. Contains 2-40% martite (and lesser limonite) averaging 10-15%; 40% quartz and the remainder decomposed felspar and mica. Decomposed epidote is a rare accessory. Grain size 1/50" - 1/200". Limonite (dispersed) is common near the surface, but decreases towards the base. Beds 1/32" - ¼" thick, usually 1/10" - 1/20". The powdered rock is coloured pink.
40.5'		END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 36

Project:	Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24	Hd. Warramboo	Co. Le Hunte	Bore Secs.No. 502/62
Collar Coords	58500N, 58000E	R.L. 540.4'	Grid Warramboo
Vertical		Depth 114'	Plan Ref.
Date Bore Commenced	12.7.61	Completed 13.7.61	Driller S. Donne
Bore Logged by	G. R. Heath	On 15.7.61	Hirer D. of M.

OBJECT: To test "peaks" in gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 10-25% martite intersected from 6' - 114'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	6'	Offwhite to light brown limey and sandy loam containing abundant light yellow-brown kunkar nodules. Nodules contain minor concretionary limonite -
6'	80'	Decomposed off-white, grey, red - and yellow-brown mottled and laminated decomposed metasediment. Grain size mainly about 1/100". Consists of martite (and secondary limonite) 2-30% averaging 10%, with quartz, decomposed felspar and mica. Limonite impregnation is common near the top of the sequence. Beds mainly 1/16" or less thick. Powdered rock is pink to 48', then light brown.
80'	114'	Brown to yellow-brown decomposed metasediment. Contains 10-25% iron oxides (martite and dull soft material) increasing from the top to the bottom of the sequence, with quartz, decomposed felspar and less abundant decomposed mica. Grain size 1/20" - 1/200", usually about 1/120". Bedding usually obscure. Where present, it is about 1/16" thick.
	114'	END OF HOLE. (Limit of flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. „A 39.

Project: Warramboo Aeromagnetic Anomaly		O.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 302/62
Collar Coords. 55400N, 58000E	R.L. 533.4'	Grid Warramboo
Vertical	Depth 60'	Plan Ref.
Date Bore Commenced 13.7.61	Completed 13.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 15.7.61	Mirer D. of M.

OBJECT: To test "peaks" in gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 5-20% primary iron oxides intersected from 6'-60'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Sandy loam (light brown).
1'	6'	Sheet and nodular yellow-brown kunkar, with scattered nodules of limonite containing scattered 1/100" martite crystals.
6'	42'	Red-brown, off-white and lesser yellow-brown mottled and laminated decomposed metasediment. Consists of iron oxides (usually martite-limonite) 2-30%, usually 5-10%, quartz 50%, remainder decomposed felspar and mica. Grain size 1/20" - 1/100". Bedding usually obscure, occasional 1/16" beds present.
42'	60'	Yellow-brown and rarely red-brown decomposed, leached and limonite stained quartz - felspar - mica - martite metasediment. Unleached portions contain about 20% iron oxides. Grain size about 1/50". No detectable bedded fragments.
60'		END OF HOLE Auger stalls (hard drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 40

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warramboo Co. Le Hunte Bore Ser. No. 502/62

Collar Coords. 57000N, 30000E R.L. 510.6' Grid Warramboo

Vertical Depth 81' Plan Ref.

Date Bore Commenced 15.7.61 Completed 15.7.61 Driller S. Donne

Bore Logged by G.R. Heath Dn 17.7.61 Miner D. of M.

OBJECT: To test material adjacent to gravity and magnetic "highs".

RESULT: Decomposed metasediment (no iron oxides) intersected from 21'-81'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	3'	Light brown sandy loam.
3'	12'	Very light yellow-brown and off-white kunkar, containing abundant 1/100" quartz grains. Mainly nodular and friable.
12'	21'	Red-brown clay, containing abundant 1/100" rounded quartz grains and scattered (1%) limonite fragments.
21'	81'	Off-white light red-brown and light yellow-brown decomposed metasediment. Consists of 20-50%, 1/20" - 1/100" quartz with decomposed felspar and mica. Bedding generally not well defined, but 1/16" beds are occasionally visible. Powdered rock: pink 21'-30', off-white 30'-48', pink 48'-54', pink to light yellow-brown 54'-60', light yellow-brown 60'-81'.
81'		END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ANGLE BORE NO. aA 41

Project:	Aerramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24	Hd. Aerramboo	Co. Le Hunte	Bore Ser. No. 502/62
Collar Coords	56900N, 60000E	R.L. 519.4'	Grid Aerramboo
Vertical		Depth 105'	Plan Ref.
Date Bore commenced	14.7.61	Completed 14.7.61	Driller S. Donne
Bore Logged by	G.R. Heath	On 17.7.61	Hirer D. of M.

OBJECT: To test material adjacent to gravity and magnetic "highs".

RESULT: Decomposed metasediment (no iron oxides) intersected from 12'-105'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Light grey-brown sandy loam.
2'	6'	Light yellow-brown and off-white nodular and friable slightly sandy kunkar.
6'	12'	Red-brown clay containing abundant 1/100" - 1/200" rounded Quartz grains.
12'	105'	Light red-brown, off-white and light yellow-brown mottled and laminated decomposed metasediment. Consists of 30-70%. 1/20" - 1/50" quartz with decomposed felspar and Mica. Bedding usually obscure, but some cuttings show 1/32" - ¼" beds and laminae. Powdered rock colour: pale pink 12'-36', off-white 36'-42', pink 42'-60', red 60'-72', red-brown to yellow-brown 72'-90', yellow-brown 90'-102', greenish-grey 102'-105'.
	105'	END OF HOLE. Auger stalls (approaching limit of machine, due to drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 42

Project: Warramboo Aeromagnetic Anomaly			M.H. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte		Bore Ser.No. 502/62
Collar Coords. 50000N, 60000E	R.L. 520.2'		Grid Warramboo
Vertical	Depth 90'		Plan Ref.
Date Bore Commenced 15.7.61	Completed 17.7.61		Driller S. Donne
Bore Logged by G.R. Heath	On 16.7.61		Hirer D. of M.

OBJECT: To test material adjacent to gravity and magnetic anomalies

RESULT: Decomposed metasediment (no iron oxides) intersected from 12'-90'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Grey-brown sandy loam.
2'	6'	Light yellow-brown sheet and nodular kunkar containing 10% 1/100" rounded quartz grains.
6'	12'	Red-brown silty containing abundant 1/100" - 1/200" rounded quartz grains.
12'	90'	Red-brown, off-white and yellow-brown mottled and bedded decomposed metasediment. Contains 30-70%, 1/20" - 1/80 quartz with decomposed felspar and mica. Bedding mainly obscure, but a few cuttings show 1/32" - ¼" beds. Powdered rock colour: 12'-24' Pink 24'-30' Off-white 30'-72' Pink grading to dark-red and red-brown 72'-84' Yellow-brown and red-brown. 84'-90' Yellow-brown to greenish-grey ("khaki").
	90'	END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 43

Project: Warramboo Aeromagnetic Anomaly		M.H. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 502/61
Collar Coords. 5670ON, 60000E	R.L. 523.0'	Grid Warramboo
Vertical	Depth 74.8'	Plan Ref.
Date Bore Commenced 17.7.61	Completed 17.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 18.7.61	Diver D. of M.

OBJECT: To test material adjacent to gravity and magnetic "highs".

RESULT: Intersected decomposed metasediment 12'-75' containing 2-5% martite from 12'-18' and 66'-72'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light-brown to grey-brown sandy clay loam.
2'	12'	Red-brown clay containing abundant 1/100" - 1/200" rounded quartz grains.
12'	18'	Yellow-brown, off-white and red-brown decomposed metasediment containing 2-5% martite, with 25% quartz and decomposed felspar and mica. Grain size about 1/50".
18'	66'	Yellow-brown, off-white (mainly) and red-brown mottled and laminated decomposed metasediment. Generally contains 50% or less, 1/20" - 1/100" quartz, with decomposed felspar and mica. Bedding generally obscure, but occasionally 1/16" - ¼" beds visible. Powdered rock colour: 18'-60' Pink (almost off-white 36'-42'). 60'-66' Greenish yellow-brown ("khaki").
66'	72'	Yellow-brown decomposed metasediment similar to 18'-66', but containing 2-5%, 1/50" martite, 10% quartz and 85-88% decomposed mica.
72'	74.8'	Greenish yellow-brown decomposed metasediment as 18'-66'. Contains rather fresher orthoclase and biotite.
74.8'		END OF HOLE. Auger stalls (due to fresher, more resistant metasediment).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 44

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 502/62
Collar Coords. 56600N, 60000E	R.L. 525.6'	Grid Warramboo
Vertical	Depth 85'	Plan Ref.
Date Bore Commenced 17.7.61	Completed 18.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 18.7.61	Idrer D. of M.

OBJECT: To test flanks of gravity and magnetic anomalies

RESULT: Decomposed metasediment (5% martite 15'-30') intersected from 15'(?) - 85'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light-brown sandy loam.
2'	8'	Light yellow-brown and off-white nodular and friable kunkar containing 40%, 1/50" - 1/100" quartz grains (rounded) and rare limonite - martite grains.
8'	15'	Red-brown clay containing abundant 1/100" - 1/200" rounded quartz grains and rare martite - limonite.
15'	30'	Red-brown, off-white and lesser yellow-brown mottled and laminated decomposed metasediment, containing 2-20%, usually 5% martite, limonite, with 20-80%, 1/20" - 1/100" quartz and decomposed felspar and mica. Laminae usually 1/16" thick.
30'	51'	Light red-brown, off-white and rarely yellow-brown decomposed quartz - felspar - mica metasediment. Similar to 15'-30', but no iron oxides. Powdered rock coloured pink (almost off-white) 36'-42'.
51'	85'	Yellow-brown to grey-green decomposed quartz-felspar (30-40%), biotite (60-70%) metasediment. Grain size 1/50". Bedding obscure due to homogeneity of rock. Powdered rock colour: yellow brown 51'-72', grey-green ("khaki") 72'-85'.
85'		END OF HOLE Auger stalls (due to hard drilling and drag on flights).

DEPARTMENT OF MINES, SOUTH AUSTRALIA

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 45.

Project: Warramboo Aeromagnetic Anomaly — O.U. 664/61

Sec. 24 Hd. Warramboo — Co. Le Hunte — Bore Ser. No. 502/62

Collar Coords. 56500N 60000E — R.L. 528.2' — Grid Warramboo

Vertical — Depth 52.5' — Plan Ref.

Date Bore commenced 18/7/61 — Completed 18/7/61 — Driller S. Donne

Bore Logged by: G. R. Heath — On 24/7/61 — Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment containing about 15% martite intersected from 12'-52.5'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1.5'	Light brown sandy and limey loam.
1.5'	8'	Light yellow-brown nodular, friable and lesser sheet kunkar, containing 20-25%, 1/50" - 1/100" rounded quartz grains, and rare rounded limonite grains.
8'	12'	Red-brown clay containing abundant 1/100" - 1/200" rounded quartz grains.
12'	36'	Off-white, yellow-brown, red-brown and lesser greenish-grey bedded decomposed metasediment. Contains 5-50% usually 10-20% martite with 40-60% quartz and 40% biotite and decomposed felspar. Grain size 1/20" - 1/100", usually 1/50"-1/100". Beds ¼"-1/16" thick, frequently obscure.
36'	42'	Dark grey decomposed metasediment containing 10-15% martite, 50-60% quartz, 30-35% dull manganiferous looking clay. Grain size mainly 1/50" - 1/200".
42'	52.5'	Off-white, yellow-brown and light grey decomposed metasediment. Similar to 12'-36'. Colour of powdered rock: 12'-18' Red-brown; 18'-24' Off-white to very light yellow-brown; 24'-30' Brown; 30-52.5' Grey
52.5'		END OF HOLE. Auger stalls (due to hard drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 46

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/61
Collar Coords. 56400N 60000E	R.L. 530.6'	Grid Warramboo
Vertical	Depth 60'	Plan Ref.
Date Bore commenced 23/7/61	Completed 23/7/61	Driller S. Deane
Bore Logged by: G. R. Heath	On 24/7/61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment containing about 20% martite, intersected from 18'-60'+

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	1.5'	Light brown sandy loam.
1.5'	9'	Light yellow-brown nodular kunkar, containing 30-40%, 1/50"-1/200" rounded quartz grains.
9'	18'	Red-brown clay containing 05%, 1/200" rounded quartz grains and rare limonite grains.
18'	60'	Off-white yellow-brown and red-brown mottled and laminated decomposed metasediment. Contains 5-30% usually 20% martite (and limonite near the top, 30% quartz, with 50% decomposed felspar and lesser mica. Grain size 1/20"-1/200", usually about 1/150". Bedding 1/32"-¼", usually ⅛"-1/16" thick, frequently obscure. Colour of powdered rock: 18'-24' Reddish-brown 24'-30' Dark brown 30'-54' Brown becoming somewhat greyish towards the base. 54-60' Yellow-brown.
60'		END OF HOLE. Auger stalls (drag on flights and hard drilling.).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. wA 47.

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24. Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/6
Collar Coords. 56300N 60000E	R.L. 531.5'	Grid Warramboo
Vertical	Depth 63.5'	Plan Ref.
Date Bore commenced 23/7/61	Completed 24/7/61	Driller S. Donne
Bore Logged by G.R. Heath	On 24/7/61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment containing 10'-20' martite intersected from 18'-63.5'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	4'	Light brown to yellow-brown sandy loam.
4'	9'	Light yellow-brown kunkar (mainly nodular) containing 40% 1/200" rounded quartz grains.
9'	18'	Brown grading down to red-brown clay containing 70% rounded 1/100"-1/200" quartz grains, and 10% similar limonite grains. A few pebbles (4p to 1" diameter) of 1/50"-1/100" limonite (and martite?) near base.
18'	60'	Mainly off-white, with lesser red- and yellow-brown mottled and laminated decomposed metasediment. Contains 5-25% usually 15-20% martite, with 30-60% quartz and variable decomposed felspar and mica. Grain size 1/20"-1/250", usually about 1/150". Bedding 1/32" -¼", usually about 1/16" thick, frequently obscure. Powdered rock colour: 18'-24' Pink 24'-54' Light-brown changing gradually to dark-brown. 54'-60' Dark, somewhat greyish-brown.
60'	63.5'	Dark-grey to dark yellow-brown decomposed metasediment similar to 18'-60', but containing 10-15% martite, and 20% dull manganiferous looking iron oxide (friable).
63.5		END OF HOLE Auger stalls (hard drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. wA 40

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords. 56200N 60000E	R.L. 533.4'	Grid Warramboo
Vertical	Depth 42'	Plan Ref.
Date Bore commenced 24/7/61	Completed 24/7/61	Driller S. Doone
Bore Logged by G. R. Heath	On 24/7/61	Miner D. of M.

OBJECT: To test gravity anomaly associated with flank of magnetic "high"

RESULT: Decomposed metasediment containing 10-20% martite intersected from 20'-42'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	6'	Light brown very sandy and somewhat limey loam, with minor nodular and friable kunkar near the base.
6'	12'	Light yellow-brown slightly clayey and limey 1/100" -1/200" rounded quartz sand, with a few limonite grains.
12'	20'	Dark red-brown clay containing abundant 1/100"-1/200" rounded quartz sand, with 5-10% rounded limonite (and possibly martite) grains.
20'	30'	Yellow-brown, red-brown and off-white mottled and laminated decomposed metasediment, containing 5-25% usually 15-20% martite, 40% quartz and 40-45% decomposed felspar and mica. Beds, frequently obscure, a few 1/16" beds visible. Grain size 1/100"-1/500", usually 1/150".
30'	36'	Dark grey decomposed metasediment, similar to 20'-30', but containing about 20% grey, (possibly manganiferous) clay.
36'	42'	Yellow-brown and red-brown decomposed metasediment as 20'-30'. Martite content about 10%
42'		END OF HOLE. Auger stalls. (hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. A 49

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords. 56100N 60000E	R.L. 532.4'	Grid Warrambee
Vertical	Depth 114'	Plan Ref.
Date Bore commenced 24/7/61	Completed 24/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 24-25/7/61	Hirer D. of M.

OBJECT: To test "peak" in gravity anomaly associated with flank of magnetic "high".

RESULT: Decomposed martite (20-30%) metasediment intersected 25'-66', manganiferous 66'-114'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	5'	Light brown sandy and limey loam.
5'	10'	Light yellow-brown and grey nodular and friable kunkar containing 20-40%, 1/100"-1/200" rounded quartz.
10'	25'	Red-brown clay containing 80% 1/100"-1/200" rounded quartz and less than 5% limonite (and martite?) grains.
25'	66'	Multicoloured mottled and laminated decomposed metasediment, containing 5-50%, usually 20-30% martite, with variable quartz, decomposed felspar and mica (clay). Grain size 1/100"-1/250" usually 1/150". Bedding generally obscure, but a few ¼"-1/32" beds visible.
66'	114'	Dark grey decomposed metasediment (limbirite) consisting of 30% clay (decomposed felspar and mica), 70% sand sized fragments and larger. Clay free fraction consists of 30-65% iron oxides (increasing from top to bottom). Martite is dominant near the top of the sequence, but manganiferous oxides (as up to ½" lumps) are dominant towards the base. Bedding obscure. The material is fluid below 90'.
114'		END OF HOLE. (Limit of flights)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. AA 50

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords. 56000N 60000E	R.L. 531.4'	Grid Warrambee
Vertical	Depth 66'	Plan Ref.
Date Bore Commenced 24/7/61	Completed 25/7/61	Driller S. Dennie
Bore Logged by G. R. Heath	On 26/7/61	Hirer D. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies

RESULT: Decomposed metasediment intersected from 24'-66'.
(15% martite 24'-57', 50-60% manganese oxides 57'-66')

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	2'	Light brown sandy clay loam.
2'	6'	Light yellow-brown kunkar, containing 30-40% 1/100" quartz, and minor limonite.
6'	12'	Light yellow-brown slightly clayey, 1/200", sub-rounded quartz sand.
12'	24'	Red-brown and dark grey mottled clay containing about 10% dull black manganiferous iron oxide and 75% 1/200" sub-rounded quartz.
24'	57'	Mainly off-white and light red brown mottled and laminated decomposed metasediment. Contains 5-20%, usually about 15% martite, with variable quartz, decomposed felspar and mica. A few limonite - martite - manganiferous oxide nodules occur through the sequence. Grain size mainly 1/150"-1/200". Beds usually ⅛"-1/16" thick, frequently obscure.
57'	66'	Dark grey, with minor off-white and light brown decomposed metasediment. Contains 50-60% manganiferous oxide, with minor martite and limonite, 30% quartz, 10-20% decomposed felspar etc. Grain size 1/20"-1/100".
66'		END OF HOLE. Auger stalls (hard drilling and drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 51

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24, Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/6
Collar Coords. 55900N 60000E	R.L. 529.4'	Grid Warramboo
Vertical	Depth 64'	Plan Ref.
Date Bore commenced: 25/7/61	Completed 25/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 26/7/61	Miner D. of M.

OBJECT: To test gravity and magnetic peaks.

RESULT: Decomposed metasediment (5-10% martite from 18'-54', 30-60% manganiferous oxides from 57'-64').

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	2'	Light brown sandy loam.
2'	8'	Mainly nodular, light yellow-brown kunkar containing 20-40% 1/100"-1/200" rounded quartz and minor limonite.
8'	12'	Light yellow-brown slightly clayey 1/250" sub-rounded quartz sand with minor manganiferous limonite.
12'	18'	Red-brown clay containing 80% sub-rounded 1/200" quartz and 1 or 2% limonite-martite.
18'	45'	Off-white, red- and yellow-brown mottled decomposed metasediment. Contains 5-20%, usually 5-10% martite, with variable quartz, decomposed felspar and mica. Grain size 1/100"-1/200".
45'	57'	Off-white decomposed quartz-felspar rock, a few fragments containing up to 5% martite. Grain size about 1/50".
57'	64'	Dark grey, with lesser light yellow-brown and red-brown decomposed metasediment. Contains 30-60% manganiferous oxide, with minor martite and limonite, the remainder being 1/50"-1/150" decomposed felspar and quartz.
64'		END OF HOLE. Auger stalls (hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. IA 52

Project:	Warramboo Aeromagnetic Anomaly		D.M. 604/61
Sec. 24	Hd. Warramboo	Co. Le Hunte	Grid Warramboo
Collar Coords.	55000N, 60000E	R.L. 527.4'	Bore Ser.No. 520/62
Vertical		Depth 34'	Plan Ref.
Date Bore Commenced	25.7.61	Completed 26.7.61	Driller S. Donne
Bore Logged by	G.R. Heath	On 26.7.61	Hirer U. of N.

OBJECT: To test gravity and magnetic peaks.

RESULT: Decomposed metasediment (?), (Limonite impregnated 12'-32'), intersected from 12'-34'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	8'	Light yellow-brown kunkar (mainly nodular and sheet) containing about 30%, 1/200", rounded quartz with rare manganiferous limonite.
8'	12'	Red-brown and lesser light yellow-brown clay containing 70-90% rounded 1/100" - 1/200" quartz grains, and a few grains and pea sized nodules of manganiferous limonite.
12'	32'	Light yellow-brown and brick red limonite containing 5-20%, 1/50" - 1/100", angular quartz and variable clay (up to 60% of some yellow-brown cuttings). A few fragments contain scattered 1/200" martite crystals. Probably impregnated metasediment.
32'	34'	White hard clay (possibly decomposed felspar) containing 20-30%, 1/50" - 1/200" quartz and a few 1/500" iron oxide grains. Angular quartz suggests metasediment, but no evidence of bedding.
34'		END OF HOLE. Auger stalls (hard drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. A 53.

Project: Warramboo Aeromagnetic Anomaly		M.L. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. [illegible]
Collar Coords. 55700N, 60000E	R.L. 528.0'	Grid Warramboo
Vertical	Depth 22'	Plan Ref.
Date Bore Commenced 26.7.61	Completed 26.7.61	Driller S. Bonne
Bore Logged by G.E. Heath	On 26.7.61	Hirer D. of M.

OBJECT: To test slight "low" in gravity and magnetic "highs".

RESULT: Sheet limonite containing rounded quartz and minor martite intersected from 12'-22'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	8'	Light yellow-brown well rounded and well sorted, 1/200" quartz sand, containing minor limey clay.
8'	12'	Light yellow-brown sheet and nodular kunkar, containing 40-60%, rounded, 1/200" - 1/500" quartz grains.
12'	22'	Brick red limonite containing 5-20% angular to rounded quartz grains (1/30" - 1/150") and scattered martite (?) fragments. Associated with light yellow-brown well rounded 1/200" quartz fairly strongly cemented with clay, and containing scattered limonite and possibly martite grains.
	22'	END OF HOLE. Too hard for drill to penetrate further.

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IRON EXPLORATION SECTION

LOG OF ACMA BORE NO. MA 54

Project: Warramboo Aeromagnetic Anomaly			D.M. 664/61
Sec. 24	Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 663/61
Collar Coords.	55600N, 60000E	R.L. 526.6'	Grid Warramboo
Vertical		Depth 70'	Plan Ref.
Date Bore Commenced	26.7.61	Completed 26.7.61	Driller S. Jenne
Bore Logged by	G.F. Heath	On 26.7.61	Hirer D. of M.

OBJECT: To test "peak" in magnetic anomaly associated with slight "low" in gravity anomaly.

RESULT: Decomposed metasediment (limonitic near the top) intersected from 18'-70'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	10'	Light yellow-brown, 1/200", fairly well sorted, rounded quartz sand, with a few limonite grains.
10'	18'	Light yellow-brown sheet and nodular kunkar, containing 20-50%, 1/200" quartz.
18'	48'	Brick red and lesser yellow-brown limonite, containing up to 20% quartz, and a few 1/200" martite grains. A few off-white to red-brown quartz (20-30%) - martite (20%) - decomposed felspar, rock fragments occur below 30'. Grain size 1/200".
48'	58'	White quartz (60%) - decomposed felspar (40%) rock. Grain size 1/100" - 1/200". No visible bedding.
58'	70'	White and pale yellow-brown decomposed metasediment, containing 30% quartz, with somewhat decomposed mica and felspar. Grain size 1/100"-1/200", bedding 1/32"-¼" thick. Contains accessory martite, and numerous limonite nodules, and limonite impregnated areas.
70'		END OF HOLE. Auger stalls. Probably combination of compact material and drag on flights.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. aA 55

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 523/61
Collar Coords. 55500N 60000E	R.L. 519.1'	Grid Warrambee
Vertical	Depth 21'	Plan Ref.
Date Bore commenced 26/7/61	Completed 26/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 28/7/61	Hirer D. of M.

OBJECT: To test slight "lows" in gravity and magnetic "highs".

RESULT: Sheet limonite containing quartz and rare martite intersected from 15'-21'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	8'	Light yellow-brown, 1/100"-1/200", rounded, well sorted quartz sand, with scattered limonite (and martite?) grains.
8'	12'	Pale yellow-brown kunkar, containing 25% rounded, 1/200" quartz grains. Mainly sheet and nodular.
12'	15'	Light yellow-brown very sandy (1/200" sub-rounded quartz) clay.
15'	21'	Brick red to red-brown limonite (containing 20-30% quartz and rare martite grains) and stiff clay containing about 35% rounded quartz (1/200") and 35% limonite and rare martite.
21'		END OF HOLE. Too hard for drill to penetrate further.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. aA 56

Project: Warramboo Aeromagnetic Anomaly		D.E. 664/61
Sec. 24 Hd. Warramboo	Co. Le Mate	Bore Ser. No. 523/62
Collar Coords. 55400N 60000E	R.L. 509.7'	Grid. Warramboo
Vertical	Depth 15'	Plan Ref.
Date Bore commenced 27/7/61	Completed 27/7/61	Driller S. Donne
Bore Logged by G. R. Heath	On 28/7/61	Hirer D. of M.

OBJECT: To test gravity anomaly associated with low in magnetic anomaly.

RESULT: Completely limonite impregnated metasediment (?) intersected from 8'-15'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	5'	Light brown very slightly clayey 1/200" rounded quartz sand.
5'	8'	Light yellow-brown kunkar, containing 40% rounded 1/200" quartz.
8'	15'	Red-brown to brick red structureless limonite containing about 10% quartz (rounded) and minor martite. Possibly some impregnated metasediment (or clay) near the base.
15'		END OF HOLE. Too hard and compact for drill to penetrate further.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 57

Project:	Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24	Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords	5530ON 60000E	G.L. 506.2'	Grid Warramboo
Vertical		Depth 15'	Plan Ref.
Date Bore commenced	27/7/61	Completed 27/7/61	Driller S. Dunne
Bore Logged by	G. R. Heath	On 28/7/61	Hirer D. of M.

OBJECT. To test gravity anomaly associated with "low" in magnetic anomaly.

RESULT. Limonite impregnated metasediment (less than 10% martite) intersected from 12'-15'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	2'	Pale brown sandy loam.
2'	4'	Pale yellow-brown mainly nodular kunkar, containing 40-50% rounded 1/200" quartz grains.
4'	12'	Light yellow-brown clay containing 80% 1/100"-1/200" rounded quartz grains and rare limonite.
12'	15'	Limonite impregnated metasediment containing less than 10% martite.
15'		END OF HOLE. Too hard for drill to penetrate further.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 58

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords 55200N 60000E	R.L. 502.6'	Grid Warramboo
Vertical	Depth 21'	Plan Ref.
Date Bore commenced 27/7/61	Completed 27/7/61	Driller S. Dunne
Bore Logged by: G. B. Heath	On 28/7/61	Hirer D. of M.

OBJECT: To test gravity and magnetic "highs."

RESULT: Limonite impregnated metasediment containing 5-20% martite intersected from 12'-21'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	6'	Light yellow-brown clayey (up to 10%) 1/200" rounded quartz sand.
6'	12'	Light yellow-brown clay, containing 90% sub-angular to well rounded quartz sand (1/200") and scattered kunkar nodules near the top of the sequence.
12'	21'	Yellow-brown and red-brown severely weathered metasediment, impregnated and in places completely disrupted with limonite. Contains 5-20% martite and 50%, 1/50"-1/200" quartz. Bedding rarely preserved; where present, it is usually 1/8"-1/16" thick.
21'		END OF HOLE. Rock too hard for drill to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. wA 59

Project: Warramboo Aeromagnetic Anomaly		D.E. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. 532/62
Collar Coords 55100N 60000E	R.L. 502.8'	Grid Warramboo
Vertical	Depth 25.5'	Plan Ref.
Date Bore commenced 27/7/61	Completed 27/7/61	Driller S. Doane
Bore Logged by G. R. Heath	On 28/7/61	Hirer D. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies.

RESULT: Limonite impregnated metasediment?, overlain by overburden. intersected from 24'-25.5'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG:
0'	6'	Light yellow-brown somewhat clayey, well rounded 1/200" quartz sand.
6'	18'	Light yellow-brown clay containing variable (70-90%) quartz sand (as 0'-6'). A few yellow-brown kunkar nodules occur near the top of the sequence.
18'	24'	Red-brown very sandy clay, similar to the overlying material.
24'	25.5'	Dark red-brown decomposed metasediment (?) impregnated with and containing nodules of limonite. 1/200" angular quartz, and rare martite crystals are the only recognisable primary constituents.
25.5'		END OF HOLE. Sheet limonite too hard for drill to penetrate

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. wA 60

Project Warrambee Aeromagnetic Anomaly		O.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 523/62
Collar Coords 55000N 60000E	R.L. 503.0'	Grid Warrambee
Vertical	Depth 27'	Plan Ref.
Date Bore commenced 27/7/61	Completed 27/7/61	Driller S. Donne
Bore Logged by G. W. Heath	On 28/7/61	Hirer D. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies.

RESULT: Limonite impregnated overburden intersected from 18'-27'

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	18'	Light yellow-brown very sandy clay or clayey sand (65-95%), well rounded, 1/100" - 1/200" quartz, and rare limonite grains. Kunker nodules (somewhat friable), are rare sub-surface constituents.
18'	27'	Sheet limonite, too hard for drill to penetrate further.
27'		END OF HOLE.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. BA 61

Project: Barramboo Aeromagnetic Anomaly		D.H. 664/61
Sec. 24 Hd. Barramboo	Co. Le Hunte	Bore Ser.No. 323/62
Collar Coords 54900N, 60000E	R.L. 499.1'	Grid Barramboo
Vertical	Depth 28.5'	Plan Ref.
Date Bore Commenced 27.7.61	Completed 27.7.61	Driller S. Donne
Bore Logged by G.R. Heath	On 28.7.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic anomalies

RESULT: Limonite impregnated material (metasediment?) intersected from 12' - 28.5'.

LOG Comprises Macro and microscopic geological logs.

From	To	Description DETAILED LOG
0	12'	Light yellow-brown somewhat clayey, 1/100" - 1/200", well rounded quartz sand.
12'	28.5'	Red-brown silica and limonite impregnated clay containing 70 - 80% rounded quartz sand (as 0'-12'). Possible decomposed metasediment (?) fragments occur sparsely near the base.
	28.5'	END OF HOLE. Rock too hard for drill to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 62

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 523/62

Collar Coords. 54000N, 60000E — R.L. 495.3' — Grid Warrambee

Vertical — Depth 32' — Plan Ref.

Date Bore commenced 27.7.61 — Completed 28.7.61 — Driller S. Dunne

Bore Logged by G.R. Heath — On 28.7.61 — Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Limonitic decomposed metasediment (?) intersected from 24' - 32'.

LOG Comprises Bore and microscopic geological log.

From	To	Description DETAILED LOG
0	3'±	Light yellow-brown sandy loam.
3'	5'	Nodular yellow-brown hunker, containing 30% 1/200" well rounded quartz grains.
5'	24'	Light yellow-brown to yellow-brown clay containing 80-90% 1/100" - 1/200" well rounded quartz grains.
24'	32'	Red brown silica and limonite impregnated clay containing about 70%. 1/200" rounded to sub-angular quartz, and 10% limonite (and possibly martite) grains. No evidence of bedding, but may be some decomposed metasediment.
32'		END OF HOLE. Rock too hard for drill to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 63

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warramboo — Co. Le Hunte — Bore Ser. No. 523/6

Collar Coords. 5470ON, 60000E — R.L. 496.1' — Grid Warramboo

Vertical — Depth 114' — Plan Ref.

Date Bore Commenced 28.7.61 — Completed 28.7.61 — Driller S. Donne

Bore Logged by G.H. Heath — On 29.7.61 — Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment (accessory iron oxides) overlain by overburden intersected from 39' - 114'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	18'	Light yellow-brown clay, containing 80%, well rounded, 1/100" - 1/200" quartz, and scattered light yellow-brown hunker nodules near the surface.
18'	30'	Yellow-brown very sandy clay, similar to 0'-18'.
30'	39'	Red-brown to brick red very sandy limonite and silica impregnated clay similar to 0'-18'.
39'	114'	Off-white, and very pale browns and greys decomposed quartz (40-60%) - feldspar (10-20%) - mica metasediment. Grain size 1/20" - 1/100". Bedding generally obscure, but a few 1/16" beds visible. Iron oxides are extremely rare, and do not form a significant proportion of the rock.
114'		END OF HOLE (Limit of flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 64

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 24 Hd. Warrambee — Co. Le Haute — Bore Ser.No. 523/62

Collar Coords: 54600N, 60000E — R.L. 495.4' — Grid Warrambee

Vertical — Depth 54' — Plan Ref.

Date Bore commenced 2.8.61 — Completed 2.8.61 — Driller S. Dunne

Bore Logged by G.R. Heath — On 4.8.61 — Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment (accessory martite) overlain by overburden intersected from 45'-54'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	4'	Light yellow-brown sandy and somewhat limey loam.
4'	6'	Pale yellow-brown nodular hunkar containing 50%. 1/200" rounded quartz.
6'	30'	Yellow-brown to brown clay containing 70-90% rounded 1/200" quartz and scattered (1 or 2%) limonite grains.
30'	45'	Red-brown, clay containing 90% rounded 1/200" quartz grai with 5-10% limonite grains and nodules up to 2" diamete
45'	54'	Light grey, red-brown and yellow-brown decomposed metasediment (flaky clay containing 80%. 1/100" - 1/200" angular quartz, and accessory martite. This material is below the water table, and structure has been destroyed during extraction.
54'		END OF HOLE. Material too hard for drill to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 65

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 523/62
Collar Coords. 59200N, 49000E	R.L. 564.1'	Grid Warrambee
Vertical	Depth 27.5'	Plan Ref.
Date Bore Commenced 3.8.61	Completed 3.8.61	Driller S. Deane
Bore Logged by G.R. Heath	On 4.8.61	Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Limonite impregnated overburden intersected from 18'-27.5'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2.5'	Light yellow-brown sandy loam.
2.5'	6'	Light yellow-brown nodular and sheet laterite, containing 30% 1/100" - 1/200" rounded quartz.
6'	18'	Yellow-brown very sandy (80-85%) clay. Contains 1/200" rounded, well sorted, quartz grains, and scattered limonite fragments.
18'	27.5'	Red-brown and lesser yellow-brown limonite and limonitic clay containing up to 30%, 1/100" - 1/200" rounded quartz grains.
27.5'		END OF HOLE. Material too hard and compact for drill to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 66

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 12 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 523/62

Collar Coords. 59100N, 49000E — R.L. 566.1' — Grid Warrambee

Vertical — Depth 102' — Plan Ref.

Date Bore Commenced 3.8.61 — Completed 3.8.61 — Driller S. Deane

Bore Logged by G.R. Heath — On 5.8.61 — Miner D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decom gneed metasediment (no iron oxides) intersected from 25' - 102'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Light yellow-brown sandy loam.
2'	6'	Pale yellow-brown nodular and sheet limkar containing 30%, 1/200" rounded quartz grains.
6'	10'	Yellow-brown clay containing 05% 1/200" rounded quartz.
10'	25'	Limonite, nodular and impregnating and replacing earlier material (overburden?)
25'	78'	Off-white red-brown and yellow-brown mottled decomposed quartz-felspar (and possibly some mica) metasediment. Mainly "granitic" in appearance. Limonite staining and impregnation occurs irregularly through the sequence. Grain size 1/20" - 1/100". No bedding detectable in cuttings.
78'	102'	Yellowish grey-green ("khaki") decomposed quartz (30%) - biotite (40%) - felspar (10%) metasediment, with minor (probably metamorphic) quartz (50%) - felspar (50%). Grain size about 1/50". Bedding generally obscure, but a few grains show 1/8" - 1/16" reddish banding (bedding or staining).
102'	(END OF HOLE	Auger stalls (due to drag on flights and increasingly resistant material).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 67

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 59000N, 49000E	R.L. 568.1'	Grid Warrambee
Vertical	Depth 78'	Plan Ref.
Date Bore Commenced 4.8.61	Completed 4.8.61	Driller S. Bonne
Bore Logged by C.R. Heath	On 5.8.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment (no iron oxides) intersected from 22' - 78'

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	4'	Pale yellow-brown kunkar containing 1/200" rounded quartz.
4'	9'	Yellow-brown clay containing 80%. rounded 1/50" - 1/200" quartz.
9'	22'	Sandy-clay (overburden) containing abundant dispersed, impregnating and nodular limonite.
22'	78'	Mainly off-white, with red-brown and yellow-brown decomposed quartz (30-70%) - feldspar - mica metasediment. Irregular limonite staining and impregnation occur throughout the sequence. Grain size mainly 1/50" (ranging from 1/20" - 1/200"). Bedding generally obscure, but where present, it is about 1/8" thick.
	78'	END OF HOLE. Auger stalls (due to harder drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 68

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/6
Collar Coords 58900N, 49000E	R.L. 571.6'	Grid Warrambee
Vertical	Depth 72'	Plan Ref.
Date Bore Commenced 4.8.61	Completed 5.8.61	Driller S. Donne
Bore Logged by C.R. Heath	On 7.8.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment intersected from 18' - 72' (1-2% martite from 18'-33').

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	3'	Scattered nodular laterite.
3'	6'	Light yellow-brown clay containing 60%, rounded 1/200" quartz.
6'	18'	Limonite nodules and impregnated material. Some angular quartz suggests bedrock.
18'	33'	Decomposed quartz-feldspar-mica metasediment (off-white and lightly stained), containing 1 or 2% dispersed 1/250" martite. Grain size mainly 1/30" - 1/100". Bedding (where detectable), about 1/16" thick.
33'	60'	Off-white, with rare slight limonite staining, decomposed "granitic" metasediment, similar to 18'-33', but contains no martite.
60'	72'	Brown, yellow-brown and lesser off-white decomposed metasediment, similar to 33'-60', but severely stained and impregnated with limonite. Grain size 1/20" - 1/100
72'		END OF HOLE. Auger stalls (due to harder drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA. 69

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 58800N. 49000E	R.L. 575.1'	Grid Warrambee
Vertical	Depth 84'	Plan Ref.
Date Bore Commenced 5.8.61	Completed 5.8.61	Driller S. Deane
Bore Logged by G.R. Heath	On 7.8.61	Miner S. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment intersected from 4'-84' (up to 2% martite from 18' - 54' and 69' - 75').

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1.5'	Light brown sandy loam.
1.5'	4'	Pale yellow-brown nodular and sheet hematite.
4'	18'	Metasediment (?) containing limonite nodules, and impregnated with limonite and cherty silica.
18'	54'	Pale greenish-grey decomposed metasediment containing minor to accessory (less than 2%) martite, and quartz - felspar-mica. Grain size mainly about 1/32". Bedding (where present) about 1/16" thick. Impregnating and nodular limonite occur intermittently throughout the sequence.
54'	69'	Off-white "granitic" decomposed metasediment, similar to 18'-54', but martite-free.
69'	75'	Off-white and light brown martite bearing metasediment (as 18'-54').
75'	84'	Very light fawn decomposed martite-free metasediment similar to 54' - 69'.
84'		END OF HOLE. Auger stalls (due to harder drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 70

Project:	Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords	58700N, 49000E	R.L. 580.1'	Grid Warrambee
Vertical		Depth 60'	Plan Ref.
Date Bore Commenced	6.8.61	Completed 6.8.61	Driller S. Dunne
Bore Logged by	G.R. Heath	On 7.8.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment containing 10-20%? martite intersected from 25'-60'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	9'	Pale yellow-brown nodular and sheet laterite, containing20%. 1/100" - 1/200" rounded quartz.
9'	12'	Nodular and impregnating limonite.
12'	25'	Off-white and red-brown mottled decomposed quartz-feldspar-rich metasediment, containing accessory martite (less than 1%). Grain size 1/150".
25'	30'	Decomposed off-white, grey and brown decomposed metasediment. Contains 20-30% limonite-martite with quartz and decomposed feldspar. Grain size 1/100" - 1/200". Structure obscure.
30'	60'	Off-white and yellow-brown decomposed and extensively limonite impregnated metasediment. Contains about 10% martite, with quartz and decomposed feldspar, and mica. Grain size about 1/200", bedding ¼"-1/2" thick, usually obscure.
60'		END OF HOLE. Auger stalls (due to harder drilling and drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. MA 71

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 12 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 524/62

Collar Coords 58600N, 49000E — R.L. 585.1' — Grid Warrambee

Vertical — Depth 84' — Plan Ref.

Date Bore Commenced 6.8.61 — Completed 6.8.61 — Driller S. Deane

Bore Logged by G.R. Heath — On 7.8.61 — Miner D. of M.

SUBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment containing up to 5% martite intersected from 6' - 84'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown, hunker containing 20% rounded 1/200" quartz.
6'	84'	Off-white and red-brown mottled and laminated decomposed quartz - felspar - mica metasediment. Iron oxides (martite) mainly accessory, but up to 5% of rock from 24' - 42'. Grain size mainly 1/20" - 1/100", with some finer grained sequences. Limonite staining and impregnation occur throughout the sequence, and nodules also occur intermittently. Bedding 1/16" thick usually obscure.
84'		END OF BORE. Auger stalls (due to drag on flights and increasingly hard drilling).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 72

Project:	Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords	58600N, 49000E	R.L. 588.3'	Grid Warrambee
Vertical		Depth 102'	Plan Ref.
Date Bore Commenced	7.8.61	Completed 7.8.61	Driller S. Deane
Bore Logged by	G.R. Heath	On 7.8.61	Hirer D. of M.

OBJECT: To test flanks of gravity and magnetic "highs".

RESULT: Decomposed metasediment, containing 5-10% martite from 12'-20', and up to 5% martite from 20'-102', intersected from 12'-102'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown bunkar containing 30%, 1/100" - 1/200" rounded quartz.
6'	12'	Nodular and impregnating limonite.
12'	102'	Off-white, red-brown and rarely yellow-brown mottled and laminated decomposed quartz-feldspar-mica metasediment. Martite content 5-10% from 12'-20', but does not exceed 5% below 20'. Grain size mainly 1/32" - 1/100". Bedding 1/32" - 1/16" thick where visible, but usually obscure.
102'		END OF HOLE. Auger stalls (due to increasingly hard drilling and drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. MA 73

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 58400N, 49000E	R.L. 591.6'	Grid Warrambee
Vertical	Depth 90'	Plan Ref.
Date Bore Commenced 7.8.61	Completed 7.8.61	Driller S. Deane
Bore Logged by G. R. Heath	On 8-10.8.61	Hirer D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: Decomposed metasediment containing 10% martite intersected from 6' - 90'.

LOG Comprises Bore and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown lumpy containing 40%, 1/100" rounded quartz.
6'	90'	Red-brown, with lesser off-white and yellow-brown, decomposed metasediment. Contains 5-20%, usually about 10% martite-limonite, with quartz and decomposed foliamr and mica. Grain size mainly about 1/100", but some iron-free quartz-felspar fragments up to 1/20". Bedding about 1/16" thick where visible.
	90'	END OF HOLE. Auger stalls(due to harder drilling and drag on flights).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 74

Project: Warrambee Aeromagnetic Anomaly			D.M. 664/61
Sec. 12 Hd. Warrambee		Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 583000N. 490000E		R.L. 594.4'	Grid Warrambee
Vertical		Depth 50'	Plan Ref.
Date Bore Commenced 7.8.61		Completed 8.8.61	Driller S. Deane
Bore Logged by G.R. Heath		On 10.8.61	Miner D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: Decomposed metasediment containing 20-30% martite intersected from 6'-50'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale brown limpher containing 30% 1/150" rounded quartz, and brown limonite containing 10-20%, 1/200" martite, and similar proportion of quartz.
6'	50'	Decomposed quartz - martite and quartz - felspar - martite - mica metasediment, containing [illegible] averaging 20-30% martite, with a similar proportion of quartz. Grain size 1/50" - 1/200". Bedding usually obscure, but where present, it is about 1/16" thick. Ilmenite (?) fragments occur from 12'-18'.
	50'	END OF HOLE. Auger stalls (due to harder drilling, and to a lesser extent, drag on the flights

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 75

Project: Warrambee Aeromagnetic Anomaly			D.M. 664/61
Sec. 12	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 58200N, 49000E		R.L. 597.2'	Grid Warrambee
Vertical		Depth 48'	Plan Ref.
Date Bore Commenced 8.8.61		Completed 8.8.61	Driller S. Bonne
Bore Logged by C.E. Heath		On 10.8.61	Miner B. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 15-25% martite intersected from 12' - 48'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown limonite containing 30-40%, 1/100" - 1/200" rounded quartz.
6'	12'	Brown limonite containing 20-30% 1/100" martite and a similar proportion of quartz.
12'	48'	Red-brown and yellow-brown decomposed quartz - foliated martite metasediment. Martite content about 25% near the top grading to 15% near the base of the sequence. Quartz 20-70%. Grain size about 1/100". Bedding generally obscure, but where present, it is 1/16" - ¼" thick.
48'		END OF HOLE. Auger stalls, due to compact, more resistant material.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. HA 76

Project: Warrambee Aeromagnetic Anomaly			D.E. 664/61
Sec. 12	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 58100N, 49000E		R.L. 597.2'	Grid Warrambee
Vertical		Depth 114'	Plan Ref.
Date Bore Commenced 10.8.61		Completed 10.8.61	Driller S. Deane
Bore Logged by G.R. Heath		On 11.8.61	Hirer D. of M.

OBJECT: To test material adjacent to "peaks" on gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 15% martite intersected from 108' - 114'

LOG Comprises Bore and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown loamy containing 30% 1/200" rounded quartz and scattered limonite fragments.
6'	15'	Red-brown clay containing abundant (85%) rounded 1/200" quartz grains and limonite grains and nodules.
15'	36'	Yellow-brown and red-brown decomposed quartz - felspar - mica metasediment. Iron oxides absent or accessory. Grain size 1/100" - 1/200". Bedding usually less than 1/16" thick. Some limonite staining.
36'	60'	Red-brown and off-white decomposed "granite". Grain size up to 1/16" bedding obscure. Felspar (up to 80%) is the dominant mineral.
60'	108'	Decomposed metasediment as 15' - 36'. Martite up to 5% in rare fragments. Limonite nodules abundant below 100'.
108'	114'	Decomposed quartz (80%) - martite (15%) - epidote metasediment containing abundant limonite nodules up to 2" diameter. Grain size 1/250" - 1/500" (for martite) to 1/50" (for quartz). Bedding fairly well defined. about 1/16" thick.
	114'	END OF HOLE (Limit of flights).

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IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. WA 77

Project: Warrenboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrenboo	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 58000N, 49000E	R.L. 597.2'	Grid Warrenboo
Vertical	Depth 114'	Plan Ref.
Date Bore Commenced 10.8.61	Completed 10.8.61	Driller S. Donne
Bore Logged by G.R. Heath	On 11.8.61	Miner D. of M.

OBJECT: To test slight "lows" in gravity and magnetic "highs".

RESULT: Decomposed metasediment containing 10% martite intersected from 102'-108'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown hunkar containing 30% 1/200" rounded quartz.
6'	15'	Red-brown clay containing 60% 1/100" - 1/200" rounded quartz and scattered limonite grains and nodules.
15'	102'	Red-brown, yellow-brown and lesser grey-brown decomposed quartz - felspar - mica metasediment, interbedded with red-brown and off-white decomposed "granite". Grain size 1/100" - 1/200" (metasediment) and 1/30" ("granite"). Bedding generally about 1/16" thick where visible. Martite accessory in most cases, but rare fragments contain up to 2%. Limonite stained and impregnated material is fairly common throughout.
102'	108'	Pale greenish-grey decomposed quartz (50%) - martite (10% - epidote (40%) metasediment (of WA 76). Grain size 1/50" - 1/200". Bedding obscure. Limonite nodules abundant.
108'	114'	Limonite stained and impregnated decomposed "granite".
114'		END OF HOLE (Limit of flights).

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IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. WA 78

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 57900N, 49000E	R.L. 597.9'	Grid Warrambee
Vertical	Depth 66'	Plan Ref.
Date Bore Commenced 10.8.61	Completed 11.8.61	Driller S. Deane
Bore Logged by G.R. Heath	On 12.8.61	Miner D. of M.

OBJECT: To test material adjacent to "peaks" on gravity and magnetic "highs".

RESULT: Decomposed metasediment containing about 10% martite intersected from 9' - 30'.

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Pale brown sandy loam.
1'	5'	Light yellow-brown and grey hunkey containing 20%, 1/200" rounded quartz, and minor nodular chert (flint).
5'	9'	Yellow-brown clay containing 60% 1/100" - 1/200" rounded quartz, and fairly abundant nodular limonite.
9'	30'	Red-brown, yellow-brown and off-white decomposed metasediment containing quartz, decomposed mica and felspar, and 2-10% martite. Grain size mainly 1/200". Bedding 1/16" thick.
30'	39'	Decomposed metasediment, similar to 9' - 30', but martite absent or accessory.
39'	46'	Red-brown and off-white "granite", containing quartz, decomposed felspar and lesser mica. Grain size 1/25" - 1/50".
46'	60'	Decomposed metasediment as 30' - 39'.
60'	66'	Off-white decomposed "granite", somewhat more limonite impregnated than 39' - 46'.
66'		END OF HOLE. Auger stalls (due to harder drilling and drag on flights.)

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. MA 79

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 524/62
Collar Coords 57000N, 49000E	R.L. 598.6'	Grid Warramboo
Vertical	Depth 114'	Plan Ref.
Date Bore Commenced 11.8.61	Completed 12.8.61	Driller S. Deane
Bore Logged by G.R. Heath	On 12.8.61	Miner D. of M.

OBJECT: To test "peak" on magnetic anomaly associated with gravity "high".

RESULT: Decomposed metasediment containing 10% martite intersected from 100' - 105'.

LOG Comprises Heare and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown humber containing 20%, 1/200" rounded quartz.
6'	97'	Red-brown and off-white mottled and laminated decomposed metasediment. Contains quartz with decomposed felspar and mica. Primary iron oxides necessary or absent. Grain size about 1/100". Bedding 1/16" - 1/8" thick where visible. Limonite staining and impregnation occurs intermittently through the sequence.
97'	100'	Off-white decomposed quartz - felspar - mica "granite". Grain size 1/50" - 1/20". Iron oxides necessary to 1 or 2% (e.g. 78'-90'). Limonite impregnation occurs from 78' - 80'. Bedding obscure.
100'	105'	Pale yellow-brown decomposed quartz (40%) - felspar (50%) - martite (10%) metasediment. Grain size 1/200".
105'	114'	Red-brown and off-white decomposed metasediment as 6' - 97'
114'		END OF HOLE (Limit of flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 60

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 00528/6
Collar Coords 57700N, 49000E	R.L. 598.6'	Grid Warrambee
Vertical	Depth 108'	Plan Ref.
Date Bore Commenced 12.8.61	Completed 12.8.61	Driller S. Deane
Bore Logged by G.R. Heath	On 15.8.61	Miner D. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies

RESULT: Decomposed metasediment, containing 5-10% martite, from 18' - 36' and less than 5% martite from 36' - 108', intersected from 6' - 108'.

LOG Comprises Bhore and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown loamy sand containing 30%, 1/100" rounded quartz.
6'	18'	Red-brown, yellow-brown and off-white decomposed quartz-felspar metasediment, containing accessory martite, and dispersed limonite. Grain size about 1/50".
18'	36'	Decomposed metasediment, similar to 6' - 18', but containing 5-10% primary iron oxides.
36'	100'	Off-white with lesser red-brown decomposed metasediment ("granite") containing quartz - decomposed felspar and 1-2% martite. Grain size about 1/20" - 1/40". Nodular and impregnating limonite is fairly abundant, particularly towards the base of the sequence.
100'	108'	Decomposed quartz-felspar and lesser mica metasediment, similar to 6' - 18'. Martite necessary to 5%.
	108'	END OF HOLE. (Auger unable to penetrate more resistant material).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. W. 81

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. DO 520/
Collar Coords 57600N, 49000W	R.L. 590.6'	Grid Warramboo
Vertical	Depth 72'	Plan Ref.
Date Bore Commenced 12.8.61	Completed 13.8.61	Driller S. Donno
Bore Logged by G.R. Heath	On 15.8.61	Miner D. of M.

OBJECT: To test "peaks" on gravity and magnetic anomalies

RESULT: Decomposed metasediment containing 15% martite intersected from 6' - 65'

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	6'	Pale yellow-brown and grey kunkar containing 30%, 1/200" rounded quartz.
6'	65'	Yellow-brown and red-brown, with lesser off-white decomposed quartz (35%) - martite (5-40%, averaging 15%) - felspar-mica metasediment, containing fairly abundant dispersed and nodular limonite. Grain size usually 1/50" - 1/100". Bedding obscure.
65'	72'	Decomposed metasediment, similar to 6' - 65', but only contains accessory martite. Nodular limonite is abundant.
72'		END OF HOLE. Auger stalls (due to harder drilling and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 02

Project: Warrenboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrenboo	Co. Le Hunte	Bore Ser.No. 00620/6
Collar Coords 57600N, 49000E	R.L. 597.6'	Grid Warrenboo
Vertical	Depth 14'	Plan Ref.
Date Bore Commenced 13.8.61	Completed 18.8.61	Driller S. Dunne
Bore Logged by G.R. Heath	On 19.8.62	Miner D. of M.

OBJECT: To test gravity "peak" coinciding with flank of magnetic "high".

RESULT: Limonite impregnated overburden intersected from 6' - 14'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	6'	Pale yellow-brown sheet and nodular limonite containing 10-30%, 1/200", rounded quartz.
6'	14'	Yellow-brown and red-brown clay, containing 50%, 1/50" - 1/100" rounded quartz, totally impregnated with secondary silica and limonite.
14'		END OF HOLE (Too hard and compact for drill to penetrate).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 83

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 12 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 00528/6

Collar Coords 5740ON. 49000E — R.L. 596.6' — Grid Warrambee

Vertical — Depth 114' — Plan Ref.

Date Bore Commenced 18.8.61 — Completed 18.8.61 — Driller S. Deane

Bore Logged by G.R. Heath — On 19.8.61 — Miner D. of M.

OBJECT: To test flanks of gravity and magnetic anomalies

RESULT: Decomposed metasediment intersected from 10'-114' (1-2% Martite 66'-70', up to 5% martite 78' - 114').

LOG Comprises: Macro and microscopic geological log

From	To	Description DETAILED LOG
0	1'	Light brown sandy loam.
1'	6'	Pale yellow-brown kunkar grading to calcareous, f/200" rounded quartz sandstone.
6'	10'	Yellow-brown stiff clay containing 80%, 1/200" rounded quartz.
10'	42'	Off-white, with irregular red-brown limonite staining, decomposed quartz (30%) - felspar - mica "granite". Grain size about 1/25", no visible structure.
42'	66'	Off-white "granite" (as 10'-42') interbedded with yellow-brown quartz-felspar-mica indistinctly laminated metasediment (as primary iron oxides). Grain size 1/50" - 1/100". Limonite staining and impregnation occur throughout.
66'	70'	Granitised metasediment as 42' - 66', but containing 1 or 2% 1/100" martite.
70'	78'	Off-white "granite" as 10' - 42'
78'	114'	Pale yellow-brown to pale khaki decomposed biotite (usually 50-70%), - quartz (20-50%) - felspar metasediment. Martite usually about 1%, but up to 5% in rare fragments. A few off-white quartz-felspar fragments suggest slight granitisation. Grain size 1/50" - 1/100". Structure obscure.
114'		END OF HOLE (limit of machine).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 84

Project:	Warrambee Aeromagnetic Anomaly		R.N. 664/61
Sec. 12	Hd. Warrambee	Co. Le Hunte	Bore Ser.No. 00639/62
Collar Coords	57300N, 49000E	R.L. 595.7'	Grid Warrambee
Vertical		Depth 114'	Plan Ref.
Date Bore Commenced	19.8.61	Completed 19.8.61	Driller S. Deane
Bore Logged by	G.R. Heath	On 21.8.61	Miner D. of M.

OBJECT: To test slight "low" in gravity anomaly associated with flank of magnetic anomaly.

RESULT: Decomposed metasediment (no iron oxides) intersected from 15' - 114'.

LOG Comprises Shore and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light brown sandy loam.
2'	6'	Pale yellow-brown calcareous quartz sand containing scattered hunter nodules.
6'	15'	Red-brown stiff clay containing 75% 1/100" - 1/200" rounded quartz.
15'	24'	Light yellow-brown decomposed metasediment containing 30% 1/25" quartz, 70% clay (decomposed mica and felspar). Some limonite staining.
24'	60'	Decomposed metasediment, similar to 15' - 24' but red-brown and off-white in colour, and containing 60% quartz. Beds 1/8" - 1/32" thick.
60'	70'	Yellow-brown metasediment, similar to 15' - 24', but containing 10-20% recognisable biotite.
70'	114'	Light grey-green and off-white decomposed granitised quartz (40%) - biotite (30%) - felspar (30%) metasediment. Grain size 1/10" - 1/100" usually 1/50". Bedding obscure (almost biotite rich "granite"). Primary iron oxides accessory or absent.
114'		END OF HOLE (limit of machine).

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 85

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 12 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 00639/6

Collar Coords. 57200N, 49000E — R.L. 594.8' — Grid Warrambee

Vertical — Depth 87' — Plan Ref.

Date Bore Commenced 19/8/61 — Completed 19/8/61 — Driller S. Deane

Bore Logged by G.R. Heath — On 21/8/61 — Hirer D. of M.

OBJECT: To test gravity and magnetic anomalies

RESULT: Decomposed metasediments (negligible iron oxides) intersected from 12' - 87'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	1'	Light yellow-brown sandy loam.
1'	6'	Light yellow-brown calcareous quartz sand containing nodular kunker.
6'	12'	Red-brown clay containing 80% 1/150" rounded quartz.
12'	30'	Red-brown and off-white mottled decomposed quartz (40%) - flaky clay (decomposed felspar and mica, 60%) metasediment. Grain size 1/50".
30'	35'	Off-white "granite". Similar to 12'-30', but no visible structure.
35'	42'	Decomposed metasediment as 12' - 30'.
42'	66'	Off-white "granite" (decomposed) as 30'-35'. Primary iron oxides necessary.
66'	72'	Red-brown decomposed metasediment, similar to 12' - 30', but grain size 1/20" and structure obscure.
72'	77'	Off-white decomposed "granite", similar to 30'-35', grain size 1/25".
77'	87'	Pale grey-green and lesser off-white granitized quartz (60%) - biotite (25%) - felspar (15%) metasediment. Grain size 1/25" - 1/50". Bedding 1/16" thick, indistinct.
87'		END OF HOLE. (Auger stalls due to hard drilling and drag on flights).
		Too hard for Auger to penetrate.

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IRON EXPLORATION SECTION

LOG OF AUGER BORE NO. WA 86

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 12 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. D0639/6

Collar Coords. 57100N, 49000E — R.L. 597.4' — Grid Warrambee

Vertical — Depth 84' — Plan Ref.

Date Bore Commenced 21.8.61 — Completed 21.8.61 — Driller S. Donne

Bore Logged by G.H. Heath — On 21.8.61 — Hirer D. of M.

OBJECT: To test slight "low" in gravity anomaly associated with flank of magnetic "high".

RESULT: Decomposed metasediment intersected from 6' - 84' (2-6% martite from 36' - 42').

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light yellow-brown sandy loam.
2'	6'	Pale yellow-brown colcareous quartz sand containing scattered nodules of rather friable hematite.
6'	33'	Red-brown, yellow-brown and off-white mottled and indistinctly laminated quartz (40-50%) - clay (decomposed feldspar and mica, 50-60%) metasediment. Grain size 1/20" - 1/50".
33'	36'	Off-white decomposed "granite". Grain size 1/25", no visible structure.
36'	42'	Decomposed and calcite impregnated quartz (1/30" - 1/100", 30%) - martite (2-6%) - feldspar - mica metasediment. Forms hard resistant layer.
42'	75'	Red-brown and off-white decomposed metasediment, similar to 6' - 33'. Bedding indistinct. 1/10" - 1/20" thick.
75'	80'	Off-white decomposed "granite" as 33' - 36'.
80'	84'	Decomposed metasediment as 42' - 75'.
84'		END OF HOLE. (Auger stalls due to increasingly resistant material and drag on flights).

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IRON EXPLORATION SECTION

LOG OF AUGER HOLE NO. WA 87

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 12 Hd. Warrambee	Co. Le Hunte	Bore Ser.No. DH639/61
Collar Coords 57000N, 49000E	R.L. 600.0'	Grid Warrambee
Vertical	Depth 84'	Plan Ref.
Date Bore Commenced 21.8.61	Completed 24.8.61	Driller S. Bonne
Bore Logged by G.R. Heath	On 26.8.61	Miner D. of M.

OBJECT: To test slight "low" in gravity anomaly adjacent to magnetic "high"

RESULT: Granitised metasediment containing less than 2% martite intersected from 12' - 84'.

LOG Comprises Bore and microscopic geological log

From	To	Description DETAILED LOG
0	2'	Light yellow-brown sandy loam.
2'	6'	Pale yellowbrown sheet and nodular hardpan, in a sandy clay matrix. Hardpan contains 40% 1/200" rounded quartz.
6'	12'	Yellow-brown and red-brown stiff clay containing 75% 1/150" rounded quartz.
12'	18'	Red-brown, off-white and yellow-brown decomposed silica and limonite stained and impregnated "granite". Contain 60% 1/25" quartz, with clay (decomposed felsics) and less than 1% martite.
18'	24'	Brown decomposed quartz (50%) - martite (2%) - felspar - mica metasediment. Grain size 1/25" - 1/50". Structure obscure.
24'	60'	Red-brown and off-white laminated and mottled decomposed quartz 40-50% - felspar - mica metasediment. Contains less than 1% martite. Grain size about 1/25" - 1/50". Laminae (where visible) about 1/20" thick.
60'	84'	Off-white decomposed "granite". Contains about 50% quartz with felspar and lesser mica. Grain size 1/15". Martite absent or rare accessory. No visible structure.
84'		END OF HOLE (Auger stalls due to increasingly resistant material and drag on flights).

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IRON EXPLORATION SECTION

LOG OF DIAMOND DRILL HOLE NO. WD 1

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. DD 3/62

Collar Coords. 58400N, 67150E — R.L. 451.2° — Grid Warrambee

Vertical — Depth 400° — Plan Ref.

Date Bore Commenced 28.6.61 — Completed 12.7.61 — Driller G.Speldewin

OBJECT: To test at depth itabirite intersected on magnetic "high" by WR 2

RESULT: Iron formation intersected from 60° - 116.5°, 189.5° - 195°, 203° - 220° and 255.3° - 260°.

LOGS - Comprises
Whole and microscopic geological log
Magnetic Log
Summary Log
Core Recovery and Condition

From	To	Description SUMMARY LOG
		Continued from WR 2
60°	116.5°	Metasediment (itabirite in part) containing 10-75% averaging 30% magnetite-martite, with quartz, orthoclase, biotite and variable garnet and epidote.
116.5°	189.5°	Irregularly granitised metasediment (varied from unaltered metasediment to "granite"). "Pseudo-diorite" (amphibole metasediment) 139.7° - 140.7°.
189.5°	260°	Metasediment (usually somewhat granitised). Magnetite rich 189.5° - 195° (15%) " " 203° - 220° (30%) " " 255.3° - 260° (40%) Amphibole rich 194° - 194.5°
260°	389.7°	Granitised metasediment grading to "granite" Amphibole rich 305° - 306° " " 329° - 330.3° " " 365° - 367°
389.7°	400°	Homogeneous amphibole metasediment.

DIAMOND DRILL HOLE HD 1 (Contd.)

DETAILED LOG - CONTINUED FROM HR 2

From	To	Description
68'	93'	Martite-magnetite itabirite containing irregular blebs and lenses of metasomatically introduced (?) pink orthoclase (crystals up to ¼"). Composition about: 50-65% quartz-felspar, 0-20% average 5-10% biotite, 15-70% average 30-40% martite-magnetite, very rare garnet and epidote. Grain size 1/20"-1/50". Beds (due to mineral segregation) 1/10"-1" thick. Attitude 60° to core axis at 69° " 60° " " " " 72° " 55° " " " " 78° " 55° " " " " 85° " 40° " " " " 89°
93'	97'	Martite-magnetite itabirite, similar to 68'-93', but containing 10-20% bedded somewhat decomposed epidote. Attitude 55° to core axis at 97'.
97'	101'	Martite-magnetite itabirite, finer grained than 68'-97' (1/50"-1/100"). Contains 30-75% averaging 40-60% martite-magnetite, 5-10% pale pink garnet, 40-55% quartz with minor orthoclase. Regular bedding 1" - 1/20" thick. Attitude 45°-50° to core axis at 98'. " 60° " " " " 101'.
101'	111'	Quartz-biotite-martite-magnetite garnet metasediment, containing irregular beds, lenses and masses of up to ¼" crystals of metasomatic quartz-orthoclase and rarely biotite, which may obliterate bedding (e.g. 107'-108'). Metasediment, 1/50"-1/100" grains, quartz 70%, garnet 10%, biotite 10%, martite-magnetite 10%. Bedding similar to itabirite. Attitude 55° to core axis at 104'. " 55°-55° " " " " 110'.
111'	116.5'	Metasediment as 101'-111', but containing less metasomatic quartz-orthoclase and rare ¼" epidote masses in dislocated areas (e.g. 114'). Attitude 55° to core axis at 112' " 55° " " " " 115'
116.5'	118.5'	Very hard quartz (85%) - biotite (15%) metasediment with rare epidote and pyrite. Bedding etc. as itabirite
118.5'	127.7'	Quartz-biotite-garnet metasediment, similar to 111'-116.5' but containing less than 5% magnetite-martite. Grain size 1/20"-1/50". Attitude 40°-45° to core axis at 120'. " 40° " " " " 125'.
127.7'	139.7'	Granitic metasediment. 1/30"-¼" beds of quartz, orthoclase and biotite. Grain size uniformly 1/15". Garnet and iron oxides are rare accessories. Zig-Zag (possibly en echelon) folding (1" amplitude and wavelength) is common throughout the sequence. Attitude 30° (accumulated) to core axis at 130'. Attitude 45° (") " " " " 135'.

DIAMOND DRILL HOLE ND 1 (Contd.)

DETAILED LOG - CONTINUED FROM ND 2

From	To	Description
139.7'	140.7'	Dark grey 1/50" - 1/100" quartz-felspar (white) - biotite rock, containing amphibole (?) and minor magnetite. This rock is metasedimentary, but looks like a fine grained diorite. Attitude 45° to core axis at 140'.
140.7'	172.3'	Granitic metasediment as 127.7' - 139.7', but augens of quartz-orthoclase are more common, and bedding in places (e.g. 164.5') is obliterated, giving a classic quartz-orthoclase-biotite granite. Drag folding is common (east limb anticline, e.g. 158'). Cross bedding (?) is present at 157', suggesting beds are overturned. Garnet and magnetite are only present in the least altered metasediment. Attitude 65°(?) to core axis at 141'. " 50° " " " " 145'. " 55°(?) " " " " 149'. " 45°-60° " " " " 151'. " 50° (lenticular)" " " 155'. " 55° " " " " 155.5' " 60° " " " " 157' " 60°-65° " " " " 160' " 55° " " " " 165' " 55°(contorted) " " 170'
172.3'	182.5'	Fine grained (1/50") metasediment containing numerous veins of pure white quartz up to 1" thick. These are most numerous near 176'. Grain size is mainly less than 1/50 in unaltered areas. Rock contains quartz, epidote, biotite and minor magnetite (less than 1%). At 173', a brecciated zone contains" epidote crystals and masses of fibrous serpentine (possibly after amphibole). From 173.5' - 175', rock is very homogeneous dark grey. Garnet and metasomatic quartz-orthoclase are irregular constituents. Attitude 45°-60° to core axis at 177'. " 70° " " " " 178' " 65°-70° " " " " 180'
182.5'	183.5'	Unaltered quartz-felspar-biotite metasediment similar to 111' - 114.5'.
183.5'	189.5'	Strongly metasomatised quartz-felspar-biotite metasediment. Bedding severely contorted or obliterated. Rock contains more than 50% orthoclase. Attitude 45°-70° to core axis at 190°. " 60° " " " " 192°.
189.5'	195'	Metasediment containing 25% garnet, 15% magnetite, 20% chlorite, 10% biotite, 30% quartz. Metasomatic quartz, and to a lesser extent orthoclase, occur as irregular masses through the sequence. Epidote is an irregular minor constituent. Attitude 45°-70° to core axis at 190°. " 60° " " " " 192°.

DIAMOND DRILL HOLE NO 1 (Contd.)

DETAILED LOG - CONTINUED FROM NO 2

From	To	Description
195'	196'	Quartz-felspar-biotite metasediment as 182.5' - 183.5'. Bedding 55° - 60° to core axis at 195'.
196'	196.5'	Quartz-epidote-amphibole rock containing minor magnetite. Grain size about 1/20". Amphibole is dark green and irregularly oriented (hornblende or actinolite ?).
196.5'	203'	Quartz-felspar-biotite metasediment containing minor magnetite and accessory epidote. Contains irregular quartz and quartz-orthoclase masses, similar to 111'-116.5'. Attitude 65°-70°(?) to core axis at 200'. " 55°-60° " " " " 202'.
203'	220'	Quartz (40%) - magnetite (lesser martite) (30%) - garnet (15%) - biotite (15%) metasediment similar to 109.5' - 195'. Magnetite content up to 80% for short (less than 6") sequences. Grain size 1/50" - 1/200". Metasomatic quartz-orthoclase (up to ¼" crystals) is a minor constituent, but occurs throughout the sequence. Pyrite is occasionally abundant in joint planes. Attitude 50° to core axis at 205'. " 50°-55° " " " 210'. " 65° to " " " 215'. " 50° " " " " 220'.
220'	244'	Quartz-biotite metasediment, with fairly abundant (40%) metasomatic quartz-orthoclase present as irregular beds and dispersed masses. Grain size 1/20" - 1/50", beds usually less than ½" thick. Attitude 45°-60° to core axis at 225'. " 50° " " " " 230'. " 35°-45° " " " " 235'. " 40° " " " " 240'.
244'	250'	Fine grained (1/50" - 1/100") "granite" (quartz-biotite metasediment completely impregnated with orthoclase, bedding virtually obliterated). Rare grains of garnet occur in the least altered portions.
250'	254.2'	Quartz-biotite metasediment with minor garnet and metasomatic quartz-orthoclase similar to 220'-244'. Attitude 40° to core axis at 250'.
254.2'	255.3'	Fine grained "granite" as 244'-250'. Attitude 65° to core axis at 225'.
255.3'	260'	Quartz (25%) - magnetite (40%) - garnet (20%) - biotite (15%) metasediment. Grain size uniformly 1/100". Bedding not well defined. Quartz-orthoclase rare. Beds less than ½" thick. Attitude 65° to core axis at 260'.

DIAMOND DRILL HOLE #D 1 (Contd.)

DETAILED LOG - CONTINUED FROM #H 2

From	To	Description
260'	305'	Quartz-plagioclase-biotite metasediment, with abundant quartz-orthoclase in most places. Bedding generally obscure, giving classic looking "granites" and "granodiorites". Some plagioclase (e.g. 304') shows prominent multiple twinning. Grain size 1/50" - 1/10". Attitude 55° to core axis at 265° " 45° " " " " 270° " 50° " " " " 275° " 45°-50° " " " " 280° " 45° " " " " 285° " 30°-40° " " " " 290° " 50°-55° " " " " 295° " 45°-50° " " " " 300° " 50°-55° " " " " 305°
305'	306'	Greenish grey quartz-biotite-amphibole rock. Contains minor magnetite. Grain size 1/20".
306'	329'	"Granite" and "granodiorite" type metasediments as 260°-305°. Attitude 45°-50° to core axis at 310° " 40° " " " " 315° " 40° " " " " 320° " 40° " " " " 325°
329'	330.3'	Quartz-biotite (60%) - amphibole metasediment. Grain size 1/50". Bedding about 1/8" thick. Attitude 30° to core axis at 330°.
330.3'	355'	"Granodiorite" type metasediment similar to 260'-305'. Attitude 35° to core axis at 335° " 40° " " " " 340° " 35° " " " " 345° " 55° " " " " 350° " 40° " " " " 355°
355'	357'	Biotite-amphibole metasediment. Grain size 1/20". Bedding generally poorly defined.
357'	389.7'	"Granodiorite" and lesser "granite" type metasediments similar to 260'-305'. Bedding generally contorted and frequently obliterated. Grain size 1/20" - 1/50". Attitude 50° to core axis at 360° " 45° " " " " 365° " 30°-40° " " " " 370° " 40° " " " " 375° " 40° " " " " 380° " 50° " " " " 385°
389.7'	400'	Quartz-plagioclase-biotite-amphibole metasediment, very uniform appearance throughout. Grain size mainly about 1/30". Beds somewhat irregular, average 1/16" thick. Attitude 45° to core axis at 390° " 35° " " " " 395° " 35° " " " " 397° " 50° " " " " 400°
400'		END OF HOLE.

DIAMOND DRILL HOLE NO 1

CORE RECOVERY

From	To	Recovery	Condition
68'	75.3'	6.3'	Fair - Good
75.3'	85'	3.9'	Broken
85'	88'	1.8'	Fair
88'	97'	3.7'	Fair
97'	98.3'	1.0'	Fair - Good
98.3'	101'	2.2'	Broken
101'	106'	3.8'	Excellent
106'	110'	4.6'	Good - Excellent
110'	117.5'	6.0'	Good
117.5'	122.5'	4.5'	Excellent - Fair
122.5'	132.8'	10.0'	Excellent
132.8'	136.3'	3.5'	"
136.3'	142.8'	6.4'	"
142.8'	152.8'	9.6'	"
152.8'	155.3'	2.4'	"
155.3'	162.5'	7.7'	"
162.5'	172.8'	10.0'	"
172.8'	182.5'	9.9'	"
182.5'	191.3'	8.0'	Excellent - Fair
191.3'	192.5'	1.6'	Good
192.5'	202'	8.8'	Good
REDUCE		TO	BX
202'	212'	8.6'	Fair - Good
212'	222'	9.6'	Broken - Fair
222'	227'	5.0'	Broken - Fair
227'	232'	4.6'	Fair - Good
232'	242'	9.8'	Good
242'	251.7'	9.4'	Excellent
251.7'	252'	0.4'	Good
252'	262'	9.5'	Broken & Fair
262'	272'	9.9'	Excellent
272'	279.3'	7.1'	"
279.3'	282'	2.5'	Excellent
282'	292'	9.7'	"
292'	301.8'	8.8'	"
301.8'	304'	2.3'	"
304'	310.8'	6.3'	"
REDUCE		TO	AX
310.8'	319.8'	8.3'	Excellent
319.8'	329.8'	9.1'	"
329.8'	335'	2.2'	Fair - Broken
335'	341'	3.4'	Fair
341'	351'	9.0'	Good - Excellent.
351'	359'	5.5'	Fair
359'	369.5'	9.5'	Excellent
369.5'	379.8'	10.3'	Good - Excellent.
379.8'	389.8'	8.8'	Good
389.8'	395.3'	4.2'	"
395.3'	400'	5.6'	"
400'	END OF HOLE		
Total		294.3'	73.6%

DIAMOND DRILL HOLE NO 1

MAGNETIC LOG

At	Deflection	At	Deflection	At	Deflection
69'	90+°	180'	5°	230'	10°
70.5'	90+°	190'	5°	232'	5°
75'	90°	191'	45°	235'	5-°
78'	90+°	191.3'	90-°	240'	10°
85'	90+°	191.6'	90°	250'	5-°
90'	90+°	192'	10°	255'	90+°
95.5'	30°	192.3'	15°	256'	90+°
98'	90+°	193'	90-°	258'	90+°
99.5'	90°	195'	90°	259'	90+°
101'	90°	196'	20°	260'	10°
101.5'	90+°	197.5'	15-20°	265'	0°
105'	90°	198.5'	10°	300'	0°
107'±	90°	200.5'	10°	306'	5°
110'	90-°	201.7'	15°	310'	0°
112'	15°	202.5'	5°	312'	15°
113'	15°	203.5'	90°	329'	15°
115'	90-°	204.5'	90°	330'	10°
116'	90-°	205'	90+°	352'	5°
118'	10°	206.5'	90+°	353'	5°
120'	10°	208'	90+°	359'	0°
125'	5°	209'	90+°	380'	0°
130'	5°	210'	90-°	390'	0°
135'	0°	211'	90°	400'	0°
140'	15°	212'	90-°		
162'	5°	213'	90-°		
171'	5-°	214'	90°	400'	END OF HOLE
172.5'	5°	215'	90°		
173.5'	30°	216'	90-°		
174.3'	20°	218'	90°		
175'	30°	220'	10°		
175.5'	30°	223'	5°		
177'	5°	225'	0°		

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF DIAMOND DRILL HOLE NO. WD 2

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. DD 7/6

Collar Coords 55250N, 58000E — R.L. 525.9' — Grid Warrambee

Vertical — Depth 928' — Plan Ref.

Date Bore Commenced 19.7.61 — Completed 29.8.61 — Driller G. Speldew

Bore Logged by G.R. Heath — On 24.7.61 to 7.9.61 — Miner D. of M.

OBJECT: To test material producing gravity and magnetic "highs" below WR 13.

RESULT: Iron formation intersected from 247'-886'.

LOG Comprises: Macro and microscopic geological log
Summary Log
Magnetic Log
Core Recovery and Condition. Inclination of Hole.

From	To	Description SUMMARY LOG
		CONTINUED FROM WR 13
196'	196.8'	"Granite" as 193' - 197' in WR 13.
196.8'	198'	Quartz-epidote-biotite metasediment.
198'	204.5'	"Granite" as 196' - 196.8'.
204.5'	232'	Granitised metasediment.
232'	243.9'	"Granite" similar to 196' - 196.8', but containing abundant garnet porphyroblasts..
243.9'	247'	Granitised metasediment, dislocated near the base.
247'	886'	Iron formation. Metasediment containing 10-25% usually 15-20% magnetite and less commonly martite. Other major constituents quartz, orthoclase, plagioclase, biotite, garnet, epidote and sillimanite. Includes a thin amphibolite sequence (872.5' - 876.1'). Granitisation occurs throughout the sequence.
886'	928'	Severely granitised granitic metasediment.

CONTINUED FROM WR 13 (197°)

From	To	Description DETAILED LOG
196°	196.8°	"Granite" as 193° - 197° in WR 13.
196.8°	198°	Grey quartz (30%) - epidote (45%) - biotite (25%) metasediment. Grain size about 1/30", very uniform appearance throughout. Felspar and amphibole are minor constituents. Bedding, frequently obscure, less than ½" thick. Attitude 45° ? to core axis at 197.5°.
198°	204.5°	Pink "granite" similar to 196° - 196.8°, with small remnant patches of relatively unaltered metasediment. Contains about 60% orthoclase, 35% quartz, 5% biotite, but pronounced variations occur throughout the sequence (regions of almost pure quartz or orthoclase). Grain size about 1/10". Relict metasediment is similar to 196.8° - 198°. Attitude 45° to core axis at 200°.
204.5°	209.5°	Grey and pink somewhat granitised, fairly uniform looking metasediment. Consists of alternating beds (1/16" - ¼ thick) of 1/50" quartz (50%) - biotite (50%) and 1/15" quartz (50%) - orthoclase (50%). Pyrite and epidote are accessory constituents. Bedding well defined but somewhat contorted. Attitude 45° (?) to core axis at 205°.
209.5°	219.5°	Granitised metasediment. Generally similar to 204° - 209.5°, but more strongly altered, and bedding more distorted. A 3" band of almost pure quartz is present at 216°, and porphyroblasts of garnet (up to ½" diameter form about 5% of the rock from 217° - 218°. Attitude 55°? to core axis at 210°. " 60° " " " " 211°. " 40° " " " " 215°.
219.5°	224.2°	Very homogeneous tough (sub-conchoidal fracture) granitise metasediment. About same degree of granitisation as 204° - 209.5°, but quartz-orthoclase uniformly spread through the rock. Contains 70-75% quartz, 15-20% orthoclase, 10% biotite with accessory pyrite and magnetite. Bedding generally obscure, but where present it is usually about 1/8" thick. Attitude 65° to core axis at 220°.
224.2°	232°	Fairly severely granitised quartz-biotite metasediment similar to 209.5° - 219.5°. Pyrite and magnetite occur as accessories throughout, while garnet (usually less than 1/10" crystals) is a minor constituent from 225.5° to 226.5°. Bedding mainly contorted or obscure. Attitude 0° to core axis at 225°. " 35° " " " " 226°. " 45° " " " " 230°.
232°	243.9°	Pink "granite" containing relict metasediment, similar to 196° - 204.5° but containing garnet crystals from 232° - 241°. This garnet is most abundant from 239° - 240.5° where it is present as porphyroblasts (perfect rhombic dodecahedrons) up to 1/4" diameter forming 10-20% of the rock. Grain size is variable, but generally 1/10" - 1/20". Bedding obscure and contorted. Attitude 55°? to core axis at 235°. " 40°? " " " " 240°.

From	To	Description DETAILED LOG
243.9'	245'	Fairly severely granitised metasediment as 209.5' - 219.5'. Attitude 55° - 65° to core axis at 245'.
245'	247'	Severely dislocated and discordantly granitised zone. Consists of clots and veins of biotite-magnetite irregularly distributed through a mass of up to 3/4" diameter orthoclase crystals. Magnetite forms 15-20% of the rock. Quartz, epidote and pyrite are minor accessories.
247'	886'	Low grade iron formation. With the exception of a thin amphibolite sequence, the unit consists of granitised quartz-orthoclase-magnetite-martite-biotite-garnet-epidote-sillimanite metasediment. Quartz is invariably present in the metasediment, as well as forming veins in some of the more severely granitised areas. Unless otherwise mentioned, white felspar (usually plagioclase) is estimated with quartz, as they are practically indistinguishable using the equipment available. In a few cases, plagioclase shows prominent multiple twinning, and the mineral is estimated separately in these cases. Orthoclase Plagioclase, like quartz, occurs throughout the sequence. In the least affected metasediment, it is finely dispersed through the rock, but in the severely granitised areas it forms discordant masses of up to 1" diameter crystals. Primary iron oxides occur in most units of the sequence. As far as can be determined, magnetite is the dominant species, but a few aggregates of non-magnetic octahedra (martite) occur. Garnet and biotite are almost ubiquitous, but rarely become major constituents. Garnet is usually present as 1/100" - 1/200" perfect rhombic dodecahedra. Sillimanite is a fairly common constituent, usually occurring in fairly pure laminae up to 1/10" thick. Epidote is present as dispersed crystals in some metasediment beds, and also occurs as masses up to 3/4" diameter in some dislocated areas. The colour in these masses varies from dirty red-brown to greyish green. Pyrite, calcite, tremolite, serpentine and green amphibole are rare accessories, or only occur over short sequences. Grain size is very consistent throughout the sequence. Garnet and iron oxides usually 1/100" - 1/250" diameter, metasomatic quartz-orthoclase 1/20" - 1" diameter. Other minerals are usually intermediate in size between these extremes. Bedding is fairly well defined in all but the most granitised areas. Beds are mainly less than 1/8" thick, and are usually lenticular in nature. Folding is much less common than in HD 1, but some drag folds (e.g. west limb anticline (?) at 210') to occur.

From	To	Description DETAILED LOG
247'	886' (contd.)	The sequence consists of the following units:
247'	247.4'	Very slightly concordantly to discordantly granitised quartz (30%) - orthoclase (15%) - magnetite (50%) - biotite (5%) metasediment.
247.4'	247.7'	Moderately severely, to severely discordantly granitised quartz (25-30%) - orthoclase (40%) - magnetite martite (10-15%) - biotite (20%0 - metasediment. Bedding obliterated. Orthoclase crystals up to 1/2" diameter.
247.7'	249'	Slightly to moderately, dominantly concordantly granitised quartz (30%) - orthoclase (35%) - magnetite, martite (25%) - biotite (10%) metasediment. Bedding slightly contorted.
249'	250'	Moderately to severely concordantly to discordantly granitised quartz (50%) - orthoclase (35%) - martite, magnetite (5%), - biotite (10%) metasediment. Attitude 40° - 50° to core axis at 250'.
250'	250.4'	Slightly to moderately, dominantly concordantly granitised quartz (35%) - orthoclase (35%) - magnetite (10-15%) - biotite (10%) - garnet (5-10%) metasediment.
250.4'	251.7'	Slightly to moderately discordantly and concordantly granitised quartz (35-40%) - orthoclase (35%) - magnetite (15-20%) - biotite (10%) metasediment.
251.7'	252.2'	Moderately to severely concordantly granitised quartz (35%) - orthoclase (45%) - magnetite (5-10%) - biotite (5-10%) garnet (5%) metasediment.
252.2'	252.7'	Severely concordantly to dominantly discordantly granitised quartz (30%) - orthoclase (55%) - magnetite (5%) - biotite (5%) - garnet (5%) metasediment.
252.7'	253.1'	Slightly to moderately concordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20-25%) - biotite (10%) - garnet (5-10%) metasediment.
253.1'	255.5'	Slightly to moderately discordantly granitised quartz (60-65%) - orthoclase (30%) - magnetite (5-10%) metasediment with accessory garnet and biotite. Very hard with sub-conchoidal fracture. Attitude 50° to core axis at 255'.
255.5'	258.5'	Slightly concordantly granitised quartz (45%) - orthoclase (25%) - magnetite (5%) - biotite (10%) - garnet (5%) - sillimanite (10%) metasediment.
258.5'	260.7'	Moderately, to dominantly strongly discordantly granitised quartz (45%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - garnet (5%) metasediment. Attitude 60° to core axis at 260'.
260.7'	262'	Severely discordantly granitised quartz (60%) - orthoclase (20%) - plagioclase (15%) - magnetite (5%) metasediment. "Quartzitic" looking with sub-conchoidal fracture.
262'	262.3'	Severely discordantly granitised quartz (35-40%) - orthoclase (45%) - biotite (10%) - garnet (5-10%) metasediment.

From	To	Description DETAILED LOG
262.3'	263.2'	Moderately concordantly and lesser discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (20%) metasediment.
263.2'	264.5'	Severely discordantly granitised quartz (35%) - orthoclase (30%) - plagioclase (20%) - biotite (10%) - epidote (5%) metasediment.
264.5'	264.8'	Slightly to moderately concordantly granitised quartz (40%) - orthoclase (30%) - magnetite (25%) - garnet (5%) metasediment.
264.8'	266.2'	Moderately to severely discordantly and lesser concordantly granitised quartz (30-35%) - orthoclase (40%) - magnetite (10%) - biotite (10%) - garnet (5-10%) metasediment. Attitude 15°-20° to core axis at 265'.
266.2'	266.7'	Severely discordantly granitised quartz (25%) - orthoclase (45-50%) - magnetite (5-10%) - biotite (10%) - garnet (5%) metasediment.
266.7'	268.1'	Slightly concordantly granitised quartz (40%) - magnetite (5%) - orthoclase (30%) - biotite (5%) - garnet (15%) - epidote (5%) metasediment.
268.1'	268.6'	Very slightly concordantly granitised quartz (35%) - orthoclase (10%) - magnetite (25%) - biotite (30%) metasediment.
268.6'	269.2'	Moderately to strongly discordantly granitised quartz (20% - orthoclase (60%) - magnetite (5%) - biotite (5%) - garnet (5%) - epidote (5%) metasediment. Orthoclase crystals 1/4" diameter.
269.2'	269.4'	Slightly concordantly granitised quartz (30%) - orthoclase (10%) - magnetite (20%) - garnet (20%) - epidote (20%) metasediment. Garnet and magnetite concentrated in alternate 1/10" beds.
269.4'	269.8'	Severely discordantly granitised quartz (15%) - orthoclase (60%) - magnetite (10%) - garnet (15%) metasediment.
269.8'	270.2'	Moderately to severely concordantly granitised quartz (15% - orthoclase (45%) - magnetite (15%) - biotite (10%) - garnet (10%) - epidote (5%) metasediment with accessory sillimanite. Attitude 45°-60° (contorted) to core axis at 270'.
270.2'	270.3'	Slightly to moderately concordantly and lesser discordantly granitised quartz (45%) - orthoclase (5%) - magnetite (50%) metasediment with accessory epidote and biotite. Vein quartz common.
270.3'	273.3'	Slightly to moderately concordantly granitised quartz (30%) - orthoclase (30%) - magnetite (5%) - garnet (5%) - epidote (30%) metasediment showing minor ptygmatic folding.
273.3'	273.5'	Very slightly concordantly granitised quartz (35%) - orthoclase (5%) - magnetite (60%) metasediment.

From	To	Description DETAILED LOG
273.5'	274.6'	Moderately to severely concordantly and lesser discordant. granitised quartz (35%) - orthoclase (40%) - biotite (1 - garnet (5%) - epidote (10%) metasediment, showing mi ptygmatic folding.
274.6'	275.4'	Slightly concordantly granitised quartz (15%) - orthoclas (5%) - magnetite (60%) - garnet (10%) - epidote (10%) metasediment. Very homogeneous appearance. Attitude 60-65° to core axis at 275'.
275.4'	275.7'	Moderately to severely concordantly granitised quartz (25 - orthoclase (30%) - magnetite (10-15%) - biotite (10-15%) epidote (20%) metasediment
275.7'	276.7'	Slightly discordantly and concordantly granitised quartz (30%) - orthoclase (20%) - magnetite (5-10%) - biotite (10%) - garnet (5-10%) - epidote (25%) metasediment.
276.7'	277.1'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (15%) - magnetite (10-15%) - biotite (5-10%) - garnet (10%) - sillimanite (10%) - epidote (15 metasediment.
277.1'	277.6'	Slightly to moderately concordantly granitised quartz (20% - orthoclase (35%) - magnetite (20%) - biotite (5-10%) - garnet (10%) - epidote (5-10%) metasediment.
277.6'	279.4'	Moderately concordantly granitised quartz (25%) - orthoclase (30-35%) - magnetite (25%) - biotite (5-10%) - garnet (10%) metasediment.
279.4'	279.9'	Moderately concordantly and discordantly granitised quartz (45%) - orthoclase (20%) - magnetite (10%) - biotite (10%) metasediment, with accessory garnet.
279.9'	281.8'	Slightly to moderately concordantly and lesser discordantly granitised quartz (40%) - orthoclase (30%) - magnetite (5%) - biotite (5%) - garnet (5%) - epidote (10%) metasediment. Hard compact rock with sub-conchoidal fracture. Attitude 55° to core axis at 280'.
281.8'	283.5'	Moderately to severely discordantly and concordantly granitised quartz (20%) - orthoclase (45%) - magnetite (5%) - biotite (10%) - garnet (5%) - epidote (10%) metasediment. Contains one 1/2" bed or concordant veing of pure quartz.
283.5'	286.0'	Moderately concordantly granitised quartz (25%) - orthocla (25%) - magnetite (10%) - garnet (10%) - biotite (10%) - epidote (20%) metasediment.
286.0'	286.9'	Moderately concordantly and discordantly granitised quartz (20%) - orthoclase (35%) - magnetite (5%) - biotite (15% - garnet (5%) - epidote (20%) metasediment. Homogeneous appearance, bedding obscure.
286.9'	287.6'	Very slightly concordantly granitised quartz (15%) - orthoclase (5%) - magnetite martite (75%) - biotite (5%) metasediment, very homogeneous appearance.
287.6'	289.3'	Severely discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (showing well developed multiple twinning, 20%) - epidote (20%) metasediment.

From	To	Description DETAILED LOG
289.3'	290.7'	Very severely discordantly granitised (completely dislocated) metasediment consisting of up to 1/2" clots of quartz (40%), orthoclase (20%), magnetite (10%), biotite (5%), garnet (5%) and epidote (20%). Attitude 30°-35° to core axis at 291'.
290.7'	291.8'	Moderately to severely concordantly and lesser discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (15%) - garnet (5%) - epidote (20%) metasediment.
291.8'	293.3'	Slightly concordantly granitised quartz (80%) - orthoclase (5-10%) - magnetite (5-10%) - epidote (5%) metasediment. "Quartzitic" texture, bedding obscure.
293.3'	294.2'	Severely discordantly granitised (almost completely dislocated) metasediment consisting of up to 1/4" clots of quartz (35%), orthoclase (35%), magnetite (5-10%) and epidote (20-25%) crystals.
294.2'	296.0'	Moderately concordantly and discordantly granitised quartz (40%) - orthoclase (35%) - magnetite (10%) - biotite (10% - garnet (10%) - epidote (5%) metasediment. Attitude 35°-40° to core axis at 295'.
296'	296.8'	Slightly to moderately discordantly and concordantly granitised quartz (30%) - orthoclase (40%) - magnetite (20%) - garnet (10%) metasediment. Bedding somewhat contorted.
296.8'	297.5'	Slightly concordantly granitised quartz (40%) - orthoclase (25%) - magnetite (15%) - biotite (10%) - garnet (10%) metasediment.
297.5'	297.7'	Very slightly concordantly granitised quartz (45%) - orthoclase (20%) - magnetite (15-20%) - biotite (5%) - garnet (5-10%) - sillimanite (5%) metasediment.
297.7'	299.2'	Slightly to moderately concordantly and discordantly granitised quartz (25%) - orthoclase (20%) - magnetite (15-20%) - biotite (5%) - garnet (15-20%) - epidote (5%) metasediment. Bedding somewhat distorted.
299.2'	299.5'	Severely concordantly granitised quartz (30%) - orthoclase (45-50%) - magnetite (10%) - biotite (5-10%) - garnet (5%) metasediment.
299.5'	300.9'	Moderately to severely concordantly granitised metasediment consisting of alternating beds of quartz (40%) - martite (60%) and quartz (30%) - orthoclase (25%) - magnetite (25%) - biotite (5%) - garnet (15%). Bedding somewhat contorted. Attitude 40°-45° to core axis at 300'.
300.9'	301.2'	Slightly concordantly granitised quartz (35%) - orthoclase (15%) - magnetite (15%) - biotite (10%) - garnet (15%) - sillimanite (10%) metasediment.
301.2'	302.1'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20%) - biotite (10%) - garnet (10%) metasediment.

DIAMOND DRILL HOLE HD 2 (Contd.) -8-

From	To	Description DETAILED LOG
302.1'	302.5'	Severely discordantly granitised quartz (20%) - orthoclase (55%) - magnetite (5%) - garnet (5%) - epidote (15%) metasediment.
302.5'	304.8'	Moderately concordantly granitised quartz (30%) - orthoclase (20%) - magnetite (20%) - biotite (5%) - garnet (20%) - sillimanite (5%) metasediment.
304.8'	305.9'	Severely discordantly granitised quartz (35%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - epidote (5%) metasediment. Attitude 45°-50° to core axis at 305'.
305.9'	306.9'	Moderately concordantly and lesser discordantly granitised quartz (20%) - orthoclase (35%) - magnetite (20-25%) - biotite (10-15%) - garnet (10%) metasediment.
306.9'	307.1'	Severely discordantly granitised quartz (25%) - orthoclase (45%) - magnetite (15-20%) - biotite (5-10%) - garnet (5%) metasediment.
307.1'	308.5'	Slightly concordantly granitised quartz (25%) - orthoclase (20-25%) - magnetite (15%) - biotite (5%) - garnet (15%) - sillimanite (5%) - epidote (10-15%) metasediment.
308.5'	309'	Slightly concordantly granitised quartz (40%) - orthoclase (15%) - magnetite (5-10%) - biotite (20%) - garnet (5-10%) - tremolite (10%) metasediment.
309'	309.3'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (10%) - biotite (20%) - garnet (5%) - epidote (5%) metasediment.
309.3'	309.4'	Severely discordantly granitised quartz (45-60%) - orthoclase (20%) - magnetite (less than 5%) - epidote (20%) metasediment.
309.4'	314'	Slightly to moderately concordantly and rarely, discordantly granitised quartz (30%) - orthoclase (25-30%) - magnetite (15%) - biotite (5-10%) - garnet (10%) - epidote (10%) metasediment, with accessory sillimanite in scattered laminae. Attitude 55°-60° to core axis at 310'.
314'	315.2'	Moderately discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (20%) - biotite (10%) - garnet (5%) - epidote (5%) metasediment. Attitude 50° to core axis at 315'.
315.2'	316.7'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (20%) - magnetite (10%) - biotite (10%) - garnet (10%) - epidote (15%) metasediment. Contains one 1" sillimanite rich bed.
316.7'	317.2'	Very slightly concordantly granitised quartz (25-30%) - orthoclase (10%) - magnetite (20%) - biotite (15%) - garnet (5-10%) - epidote (20%) metasediment.
317.2'	319.7'	Slightly to moderately discordantly to concordantly granitised quartz (25%) - orthoclase (25%) - magnetite (10%) - biotite (5%) - garnet (15%) - sillimanite (20%) metasediment.

DIAMOND DRILL HOLE HD 2 (Contd.) -9-

From	To	Description DETAILED LOG
319.7'	320'	Severely discordantly granitised quartz (20%) - orthoclase (55%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (5%) metasediment. Attitude 45°? to core axis at 320'.
320'	321'	Moderately discordantly and concordantly granitised quartz (25-30') - orthoclase (30%) - magnetite (15%) - biotite (5-10%) - garnet (10%) - epidote (10%) metasediment.
321'	326.5'	Moderately to severely discordantly and lesser concordantl granitised quartz (20-25%) - orthoclase (40%) - magnetite (10%) - biotite (15%) - garnet (5-10%) - epidote (5%) metasediment. Attitude 45° to core axis at 325'.
326.5'	329.1'	Moderately to severely discordantly granitised quartz (25%) - orthoclase (50%) - magnetite (5%) - garnet (5%) - epidote (15%) metasediment, with accessory biotite.
329.1'	331.4'	Slightly to moderately discordantly and lesser concordantly granitised quartz (40%) - orthoclase (20%) - magnetite (20-25%) - biotite (5%) - garnet (less than 5%) - epidote (5%) metasediment. Attitude 55° to core axis at 330'.
331.4'	332.6'	Severely discordantly granitised quartz (20%) - orthoclase (50%) - magnetite (10%) - biotite (5%) - sillimanite (15%) metasediment.
332.6'	333.8'	Moderately discordantly granitised quartz (35-40%) - orthoclase (25%) - magnetite (35-40%) metasediment.
333.8'	334.8'	Very slightly concordantly granitised quartz (50%) - magnetite (40%) - biotite (10%) metasediment. Very homogeneous appearance.
334.8'	336.3'	Moderately to severely discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (5%) - garnet (5%) - sillimanite (15%) metasediment. Attitude 60° to core axis at 335'.
336.3'	338'	Slightly discordantly and concordantly granitised quartz (40%) - orthoclase (15%) - magnetite (10-15%) - biotite (5-10%) - garnet (5%) - sillimanite (20%) metasediment.
338'	338.4'	Severely discordantly granitised quartz (15%) - orthoclase (45%) - magnetite (5%) - garnet (5%) - epidote (5%) - sillimanite (5%) metasediment.
338.4'	344'	Slightly to moderately concordantly and lesser discordantl granitised quartz (30-35%) - orthoclase (25%) - magnetite (10%) - biotite (5-10%) - garnet (10%) - sillimanite (15%) metasediment. Attitude 50°-55° to core axis at 340'.
344'	345.1'	Moderately to severely discordantly granitised quartz (35%) - orthoclase (45%) - magnetite (5%) - garnet (5%) - epidote (5%) - sillimanite (15%) metasediment. Attitude 60° to core axis at 345'.

From	To	Description DETAILED LOG
345.1'	346.7'	Slightly concordantly granitised quartz (40%) - orthoclase (10%) - magnetite (5%) - biotite (15%) - garnet (10%) - sillimanite (20%) metasediment.
346.7'	347.1'	Moderately to severely discordantly granitised quartz (15%) - orthoclase (35-40%) - magnetite (10%) - biotite (10-15%) - garnet (5%) - sillimanite (20%) metasediment.
347.1'	349.6'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (20-25%) - magnetite (25%) - biotite (5%) - garnet (10-15%) - sillimanite (5% metasediment.
349.6'	349.9'	Moderately to severely concordantly and discordantly granitised quartz (15%) - orthoclase (35%) - magnetite (15%) - garnet (10%) - biotite (10%) - sillimanite (15%) metasediment.
349.9'	352.7'	Slightly concordantly and discordantly granitised quartz (25-30%) - orthoclase (25%) - magnetite (10-15%) - biotite (10%) - garnet (5%) - sillimanite (20%) metasediment. Attitude 45°-50° to core axis at 350°.
352.7'	353'	Severely concordantly and discordantly granitised quartz (20%) - orthoclase (60%) - magnetite (5%) - epidote (5%) - sillimanite (10%) metasediment.
353'	355.5'	Slightly concordantly and discordantly granitised quartz (35%) - orthoclase (15%) - magnetite (10%) - garnet (10%) - biotite (15%) - sillimanite (15%) metasediment. Attitude 60°-65° to core axis at 355'.
355.5'	355.8'	Severely discordantly granitised quartz (20%) - orthoclase (80%) - biotite - magnetite (both minor) metasediment.
355.8'	358.7'	Slightly concordantly granitised quartz (40%) - orthoclase (15%) - magnetite (20%) - biotite ((10%) - garnet (5%) - sillimanite (10%) metasediment.
358.7'	359.7'	Slightly to moderately concordantly granitised quartz (25%) - orthoclase (30%) - magnetite (10%) - biotite (5%) - garnet (10%) - sillimanite (20%) metasediment.
359.7'	361.3'	Moderately concordantly and discordantly granitised quartz (35%) - orthoclase (35%) - magnetite (10%) - biotite (5%) - garnet (5%) - sillimanite (10%) metasediment. Attitude 40° to core axis at 360°.
361.3'	362.7'	Slightly concordantly granitised quartz (40%) - orthoclase (20%) - magnetite (5%) - biotite (15%) - garnet (5-10%) - sillimanite (10-15%) metasediment.
362.7'	363.1'	Severely discordantly and concordantly granitised quartz (20%) - orthoclase (55%) - magnetite (5-10%) - biotite (5%) - garnet (5-10%) - sillimanite (5%) metasediment.
363.1'	365'	Slightly to moderately discordantly and lesser concordantly granitised quartz (25%) - orthoclase (30%) - magnetite (15%) - biotite (5%) - garnet (10%) - sillimanite (15%) metasediment. Attitude 45° to core axis at 365'.

From	To	Description DETAILED LOG
366'	367.1'	Severely discordantly granitised quartz (15%) - orthoclase (50%) - magnetite (10%) - garnet (10%) - sillimanite (15%) metasediment.
367.1'	367.8'	Slightly concordantly granitised quartz (30%) - orthoclase (25%) - magnetite (25%) - biotite (10%) - garnet (10%) metasediment.
367.8'	368.7'	Severely discordantly granitised quartz (20%) - orthoclase (70%) - biotite (5%) - magnetite (5%) metasediment.
368.7'	369.7'	Slightly to moderately concordantly and rarely discordantly granitised quartz (45%) - orthoclase (25%) - magnetite (10%) - biotite (5%) - garnet (10%) - epidote (5%) metasediment.
369.7'	370.7'	Rarely concordantly granitised quartz (40%) - magnetite (40%) - garnet (5%) - epidote (15%) metasediment. Fairly homogeneous appearance. Attitude 60° to core axis at 370'.
370.7'	373.5'	Slightly to moderately concordantly granitised quartz (20-25%) - orthoclase (25%) - magnetite (20%) - biotite (25%) - garnet (5-10%) metasediment.
373.5'	374.9'	Moderately to severely discordantly granitised quartz (20%) orthoclase (50%) - magnetite (20%) - biotite (5%) - epidote (5%) metasediment.
374.9'	375.9'	Moderately discordantly and concordantly granitised quartz (20-25%) - orthoclase (40%) - magnetite (20%) - biotite (5%) - garnet (5%) - sillimanite (5-10%) metasediment. Attitude 45°-50° to core axis at 375'.
375.9'	377.3'	Moderately concordantly and lesser discordantly granitised quartz (45-50%) - orthoclase (25%) - magnetite (15%) - biotite (5-10%) - garnet (5%) metasediment.
377.3'	378.1'	Moderately to severely discordantly and concordantly granitised quartz (20%) - orthoclase (40%) - magnetite (10%) - biotite (10%) - garnet (5%) metasediment.
378.1'	380'	Moderately to severely discordantly and lesser concordantly granitised quartz (25%) - orthoclase (30-35%) - magnetite (25%) - biotite (5-10%) - garnet (10%) metasediment. Includes one "speckled", 1/2" magnetite-rich bed typical of those occurring throughout the rest of the sequence. Attitude 50° to core axis at 380'.
380'	381.5'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (25%) - magnetite (20%) - biotite (10%) - garnet (15%) metasediment.
381.5'	381.9'	Slightly concordantly granitised quartz (35%) - orthoclase (15%) - magnetite (15%) - biotite (5%) - garnet (10%) - sillimanite (15%) - epidote (5%) metasediment.

DIAMOND DRILL HOLE ND 2 (Contd.) -12-

From	To	Description DETAILED LOG
381.9'	382.2'	Severely discordantly granitised quartz (20%) - orthoclase (50%) - magnetite (10%) - biotite (5%) - garnet (5%) - sillimanite (10%) metasediment.
382.2'	383.5'	Slightly to moderately concordantly granitised quartz (40%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - garnet (5%) - sillimanite (10%) metasediment.
383.5'	385.3'	Slightly concordantly granitised quartz (60%) - orthoclase (10%) - magnetite (10%) - biotite (5%) - garnet (5%) - sillimanite (5%) metasediment. Attitude 45° to core axis at 385'.
385.3'	388.2'	Slightly to moderately concordantly and rarely discordantly granitised quartz (45%) - orthoclase (15%) - magnetite (10%) - biotite (10%) - garnet (15%) - sillimanite (5%) metasediment.
388.2'	389.8'	Moderately concordantly and discordantly granitised quartz (35%) - orthoclase (25%) - magnetite (10%) - biotite (15% - garnet (5%) - epidote (10%) metasediment containing accessory sillimanite.
389.8'	390.1'	Moderately concordantly granitised quartz (40%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - sillimanite (10%) metasediment containing accessory garnet. Attitude 45° ; to core axis at 390'.
390.1'	392.8'	Slightly concordantly and rarely discordantly granitised quartz (45%) - orthoclase (20%) - magnetite (20%) - biotite (5%) - garnet (5%) metasediment.
392.8'	393.2'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (50%) - magnetite (15%) biotite (10%) - garnet (5%) metasediment.
393.2'	394.5'	Slightly concordantly granitised quartz (60%) - orthoclase (15%) - magnetite (15%) - biotite (5%) - garnet (5%) metasediment.
394.5'	394.9'	Moderately to severely discordantly granitised quartz (30%) - orthoclase (50%) - magnetite (10%) - garnet (5%) metasediment.
394.9'	395.5'	Slightly concordantly granitised quartz (50%) - orthoclase (10%) - magnetite (20%) - biotite (10%) - garnet (10%) metasediment. Attitude 45° to core axis at 395'.
395.5'	396.0'	Severely discordantly granitised quartz (25%) - orthoclase (60%) - magnetite (5%) - biotite (5%) - garnet (5%) metasediment.
396.0'	397.7'	Slightly concordantly granitised quartz (60%) - orthoclase (10%) magnetite (10-15%) - biotite (5-10%) - garnet (5%) - sillimanite (5%) metasediment.
397.7'	400'	Moderately concordantly granitised quartz (35-40%) - orthoclase (40%) - magnetite (5-10%) - biotite (5%) - garnet (5%) - sillimanite (5%) metasediment. Attitude 65° to core axis at 400'.

From	To	Description DETAILED LOG
400'	400.7'	Slightly concordantly granitised quartz (5%) - orthoclase (15%) - magnetite (10%) - biotite (10%) - garnet (5%) - sillimanite (10%) metasediment.
400.7'	402'	Slightly concordantly granitised quartz (20%) - orthoclase (10%) - magnetite (25%) - green biotite-chlorite (10%) - garnet (5%) - epidote (30%) metasediment.
402'	403.7'	Slightly concordantly granitised quartz (40%) - orthoclase (15%) - magnetite (15%) - garnet (10%) - sillimanite (20%) metasediment.
403.7'	404.1'	Moderately to severely discordantly granitised quartz (20%) - orthoclase (45%) - magnetite (10%) - biotite (5%) - sillimanite (15%) - epidote (5%) metasediment.
404.1'	405.7'	Moderately concordantly granitised quartz (20%) - orthoclase (30%) - magnetite (20%) - biotite (5%) - garnet (10%) - sillimanite (15%) metasediment. Attitude 45°-50° to core axis at 405'.
405.7'	406.3'	Moderately to severely concordantly granitised quartz (20%) - orthoclase (45%) - magnetite (15%) - biotite (5%) - garnet (5%) - epidote (10%) metasediment.
406.3'	407.1'	Slightly to moderately concordantly and rarely discordantly granitised quartz (35-40%) - orthoclase (20%) - magnetite (20-25%) - biotite (10%) - garnet (5%) - epidote (5%) metasediment.
407.1'	409.1'	Moderately concordantly and lesser discordantly granitised quartz (25%) - orthoclase (30%) - magnetite (10%) - biotite (15%) - garnet (5%) metasediment.
409.1'	409.8'	Slightly concordantly granitised quartz (45%) - orthoclase (20%) - magnetite (10%) - biotite (5%) - garnet (15%) - epidote (5%) metasediment.
409.8'	411'	Moderately to severely discordantly granitised quartz (30%) orthoclase (50%) - magnetite (20%) metasediment. Attitude 45° to core axis at 410'.
411'	411.4'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (15%) - magnetite (30%) - biotite (5%) - garnet (5%) - epidote (10%) metasediment.
411.4'	412.2'	Moderately to severely concordantly and discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (10%) - biotite (10%) - garnet (10%) - epidote (5%) metasediment.
412.2'	413.1'	Slightly concordantly and lesser discordantly granitised quartz (55%) - orthoclase (20%) - magnetite (15%) - biotite (5%) - garnet (5%) metasediment.
413.1'	413.4'	Moderately to severely concordantly and discordantly granitised quartz (35%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - garnet (5%) metasediment.
413.4'	413.7'	Very slightly granitised quartz (55%) - orthoclase (dispersed, 10%) - magnetite (15%) - biotite (5%) - garnet (15%) metasediment.

From	To	Description DETAILED LOG
413.7'	415.5'	Moderately to severely discordantly and concordantly granitised quartz (40%) - orthoclase (40%) - magnetite (10%) - biotite (5%) - garnet (5%) metasediment. Attitude 35°-40° to core axis at 416'.
415.5'	418.2'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (15%) - biotite (10%) - garnet (5%) metasediment.
418.2'	419'	Severely concordantly and discordantly granitised quartz (25%) - orthoclase (55%) - magnetite (10%) - biotite (5% - garnet (5%) metasediment.
419'	419.5'	Slightly to moderately concordantly granitised quartz (30% - orthoclase (25%) - magnetite (20%) - biotite (10%) - garnet (15%) metasediment.
419.5'	422.1'	Moderately to severely discordantly and lesser concordantl granitised quartz (25%) - orthoclase (40-45%) - magnetite (5-10%) - biotite (10%) - garnet (15%) metasediment. Attitude 50° to core axis at 420'.
422.1'	423.1'	Slightly to moderately concordantly and minor discordantly granitised quartz (40%) - orthoclase (30%) - magnetite (15%) - biotite (10%) - garnet (5%) metasediment.
423.1'	425'	Severely concordantly and discordantly granitised quartz (35-40%) - orthoclase (50%) - magnetite (10-15%) metasediment. Attitude 40°-45° to core axis at 425'.
425'	427.2'	Moderately concordantly and discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (20%) - biotite (10%) - garnet (5%) metasediment.
427.2'	427.8'	Severely discordantly granitised quartz (40-45%) - magnetite (5-10%) - orthoclase (50%) metasediment.
427.8'	429.5'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - plagioclase (25%) metasediment.
429.5'	430.2'	Severely discordantly granitised quartz (25%) - orthoclase (55-60%) - magnetite (10%) - biotite (5-10%) metasediment Attitude 55° to core axis at 430'.
430.2'	431.2'	Slightly to moderately concordantly granitised quartz (50% - orthoclase (30%) - magnetite (15%) - biotite (5%) metasediment.
431.2'	436'	Severely discordantly granitised (completely dislocated) metasediment containing irregular masses of quartz (30%) - magnetite (15%) - epidote (25%) crystals. Attitude 40° ; to core axis at 436.5'.
436'	439.1'	Moderately concordantly and discordantly granitised quartz (25/40%) - orthoclase (30%) - magnetite (15%) - biotite (5-10%) - garnet (10%) metasediment.
439.1'	440.5'	Severely discordantly granitised quartz (30%) - orthoclase (50%) - magnetite (5%) - garnet (5%) - epidote (10%) metasediment. Attitude 40° to core axis at 440'.

From	To	Description DETAILED LOG
440.5'	442.2'	Slightly concordantly granitised quartz (45%) - orthoclase (20%) - magnetite (5%) - biotite (15%) - sillimanite (15%) metasediment.
442.2'	442.7'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (20%) - magnetite (35-40%) - garnet (5-10%) - epidote (5%) metasediment.
442.7'	443.6'	Moderately to severely discordantly granitised quartz (30%) - orthoclase (45%) - magnetite (10%) - biotite (5%) - epidote (10%) metasediment.
443.6'	448.1'	Moderately discordantly granitised quartz (35%) - orthoclase (45%) - magnetite (15%) - biotite (5%) metasediment. Attitude 40° to core axis at 444'.
448.1'	449.6'	Slightly to moderately concordantly and lesser discordantly granitised quartz (50%) - orthoclase (20%) - magnetite (15%) - biotite (10%) - garnet (5%) metasediment.
449.6'	450.5'	Severely discordantly granitised quartz (25%) - orthoclase (1/8" - 1/4" crystals, 65%) - magnetite (5%) - garnet (5%) metasediment. Attitude 45° to core axis at 451'.
450.5'	451.2'	Slightly concordantly granitised quartz (45%) - orthoclase (25%) - magnetite (10%) - biotite (15%) - garnet (5%) metasediment.
451.2'	453.9'	Moderately to severely discordantly and lesser concordantly granitised quartz (25%) - orthoclase (30%) - biotite (20%) - magnetite (15%) - garnet (10%) metasediment.
453.9'	454.6'	Slightly to moderately concordantly granitised quartz (45% - orthoclase (20%) - magnetite (20%) - biotite (15%) metasediment with accessory garnet. Attitude 45°-50° to core axis at 455'.
454.6'	458'	Moderately to severely discordantly granitised quartz (30% - orthoclase (45%) - magnetite (10%) - biotite (5%) - epidote (5%) metasediment.
458'	460.3'	Slightly to moderately concordantly and lesser discordantly granitised quartz (40%) - orthoclase (10%) - magnetite (35%) - biotite (5%) - garnet (5%) metasediment. Attitude 45°-50° to core axis at 460'.
460.3'	463.1'	Slightly to moderately concordantly and discordantly granitised quartz (50%) - orthoclase (20%) - magnetite (10%) - biotite (10%) - garnet (5%) metasediment.
463.1'	464.6'	Moderately to severely discordantly and concordantly granitised quartz (40%) - orthoclase (35-40%) - magnetite (20-25%) metasediment.
464.6'	465.6'	Moderately concordantly and discordantly granitised quartz (45%) - orthoclase (30%) - magnetite (10%) - biotite (15%) metasediment. Attitude 25°(?) to core axis at 465'.
465.6'	466.2'	Moderately concordantly granitised quartz (35%) - orthoclase (30%) - magnetite (15%) - biotite (20%) metasediment.

From	To	Description DETAILED LOG
466.2'	467.1'	Moderately to severely concordantly and lesser discordantl granitised quartz (30%) - orthoclase (45%) - magnetite (5-10%) - biotite (15-20%) metasediment.
467.1'	470.9'	Slightly to moderately concordantly and lesser discordantl granitised quartz (40-45%) - orthoclase (25-30%) - magnetite (15-20%) - biotite (10-15%) metasediment. Attitude 40° to core axis at 470'.
470.9'	475.2'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - garnet (10%) metasediment. Attitude 55° to core axis at 474'. " 30° " " " " 475'.
475.2'	477.4'	Moderately to severely discordantly granitised quartz (15% - orthoclase (mass of 1/4" crystals, 50%) - magnetite (20%) - biotite (5%) - epidote (10%) metasediment.
477.4'	480.2'	Moderately discordantly and lesser concordantly granitised quartz (30-35%) - orthoclase (25-30%) - magnetite (25%) - biotite (15%) metasediment with accessory garnet. Attitude 45°-50° to core axis at 480'.
480.2'	481'	Severely discordantly granitised quartz (20%) - orthoclase (70%) - magnetite (5%) - biotite (5%) metasediment.
481'	483.7'	Moderately concordantly and rarely discordantly granitised quartz (35-40%) - orthoclase (35%) - magnetite (20-25%) - biotite (5%) metasediment.
483.7'	484.7'	Slightly to moderately concordantly granitised quartz (40% - orthoclase (30%) - magnetite (20-25%) - biotite (5-10%) metasediment.
484.7'	491'	Moderately concordantly and discordantly granitised quartz (50%) - orthoclase (30%) - magnetite (15%) - biotite (5%) metasediment. Attitude 50° to core axis at 485'. " 45° " " " " 490'.
491'	493.5'	Slightly concordantly granitised quartz (40%) - orthoclase (20%) - magnetite (10%) - biotite (10-15%) - epidote (10-15%) metasediment.
493.5'	496'	Severely discordantly granitised quartz (30%) - orthoclase (60%) - magnetite (10%) metasediment. Attitude 50° to core axis at 495'.
496'	502.5'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20%) - biotite (15%) - garnet (5%) metasediment. Attitude 50°-55° to core axis at 500'.
502.5'	508.7'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (25-30%) - biotite (10-15%) metasediment containing accessory garnet. Attitude 55° to core axis at 505'.

From	To	Description DETAILED LOG
508.7'	509.5'	Slightly to moderately concordantly and lesser discordantl granitised quartz (35-40%) - orthoclase (25-30%) - magnetite (15-20%) - biotite (10-15%) - garnet (5%) metasediment.
509.5'	510'	Slightly concordantly granitised quartz (45%) - orthoclase (5%) - magnetite (40%) - epidote (10%) metasediment. Attitude 55° to core axis at 510'.
510'	511'	Slightly to moderately concordantly and lesser discordantl granitised quartz (40%) - orthoclase (25%) - magnetite (15%) - biotite (15%) - epidote (5%) metasediment.
511'	511.4'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20%) - biotite (10%) - sillimanite (5%) metasediment.
511.4'	514.8'	Moderately concordantly and rarely discordantly granitised quartz (30%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - epidote (25%).
514.8'	515.3'	Slightly concordantly granitised quartz (35%) - orthoclase (25%) - magnetite (15%) - biotite (10%) - sillimanite (15%) metasediment. Attitude 40° to core axis at 515'.
515.3'	515.8'	Moderately irregularly discordantly granitised quartz (30% - orthoclase (35%) - magnetite (25%) - biotite (10%) metasediment.
515.8'	517.5'	Moderately to severely discordantly and lesser concordantly granitised quartz (30%) - orthoclase (45%) - magnetite (20%) - biotite (5%) - epidote (5%) metasediment.
517.5'	518'	Moderately discordantly and concordantly granitised quartz (35%) - orthoclase (35%) - magnetite (15%) - biotite (10 - garnet (5%) metasediment.
518'	519.3'	Severely discordantly granitised quartz (20%) - orthoclase (65%) - magnetite (5%) - garnet (5%) - sillimanite (5%) metasediment.
519.3'	522'	Slightly to moderately concordantly granitised quartz (25%) - orthoclase (25%) - magnetite (15%) - biotite (15%) - epidote (10%) - sillimanite (10%) metasediment. Attitude 40°-45° to core axis at 520'.
522'	522.6'	Slightly concordantly granitised quartz (50%) - orthoclase (5%) - magnetite (30-35%) - garnet (10-15%) metasediment. Very homogeneous appearance.
522.6'	523.6'	Severely discordantly granitised quartz (20%) - orthoclase (65%) - magnetite (10%) - epidote (5%) metasediment. Contains orthoclase crystals up to 1/2" diameter.
523.6'	526.7'	Moderately to severely concordantly and discordantly granitised quartz (25%) - orthoclase (45%) - magnetite (15%) - biotite (10%) - garnet (5%) metasediment. Attitude 60° to core axis at 525'.

From	To	Description DETAILED LOG
528.7'	529.2'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (20%) - magnetite (15%) - biotite (10%) - garnet (20%) - sillimanite (15%) metasediment.
529.2'	530.5'	Moderately concordantly and discordantly granitised quartz (35%) - orthoclase (25%) - magnetite (20%) - biotite (5%) - garnet (10%) - sillimanite (5%) metasediment. Attitude 55° (?) to core axis at 530'.
530.5'	531.3'	Moderately to severely finely discordantly granitised quartz (30%) - orthoclase (45%) & magnetite (10%) - epidote (10%) - garnet (5%) metasediment.
531.3'	532.4'	Moderately discordantly and concordantly granitised quartz (25%) - orthoclase (20%) - magnetite (20%) - biotite (5% - garnet (10%) - epidote (10%) - sillimanite (10%) metasediment. Sillimanite occurs in relatively pure, less than 1/20" lenticles.
532.4'	533'	Moderately concordantly and discordantly granitised quartz (35%) - orthoclase (25%) - biotite (15%) - magnetite (15 - epidote (10%) metasediment.
533'	534.4'	Moderately to severely concordantly granitised quartz (20% - orthoclase (50%) - magnetite (5-10%) - biotite (10%) - garnet (5%) - sillimanite (5-10") metasediment.
534.4'	536.2'	Moderately concordantly granitised quartz (25%) - orthoclase (25%) - magnetite (10%) - biotite (15%) - garnet (10%) - sillimanite (15%) metasediment. Attitude 55° to core axis at 535'.
536.2'	538.6'	Slightly to moderately concordantly granitised quartz (45% - orthoclase (20%) - magnetite (10%) - biotite (5%) - garnet (5%) - sillimanite (15%) metasediment.
538.6'	540.2'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (5%) - biotite (10%) - garnet (10") - sillimanite (5%) metasediment. Attitude 60° to core axis at 540'.
540.2'	541.4'	Moderately to severely concordantly and lesser discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - epidote (10%) metasediment.
541.4'	543.9'	Moderately discordantly and concordantly granitised quartz (20%) - orthoclase (20%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (20%) - sillimanite (20%) metasediment.
543.9'	544.9'	Slightly to moderately concordantly and lesser discordantly granitised quartz (35%) - orthoclase (20%) - magnetite (30%) - biotite (5%) - garnet (5%) - sillimanite (5%) metasediment.
544.9'	545.3'	Severely discordantly granitised quartz (25%) - orthoclase (60%) - magnetite (5%) - sillimanite (10%) metasediment. Attitude 60° to core axis at 545'.

From	To	Description DETAILED LOG
545.3'	546.1'	Slightly concordantly granitised quartz (55%) - orthoclase (10%) - magnetite (35%) metasediment containing accessory sillimanite.
546.1'	546.6'	Moderately to severely discordantly and concordantly granitised quartz (15%) - orthoclase (45%) - magnetite (20%) - biotite (10%) - garnet (10%) metasediment.
546.6'	547.3'	Slightly to moderately concordantly granitised quartz (30% - orthoclase (25%) - magnetite (10%) - biotite (15%) - garnet (5%) - sillimanite (15%) metasediment.
547.3'	547.9'	Moderately to severely concordantly and lesser discordantly granitised quartz (20%) - orthoclase (45%) - magnetite (15%) - biotite (5%) - garnet (15%) metasediment.
547.9'	550.3'	Moderately concordantly and discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (10-15%) - biotite (5-10%) - garnet (5%) - sillimanite (10%) metasediment. Attitude 45° to core axis at 550'.
550.3'	551.1'	Slightly to moderately concordantly and discordantly granitised quartz (25%) - orthoclase (15%) - magnetite (50%) - biotite (10%) metasediment.
551.1'	552.1'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (15%) - biotite (15% metasediment.
552.1'	553.5'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (20%) - biotite (15%) - magnetite (15%) - garnet (5%) - epidote (10%) - sillimanite (5%) metasediment.
553.5'	555.3'	Slightly concordantly and rarely discordantly granitised quartz (35-40%) - orthoclase (20%) - magnetite (15%) - biotite (10%) - epidote (10%) - sillimanite (5-10%) metasediment. Attitude 55° to core axis at 555'.
555.3'	556.3'	Severely discordantly granitised quartz (20%) - orthoclase (60%) - magnetite (15%) - garnet (5%) metasediment.
556.3'	558.2'	Moderately to severely concordantly and lesser discordantly granitised quartz (15-20%) - orthoclase (45%) - magnetite (15%) - biotite (5%) - garnet (10%) - sillimanite (5-10%) metasediment.
558.2'	559.2'	Severely concordantly and lesser discordantly granitised quartz (10%) - orthoclase (55%) - magnetite (20%) - biotite (5%) - garnet (10%) metasediment.
559.2'	560.3'	Moderately to severely concordantly and discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (20-25%) - biotite (less than 5%) - [illegible] sillimanite (10%) metasediment. Attitude 45° to core axis at 560'.
560.3'	560.6'	Severely concordantly and discordantly granitised quartz (65%) - orthoclase (15%) - magnetite (10%) - biotite (5% - epidote (5%) metasediment.

From	To	Description DETAILED LOG
560.6'	562.6'	Moderately discordantly granitised quartz (35%) - orthoclase (35%) - magnetite (20%) - sillimanite (10%) metasediment.
562.6'	564.5'	Slightly to moderately concordantly and discordantly granitised quartz (20%) - orthoclase (20%) - magnetite (15%) - garnet (5%) - epidote (30%) - sillimanite (10%) metasediment.
564.5'	567.9'	Moderately to severely discordantly and lesser concordantly granitised quartz (10%) - orthoclase (30%) - magnetite (35%) - biotite (5%) - garnet (10%) - epidote (10%) metasediment. Attitude 55° to core axis at 565'.
567.9'	569.5'	Slightly concordantly granitised quartz (25%) - orthoclase (20%) - magnetite (25%) - biotite (5%) - garnet (15%) - epidote (10%) metasediment.
569.5'	570.2'	Moderately discordantly and concordantly granitised quartz (30%) - orthoclase (30%) - magnetite (10%) - biotite (5% - epidote (10%) - sillimanite (10%) metasediment. Attitude 45° to core axis at 570'.
570.2'	572'	Slightly concordantly granitised quartz (25%) - orthoclase (20%) - magnetite (45%) - epidote (10%) metasediment.
572'	572.5'	Brecciated zone. Crystals of green amphibole and blebs of haematite - biotite up to 1" diameter in a groundmass of calcite (one clear vein).
572.5'	576.1'	Very slightly granitised dark green somewhat serpentinised amphibolite. Consists of 70-80% serpentine - amphibole, 20-30% white felspar, with minor biotite-chlorite and quartz - orthoclase. Rather compact and "quartzitic" at each end of the sequence, but homogeneous (mass of 1/20" crystals) near the centre. Bedding generally obscure. Attitude 45°(?) to core axis at 575'.
576.1'	579.3'	Slightly concordantly granitised quartz (10%) - orthoclase (5%) - biotite (15%) - garnet (5%) - epidote (45%) metasediment containing accessory serpentinised amphibol
579.3'	580'	Severely concordantly and lesser discordantly granitised quartz (10%) - orthoclase (65%) - magnetite (5%) - biotite (5-10%) - garnet (less than 5%) - epidote (5%) - sillimanite (5%) metasediment. Attitude 55° to core axis at 580'.
580'	583'	Slightly concordantly granitised quartz (35%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - garnet (15%) - sillimanite (5%) metasediment.
583'	583.7'	Moderately to severely concordantly and discordantly granitised quartz (35%) - orthoclase (50%) - magnetite (5%) - garnet (5%) - epidote (5%) metasediment.
583.7'	586.5'	Slightly discordantly and concordantly granitised quartz (50%) - orthoclase (20%) - magnetite (15%) - biotite (5%) - garnet (5%) - sillimanite (5%) metasediment. Attitude 35° to core axis at 585'.

From	To	Description DETAILED LOG
586.5'	591.2'	Moderately concordantly and discordantly granitised quartz (20%) - orthoclase (25%) - magnetite (25-30%) - biotite (5-10%) - garnet (5%) - epidote (10%) - sillimanite (5%) metasediment. Attitude 45° to core axis at 590'.
591.2'	592.5'	Moderately to severely discordantly and lesser concordantly granitised quartz (25%) - orthoclase (45%) - magnetite (10-15%) - biotite (10%) - garnet (less than 5%) - epidote (5%) metasediment.
592.5'	593.2'	Moderately discordantly and lesser concordantly granitised quartz (35%) - orthoclase (30%) - magnetite (20-25%) - biotite (less than 5%) - garnet (5%) - epidote (5%) metasediment.
593.2'	593.4'	Severely discordantly granitised quartz (15%) - orthoclase (55%) - magnetite-martite (15%) - garnet (5%) - epidote (10%) metasediment.
593.4'	595.5'	Severely discordantly granitised (dislocated) quartz 50% - orthoclase (20%) magnetite (5%) - epidote (25%) rock. Consists of up to 1/4" epidote and garnet-orthoclase blebs in a quartz matrix. Attitude 50° to core axis at 595.5'.
595.5'	596.5'	Slightly to moderately discordantly granitised quartz (30-35%) - orthoclase (25%) - magnetite (25-30%) - biotite (10%) - garnet (5%) metasediment.
596.5'	598.7'	Moderately to severely discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (10%) metasediment.
598.7'	601.5'	Slightly concordantly and rarely discordantly granitised quartz (35-40%) - orthoclase (15%) - magnetite (10%) - biotite (10%) - garnet (5%) - sillimanite (20-25%) metasediment. Attitude 55° to core axis at 600'.
601.5'	603.6'	Severely concordantly and discordantly granitised quartz (10%) - orthoclase (65-70%) - magnetite (10%) - biotite (5%) - garnet (5-10%) metasediment.
603.6'	606.3'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (20%) - magnetite (10%) - biotite (5-10%) - epidote (10-15%) - sillimanite (20%) metasediment. Attitude 55° to core axis at 605'.
606.3'	611.5'	Moderately concordantly and discordantly granitised quartz (25%) - orthoclase (30%) - magnetite (15%) - biotite (10% - garnet (5-10%) - sillimanite (10-15%) metasediment. Attitude 45° to core axis at 610'.
611.5'	612'	Moderately to severely concordantly and discordantly granitised quartz (25-30%) - orthoclase (35-40%) - magnetite (15%, as relatively pure clots up to 1/2" diameter), biotite (5%) - epidote (15%) metasediment.
612'	616.5'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15-20%) - biotite (10-15%) - epidote (5%) metasediment. Attitude 45° to core axis at 615'.

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From	To	Description DETAILED LOG
616.5'	620.8'	Moderately to severely discordantly granitised quartz (20%) - orthoclase (45%) - magnetite (10%) - garnet (10%) - epidote (10%) - sillimanite (5%) metasediment. Attitude 56° to core axis at 620'.
620.8'	621.5'	Slightly concordantly and discordantly granitised quartz (30%) - orthoclase (15%) - magnetite (20-25%) - biotite (10-15%) - garnet (10%) - sillimanite (5%) - epidote (5%) metasediment.
621.5'	622.6'	Moderately to severely discordantly and concordantly granitised quartz (25%) - orthoclase (45%) - magnetite (15%) - biotite (5-10%) - garnet (5-10%) metasediment.
622.6'	623'	Slightly to moderately concordantly and finely discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15%) - biotite (15%) - garnet (10%) metasediment.
623'	623.8'	Moderately concordantly and lesser discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (15-20%) - biotite (10%) - garnet (5-10%) metasediment. Bedding somewhat contorted.
623.8'	624.8'	Slightly to moderately concordantly and finely discordantly granitised quartz (40%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - garnet (5%) somewhat quartzitic metasediment.
624.8'	625.9'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (50%) - magnetite (15%) - biotite (10%) - garnet (5%) metasediment. Attitude 45° to core axis at 625'.
625.9'	626.8'	Moderately concordantly and lesser discordantly granitised quartz (20%) - orthoclase (30%) - magnetite (15-20%) - biotite (5-10%) - garnet (20%) - sillimanite (5%) metasediment.
626.8'	627.3'	Moderately concordantly and discordantly granitised quartz (25%) - orthoclase (35%) - magnetite (10-15%) - biotite (10-15%) - epidote (5%) - sillimanite (10%) metasediment
627.3'	628.3'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15%) - biotite (10%) - garnet (5%) - epidote (10%) metasediment.
628.3'	632.5'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (15-20%) - biotite (10%) - garnet (5-10%) - epidote (5%) metasediment. Attitude 65° to core axis at 630'.
632.5'	633.5'	Quartz (40%) - orthoclase (20%) - magnetite (20%) - biotite (15%) - garnet (5%) metasediment showing slight dispersed granitisation.
633.5'	634'	Moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20%) - biotite (5%) - garnet (15%) metasediment.
634'	634.4'	Severely discordantly granitised quartz (15%) - orthoclase (75%) - magnetite (5%) - garnet (5%) metasediment. Consists of a mass of 1/8" - 1/2" diameter orthoclase crystals.

From	To	Description DETAILED LOG
634.4'	636.4'	Fairly severely concordantly and discordantly granitised quartz (35%) - orthoclase (35%) - magnetite (15%) - biotite (less than 5%) - garnet (5%) - sillimanite (5-10%) metasediment. Somewhat quartzitic appearance. Attitude 60° to core axis at 635'.
636.4'	640.5'	Moderately concordantly and lesser discordantly granitised quartz (30-35%) - orthoclase (30%) - magnetite (10-15%) - biotite (15%) - sillimanite (10%) metasediment. Attitude 65° to core axis at 640'.
640.5'	641.2'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (50%) - magnetite (- biotite (15%) - sillimanite (10%) metasediment.
641.2'	641.9'	Slightly concordantly granitised quartz (50%) - orthoclase (10%) - magnetite (10%) - biotite (10%) - garnet (5%) - sillimanite (15%) metasediment.
641.9'	650.4'	Moderately to severely concordantly and discordantly granitised quartz (10%) - orthoclase (40%) - magnetite (10%) - biotite (15%) - garnet (5%) - epidote (20%) . metasediment.
650.4'	656.2'	Moderately to severely discordantly and lesser concordantly granitised quartz (15%) - orthoclase (50%) - magnetite (10%) - garnet (5%) - epidote (10%) - sillimanite (10%) metasediment containing accessory pyrite. Bedding almost obliterated., Attitude 35° to core axis at 655'.
656.2'	662.2'	Moderately to severely discordantly and lesser concordantly granitised quartz (35%) - orthoclase (20%) - magnetite (25%) - biotite (5%) - garnet (5%) - sillimanite (10%) metasediment. Includes dislocated area containing 40% martite. Attitude 60° to core axis at 660'.
662.2'	663'	Slightly concordantly and finely discordantly granitised quartz (50%) - orthoclase (25%) - magnetite (10-15%) - biotite (5-10%)- garnet (5%) metasediment.
663'	666.2'	Moderately to severely concordantly and discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (10%) - biotite (10%) - garnet (10%) metasediment. Attitude 50° to core axis at 665'.
666.2'	667.2'	Slightly discordantly and lesser concordantly granitised quartz (50%) - orthoclase (10%) - magnetite (40%) metasediment. Fairly homogeneous (magnetite occurs as ¼" slats), dense rock.
667.2'	667.9'	Severely discordantly and lesser concordantly granitised quartz (30%) - orthoclase (50%) - magnetite (10%) - biotite (10%) - garnet (10%) metasediment.
667.9'	670.2'	Slightly to moderately concordantly and discordantly granitised quartz (35%) - orthoclase (25%) - magnetite (20%) - biotite (10%) - garnet (10%) metasediment. Attitude 50° to core axis at 670'.

From	To	Description DETAILED LOG
670.2'	677.5'	Moderately to severely discordantly and concordantly granitised quartz (25%) - orthoclase (45%) - magnetite (5%) - biotite (5-10%) - garnet (5%) - sillimanite (5%) - epidote (5-10%) metasediment. Attitude 60° to core axis at 675'.
677.5'	678.7'	Very slightly concordantly and finely discordantly granitised quartz (60%) - orthoclase (5%) - magnetite (35%) metasediment. Fairly homogeneous mottled appearance.
678.7'	681.7'	Moderately to severely concordantly and lesser discordantl granitised quartz (20-25%) - orthoclase (50%) - magnetite (10%) - biotite (5%) - garnet (10-15%) metasediment. Attitude 50° to core axis at 680'.
681.7'	682.8'	Very fine grained homogeneous quartz (30%) - magnetite (30%) - garnet (30%) - epidote (10%) metasediment.
682.8'	689.7'	Moderately severely concordantly and lesser discordantly granitised quartz (25%) - orthoclase (30-35%) - magnetit (10-15%) - biotite (10-15%) - garnet (10%) - sillimanite (5-10%) metasediment. Magnetite occurs in 1/4" cross-cutting biebe. Attitude 60° to core axis at 685'.
689.7'	691.3'	Moderately concordantly and lesser discordantly granitised quartz (40%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - sillimanite (10%) metasediment, containing accessory garnet. Attitude 45° to core axis at 690'.
691.3'	692.5'	Moderately concordantly granitised quartz (30%) - orthoclase (35%) - magnetite (20%) - biotite (10%) - garnet (5%) metasediment containing accessory sillimanit
692.5'	693.5'	Slightly concordantly granitised quartz (25%) - orthoclas (15%) - magnetite (15%) - garnet (5%) - epidote (20%) - sillimanite (20%) metasediment.
693.5'	695.3'	Severely discordantly granitised quartz (20%) - orthoclas (40%) - biotite (10%) - epidote (20%) - sillimanite (10 metasediment. Attitude 40° to core axis at 695.3'.
695.3'	697.3'	Moderately to severely concordantly and discordantly granitised quartz (15%) - orthoclase (35%) - magnetite (20-25%) - biotite (5-10%) - garnet (10%) - sillimanite (10%) metasediment.
697.3'	698.5'	Slightly concordantly granitised quartz (25%) - orthoclas (15%) - biotite (5-10%) - garnet (5%) - magnetite (5-10%) - epidote (20%) - sillimanite (20%) metasediment
698.5'	706.7'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (5-10%) - garnet (5%) - epidote (15-20%) - sillimanite (10%) metasediment. Contains blebs and crystals of quartz, orthoclase and epidote up to 1/4" diameter. Attitude 45° to core axis at 700'. " 60° " " " " 706'.

From	To	Description DETAILED LOG
706.7'	707.1'	Slightly to moderately concordantly and discordantly granitised quartz (15%) - orthoclase (25%) - magnetite (5%) - biotite (10%) - garnet (5%) - epidote (20%) - sillimanite (20%) metasediment.
707.1'	707.6'	Severely concordantly and discordantly granitised quartz (15%) - orthoclase (50%) - magnetite (5-10%) - biotite (10%) - garnet (5-10%) - sillimanite (10%) metasediment.
707.6'	709.5'	Moderately discordantly and lesser concordantly granitised quartz (10%) - orthoclase (30%) - magnetite (5-10%) - biotite (5-10%) - garnet (15%) - epidote (15%) - sillimanite (15%) metasediment.
709.5'	709.9'	Slightly concordantly and discordantly granitised quartz (25%) - orthoclase (10%) - magnetite (10%) - biotite (10-15%) - garnet (5-10%) - epidote (20%) - sillimanite (15%) metasediment.
709.9'	710.3'	Severely concordantly granitised quartz (30%) - orthoclase (40%) - magnetite (10%) - sillimanite (20%) metasediment Attitude 60° to core axis at 710'.
710.3'	712.7'	Moderately concordantly and discordantly granitised quartz (25%) - orthoclase (20%) - magnetite (15%) - biotite (5%) - epidote (10%) - sillimanite (25%) metasediment.
712.7'	713'	Moderately to severely concordantly and discordantly granitised quartz (15%) - orthoclase (45%) - magnetite (10%) - biotite (10%) - garnet (10%) - sillimanite (10%) metasediment.
713'	713.5'	Slightly to moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15%) - biotite (15%) - garnet (10%) metasediment.
713.5'	713.7'	Severely discordantly granitised quartz (20%) - orthoclase (45%) - magnetite (10%) - biotite (10%) - garnet (15%) metasediment.
713.7'	714.3'	Slightly to moderately concordantly and discordantly granitised quartz (30%) - orthoclase (20%) - magnetite (15%) - biotite (5%)(- garnet (10%) -: sillimanite (20%) metasediment.
714.3'	719.7'	Moderately to severely discordantly and lesser concordantly granitised quartz (15%) - orthoclase (40%) - magnetite (15%) - biotite (15%) - garnet (5%) - sillimanite (10%) metasediment.
719.7'	720.3'	Severely discordantly and lesser concordantly granitised quartz (15%) - orthoclase (55%) - magnetite (10%) - biotite (5-10%) - garnet (5-10%) - sillimanite (5%) metasediment. Orthoclase crystals up to 1/4" diameter. Attitude 55° to core axis at 720'.
720.3'	721.2'	Slightly concordantly and lesser discordantly granitised quartz (35%) - orthoclase (20%) - magnetite (5%) - biotite (10%) - garnet (10%) - sillimanite (20%) metasediment.

From	To	Description DETAILED LOG
721.2'	724.1'	Moderately to severely concordantly and discordantly granitised quartz (15%) - orthoclase (40%) - magnetite (15%) - biotite (5-10%) - garnet (5-10%) - sillimanite (15%) metasediment. Contains one 1½" bed with 50% magnetite.
724.1'	726.5'	Moderately to severely discordantly and lesser concordantl granitised quartz (15%) - orthoclase (30%) - magnetite (10%) - garnet (5%) - epidote (25%) - sillimanite (15%) metasediment. Attitude 50° to core axis at 725'.
726.5'	728'	Slightly concordantly and discordantly granitised quartz (15%) - orthoclase (10%) - magnetite (10-15%) - biotite (5%) - garnet (5%) - epidote (30-35%) - sillimanite (20%) metasediment.
728'	729.5'	Moderately to severely discordantly granitised quartz (25% - orthoclase (25%) - magnetite (15%) - garnet (5%) - epidote (20%) - sillimanite (10%) metasediment.
729.5'	730.5'	Severely discordantly granitised quartz (20%) - orthoclase (5%) - magnetite (5%) - garnet (10%) - epidote (5%) - sillimanite (10%) metasediment. Attitude 55° to core axis at 730.5'.
730.5'	731'	Slightly to moderately concordantly and discordantly granitised quartz (15%) - orthoclase (25%) - magnetite (10%) - biotite (15%) - garnet (25%) - sillimanite (10%) metasediment.
731'	732.2'	Very slightly concordantly granitised quartz (20%) - orthoclase (5%) - magnetite (2%) - biotite (10%) - garnet (25%) - epidote (20%) metasediment. Fine grained homogeneous appearance at 681.7' - 682.8'.
732.2'	733.1'	Severely discordantly granitised (virtually dislocated) quartz (35-40%) - orthoclase (20-25%) - magnetite (5%) - garnet (5%) - sillimanite (5%) - epidote (25%) metasediment. Consists of 1/8" epidote and orthoclase crystals in a quartz groundmass.
733.1'	736.2'	Moderately to severely discordantly and lesser concordantl granitised quartz (25%) - orthoclase (40%) - magnetite (10%) - biotite (5-10%) - garnet (5-10%) - sillimanite (10%) metasediment. Orthoclase darker in colour than usual (almost red). Attitude 55° to core axis at 735'.
736.2'	737'	Slightly concordantly and discordantly granitised quartz (25%) - orthoclase (25%) - magnetite (10%) - biotite (10%) - sillimanite (30%) metasediment.
737'	736.8'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (20%) - garnet (15%) - sillimanite (5%) metasediment.
736.8'	747.9'	Slightly to moderately concordantly and discordantly granitised quartz (15%) - orthoclase (40%) - magnetite (20%) - biotite (5%) - garnet (5%) - sillimanite (15%) metasediment. Attitude 35°-40° (contorted) to core axis at 740'. " 60° " " " " 745'.

DIAMOND DRILL HOLE WD 2 (Contd.) -25-

From	To	Description DETAILED LOG
747.9'	748.8'	Slightly concordantly and finely discordantly granitised quartz (25%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - garnet (10%) - epidote (10%) - sillimanite (10%) metasediment.
748.8'	749.9'	Moderately to severely concordantly and discordantly granitised quartz (25%) - orthoclase (40%) - magnetite (10%) - garnet (5%) - epidote (5%) - sillimanite (15%) metasediment, containing rare accessory tourmaline and serpentine in joint planes.
749.9'	753.5'%	Moderately concordantly and lesser discordantly granitised quartz (25%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - garnet (5%) - sillimanite (20%) metasediment. Attitude 50°-55° to core axis at 750'.
753.5'	754.5'	Severely discordantly granitised quartz (40%) - orthoclase (30%) - magnetite (5-10%) - biotite (5%) - epidote (10-15%) - sillimanite (5%) metasediment.
754.5'	754.7'	Slightly, very finely discordantly granitised quartz (45%) - magnetite (35-40%) - epidote (15-20%) metasediment containing accessory orthoclase and sillimanite.
754.7'	756.2'	Slightly to moderately concordantly and discordantly granitised quartz (30%) - orthoclase (15-20%) - magnetit (10%) - biotite (10%) - garnet (5%) - epidote (15-20%) - sillimanite (10%) metasediment. Attitude 60° to core axis at 755'.
756.2'	756.9'	Severely discordantly and lesser concordantly granitised quartz (35%) - orthoclase (40%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (5%) metasediment.
756.9'	765.9'	Moderately irregularly concordantly and lesser discordantly granitised quartz (20%) - orthoclase (30%) - magnetite (10%) - biotite (10%) - garnet (10%) - sillimanite (20%) metasediment. Granitisation is largely restricted to 1" thick concordant masses (containing up to 1/4" crystals). Attitude 70° to core axis at 760'. " 40°-45° to core axis at 765'.
765.9'	767.8'	Moderately discordantly and concordantly granitised quartz (30%) - orthoclase (30%) - biotite (10%) - magnetite (10%) - garnet (10%) metasediment (includes several 1/2" thick magnetite rich beds).
767.8'	768'	Very slightly dominantly concordantly granitised quartz (30%) - magnetite (30%) - epidote (30%) metasediment. Very homogeneous appearance.
768'	769.2'	Moderately concordantly and very rarely discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (10-15%) - biotite (5%) - garnet (10-15%) metasediment.
769.2'	770'	Slightly concordantly granitised quartz (45%) - orthoclase (25%) - magnetite (5%) - biotite (15%) - garnet (5%) - sillimanite (5%) metasediment. Attitude 45° to core axis at 770'.

From	To	Description DETAILED LOG
770'	770.4'	Moderately to severely concordantly and lesser discordantl granitised quartz (30%) - orthoclase (45%) - magnetite (5-10%) - biotite (5-10%) - garnet (5%) - epidote (5%) metasediment.
770.4'	774'	Slightly to moderately concordantly and lesser discordantl granitised quartz (30%) - orthoclase (20%) - magnetite (5-10%) - biotite (10%) - garnet (10%) - epidote (15-20% - sillimanite (5%) metasediment.
774'	774.6'	Severely discordantly granitised quartz (15%) - orthoclase (60%) - magnetite (5%) - epidote (10%) - sillimanite (10%) metasediment.
774.6'	775.7'	Moderately concordantly granitised quartz (35%) - orthoclase (30%) - magnetite (10-15%) - biotite (10%) - garnet (5%) - sillimanite (5-10%) metasediment. Attitude 50° to core axis at 775'.
775.7'	776.2'	Slightly concordantly granitised quartz (15-20%) - orthoclase (15-20%) - magnetite (15-20%) - biotite (10-15%) - garnet (15-20%) - sillimanite (10-15%) - epidote (5%) metasediment.
776.2'	777.8'	Moderately discordantly and rarely concordantly granitised quartz (25%) - orthoclase (35%) - magnetite (15%) - biotite (10%) - epidote (15%) metasediment. Shows min o drag folding (east limb anticline?).
777.8'	778.2'	Moderately to severely discordantly and concordantly granitised quartz (20%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - garnet (10%) - sillimanite (10%) metasediment.
778.2'	781.9'	Moderately concordantly and discordantly granitised quartz (20%) - orthoclase (30%) - magnetite (15-20%) - biotite (5%) - garnet (5%) - epidote (15-20%) - sillimanite (5%) metasediment. Granitisation is largely restricted to concordant masses up to 1" thick (mass of crystals up to 1/4" diameter). Attitude 40° to core axis at 780'.
781.9'	782.4'	Severely discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (5-10%) - garnet (5%) - epidote (15%) - sillimanite (less than 5%) metasediment. Contains 1/8" quartz, orthoclase and rarely epidote crystals.
782.4'	785.4'	Moderately concordantly and lesser discordantly granitised quartz (35%) - orthoclase (25%) - magnetite (15%) - biotite (5%) - garnet (5%) - sillimanite (15%) metasediment. Attitude 45° to core axis at 785'.
785.4'	786.5'	Moderately to severely concordantly and lesser discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (5-10%) - biotite (5-10%) - epidote (15%) - sillimanite (10%) metasediment.
786.5'	790.4'	Slightly to moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15%) - biotite (5%) - garnet (5%) - sillimanite (15%) metasediment. Attitude 55° to core axis at 790'.

DIAMOND DRILL HOLE ND 2 (Contd.) -27-

From	To	Description DETAILED LOG
790.4'	791'	Severely concordantly and discordantly granitised quartz (20%) - orthoclase (60%) - magnetite (5%) - garnet (5%) - sillimanite (10%) metasediment.
791'	791.3'	Slightly concordantly granitised quartz (35%) - orthoclase (15%) - magnetite (15%) - biotite (5-10%) - garnet (5-10%) - epidote (10%) - sillimanite (10%) metasediment
791.3'	793.4'	Moderately concordantly and lesser discordantly granitised quartz (30%) - orthoclase (40%) - magnetite (15%) - biotite (5%) - garnet (10%) metasediment.
793.4'	795.1'	Moderately to severely discordantly and lesser concordantly granitised quartz (10%) - orthoclase (45%) - magnetite (10%) - biotite (5%) - garnet (5%) - epidote (20%) - sillimanite (5%) metasediment. Attitude 65°-70° to core axis at 795'.
795.1'	797.3'	Moderately discordantly and lesser concordantly granitised quartz (25%) - orthoclase (30%) - magnetite (20-25%) - biotite (5-10%) - garnet (10%) - epidote (5%) metasediment.
797.3'	798.6'	Dark, compact, fairly homogeneous slightly concordantly granitised quartz (20%) - orthoclase (20%) - magnetite (25%) - epidote (35%) metasediment.
798.6'	800.7'	Moderately discordantly and concordantly granitised quartz (5%) - orthoclase (30%) - magnetite (15%) - epidote (40%) - sillimanite (10%) metasediment. Attitude 55° to core axis at 800'.
800.7'	802.5'	Fine grained compact slightly concordantly granitised quartz (30%) - orthoclase (30%) - magnetite (10-15%) - biotite (5-10%) - epidote (5%) - sillimanite (10%) metasediment.
802.5'	807.5'	Moderately to severely discordantly and concordantly granitised quartz (20%) - orthoclase (40%) - magnetite (5-10%) - biotite (5%) - garnet (5-10%) - sillimanite (10%) metasediment. Attitude 65° to core axis at 805'.
807.5'	812.8'	Severely discordantly and lesser concordantly granitised quartz (25%) - orthoclase (50%) - magnetite (15%) - biotite (5%) - epidote (5%) metasediment. Attitude 50° to core axis at 810'.
812.8'	814.4'	Moderately discordantly and concordantly granitised quartz (10%) - orthoclase (30%) - magnetite (20-25%) - biotite (10%) - garnet (10%) - sillimanite (15-20%) metasediment.
814.4'	816.9'	Moderately to severely discordantly granitised quartz (25%) orthoclase (45%) - magnetite (15%) - biotite (10%) - sillimanite (5%) metasediment. Attitude 50° to core axis at 815'.
816.9'	817.9'	Slightly concordantly and finely discordantly granitised quartz (35%) - orthoclase (20%) - magnetite (15%) - biotite (10%) - garnet (10-15%) - sillimanite (5-10%) metasediment.
817.9'	819.6'	Moderately to severely discordantly and concordantly

From	To	Description DETAILED LOG
817.9'	819.6' (Contd.)	granitised quartz (5%) - orthoclase (35%) - magnetite (20%) - biotite (10%) - garnet (5%) - epidote (15%) - sillimanite (10%) metasediment. Orthoclase darker in colour than usual.
819.6'	819.7'	Homogeneous looking quartz (45%) - magnetite (30-35%) - biotite (10%) - epidote (10-15%) metasediment.
819.7'	822'	Slightly to moderately concordantly and discordantly granitised quartz (30%) - orthoclase (30%) - magnetite (15-20%) - biotite (less than 5%) - garnet (15%) - sillimanite (5%) metasediment. Attitude 55° to core axis at 820'.
822'	824.7'	Moderately to severely concordantly and lesser discordantly granitised quartz (35%) - orthoclase (30-35%) - magnetite (15-20%) - biotite (10%) - garnet (5%) metasediment containing accessory sillimanite.
824.7'	825.5'	Fairly homogeneous slightly concordantly granitised quartz (30%) - orthoclase (10%) - magnetite (30%) - biotite (5%) - epidote (25%) metasediment containing accessory garnet. Attitude 55°-60° to core axis at 825'.
825.5'	833.2'	Moderately to severely discordantly and concordantly granitised quartz (15%) - orthoclase (40%) - magnetite (10%) - biotite (10%) - garnet (5%) - epidote (20%) metasediment. Attitude 55° to core axis at 830'.
833.2'	834.2'	Moderately concordantly granitised quartz (20-25%) - orthoclase (25-30%) - magnetite (15%) - biotite (10%) - garnet (15%) - sillimanite (10%) metasediment.
834.2'	835.5'	Moderately to severely discordantly and concordantly granitised quartz (20%) - orthoclase (50-55%) - magnetite (15%) - biotite (5-10%) - garnet (5%) metasediment. Bedding somewhat contorted. Attitude 55° to core axis at 835'.
835.5'	837'	Dark compact slightly concordantly granitised quartz (30%) - orthoclase (20%) - magnetite (20%) - biotite (15%) - garnet (5%) - sillimanite (10%) metasediment.
837'	838.7'	Moderately concordantly and discordantly granitised quartz (20%) - orthoclase (25-30%) - magnetite (15-20%) - biotite (15-20%) - garnet (5%) - sillimanite (10-15%) metasediment.
838.7'	840.3'	Slightly to moderately discordantly and concordantly granitised quartz (40%) - orthoclase (25%) - magnetite (15%) - biotite (15%) - garnet (5%) metasediment. Attitude 50° to core axis at 840'.
840.3'	840.6'	Fairly homogeneous mottled slightly irregularly granitised quartz (35%) - orthoclase (5%) - magnetite (20%) - biotite (5-10%) - garnet (less than 5%) - epidote (30%) metasediment.
840.6'	843.5'	Moderately discordantly and lesser concordantly granitised quartz (25-30%) - orthoclase (30-35%) - magnetite (10%) - biotite (10%) - sillimanite (20%) metasediment. containing accessory garnet.

From	To	Description DETAILED LOG
843.5'	848.5'	Moderately to severely discordantly and concordantly granitised quartz (30%) - orthoclase (35%) - garnet (10% - magnetite (15%) - sillimanite (10%) metasediment containing accessory biotite. Attitude 60° to core axis at 845'.
848.5'	849.1'	Fairly homogeneous slightly granitised quartz (45%) - orthoclase (5%) - magnetite (25-30%) - garnet (10%) - epidote (10-15%) metasediment.
849.1'	849.8'	Severely discordantly granitised quartz (5-10%) - orthoclase (60%) - magnetite (5%) - biotite (5-10%) - garnet (10%) - epidote (10%) metasediment.
849.8'	857.2'	Moderately to severely irregularly discordantly and concordantly granitised quartz (15%) - orthoclase (35%) - magnetite (10-15%) - biotite (10%) - garnet (10-15%) - epidote (5%) - sillimanite (10%) metasediment. Granitisation tends to occur in subconcordant 1" thick masses. Attitude 45° to core axis at 850'. " 50° " " " " 855'.
857.2'	857.7'	Severely discordantly granitised quartz (10%) - orthoclase (70%) - magnetite (5%) - epidote (10%) - sillimanite (5%) metasediment containing accessory biotite.
857.7'	859.5'	Slightly concordantly granitised quartz (45%) - orthoclase (5-10%) - magnetite (15%) - biotite (5-10%) - garnet (5%) - sillimanite (20%) metasediment.
859.5'	861.5'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (55%) - magnetite (10%) - garnet (5%) - epidote (10%) metasediment. Attitude 50° to core axis at 860'.
861.5'	862.1'	Slightly dominantly concordantly granitised quartz (50%) - orthoclase (5-10%) - magnetite (30-35%) - epidote.(10%) metasediment containing accessory biotite. Homogeneous appearance.
862.1'	868.8'	Moderately to severely concordantly and discordantly granitised quartz (20%) - orthoclase (40%) - magnetite (15%) - biotite (15%) - garnet (10%) metasediment. "Mottled" appearance. Attitude 55° to core axis at 865'.
868.8'	869'	Slightly concordantly granitised quartz (35%) - orthoclase (15%) - magnetite (10%) - biotite (5%) - garnet (5%) - sillimanite (30%) metasediment.
869'	873.5'	Moderately to severely discordantly and concordantly granitised quartz (15%) - orthoclase (45%) - magnetite (10%) - biotite (20%) - garnet (5%) - epidote (5%) metasediment. Includes several 1" magnetite rich beds and rare epidote crystals up to 1/8" diameter. Attitude 60° to core axis at 870'.

From	To	Description DETAILED LOG
873.5'	874.2'	Slightly to moderately discordantly and very rarely concordantly granitised quartz (70%) - orthoclase (5-10%) - magnetite (10%) - epidote (10%) - biotite (less than 5%) metasediment. "Quartzitic" texture.
874.5'	875.7'	Moderately to severely discordantly granitised quartz (15%) - orthoclase (45%) - magnetite (15%) - biotite (10%) - garnet (10%) - epidote (5%) metasediment. Attitude 50° to core axis at 875'.
875.7'	876.3'	Moderately concordantly and discordantly granitised quartz (50%) - magnetite (35%) - biotite (5%) - epidote (10%) metasediment. Fairly homogeneous "mottled" appearance.
876.3'	879.5'	Severely discordantly granitised ("marbled") quartz (15%) - orthoclase (50%) - plagioclase (showing prominent multiple twinning, 15%) - magnetite (5%) - biotite (5%) - garnet (5%) - epidote (5%) metasediment.
879.5'	879.7'	Fairly homogeneous slightly discordantly granitised quartz (40%) - orthoclase (10%) - magnetite (25-30%) - biotite (10-15%) - epidote (10%) metasediment.
879.7'	882'	Moderately to severely discordantly granitised ("marbled") quartz (15%) - orthoclase (50%) - magnetite (15-20%) - biotite (10%) - epidote (5-10%) metasediment. Attitude 50° to core axis at 880'.
882'	882.2'	Homogeneous mottled slightly concordantly and discordantly granitised quartz (40%) - orthoclase (10%) - magnetite (30-35%) - biotite (10-15%) metasediment.
882.2'	886'	Moderately to severely granitised quartz (25-30%) - orthoclase (35-40%) - magnetite (20%) - biotite (10%) - garnet (5%) metasediment. Attitude 55° to core axis at 886'.
	886'	End of iron formation.
886'	890.4'	Severely, dominantly discordantly granitised quartz (about 25%) - orthoclase (40%) - plagioclase (10%) - biotite (5-20%, usually 10%) - epidote (5-30% usually 15%) metasediment containing accessory to rarely 5%, usually 1 or 2% magnetite. Grain size 1/100" (biotite and magnetite) to 1/10" (quartz and felspar). Bedding not well defined. Attitude 50° to core axis at 890'.
890.4'	928'	Severely, dominantly concordantly, granitised quartz (15%) orthoclase (pale pink to red, 60%) - plagioclase (10%) - biotite (5-25%, usually 10%) - epidote (accessory to 10%, usually 5%) metasediment containing accessory garnet and accessory to rarely 1 or 2% magnetite. Grain size 1/100" (garnet) to 1/5" (orthoclase). Bedding 1/8"-1/4" thick, somewhat contorted. Attitude 35° to core axis at 895'. " 55° " " " " 900'. " 45° " " " " 905'. " 55° " " " " 910'. " 45° " " " " 915'. " 50° " " " " 920'. " 60° " " " " 925'. " 55-60° " " " " 928'.
	928'	END OF HOLE.

DIAMOND DRILL HOLE NO 2

CORE RECOVERY

From	To	Recovery.	Condition
196'	198.5'	2.8'	Good
REDUCE TO BX			
198.5'	205'	5.4'	Fair - Good
205'	214.5'	8.7'	Excellent to Fair.
214.5'	224'	9.2'	Fair - Good
224'	227.8'	5.7'	Excellent
227.8'	233.8'	4.3'	Fair
233.8'	243.8'	10.0'	Good - Excellent
243.8'	252.5'	7.8'	Excellent
252.5'	253.5'	2.2'	"
253.5'	261.5'	6.0'	"
261.5'	269.5'	9.7'	Good - Excellent
269.5'	275.5'	5.6'	" "
275.5'	279.5'	3.0'	Excellent
279.5'	289.5'	9.3'	Excellent & Broken.
289.5'	299.5'	9.9'	" " "
299.5'	309.5'	9.8'	" " "
REDUCE TO AX			
309.5'	319.5'	10.1'	Excellent
319.5'	329'	7.1'	Excellent & Broken.
329'	337.8'	8.4'	Good - Excellent
337.8'	347.8'	10.6'	Excellent.
247.8'	349.8'	1.5'	"
349.8'	357.8'	8.2'	"
357.8'	367.5'	9.9'	Good
367.5'	377.5'	6.4'	Excellent & Broken.
377.5'	387.5'	9.3'	Fair to Good
387.5'	393.5'	5.7'	Excellent.
393.5'	397.5'	4.0'	"
397.5'	407.5'	10.4'	Excellent.
407.5'	417.5'	10.1'	"
417.5'	427.8'	8.9'	"
427.8'	432.8'	4.6'	"
432.8'	437.8'	4.9'	Good - Excellent
437.8'	448'	9.4'	Good - Broken
448'	458'	9.9'	Excellent & Fair
458'	468'	9.7'	Excellent.
468'	474'	6.1'	Good - Excellent.
474'	478'	1.9'	Broken.
478'	488'	8.7'	Excellent - Fair
488'	498'	1.7'	Very Broken.
498'	508'	5.8'	Excellent & Broken.
508'	518'	9.1'	Good - Fair.
518'	528'	6.1'	Excellent - Fair
528'	534.3'	5.9'	Excellent.
534.3'	538'	3.5'	Excellent - Fair
538'	542'	3.7'	Excellent.
542'	552'	10.2'	"
552'	562'	9.2'	"
562'	570.5'	7.1'	Excellent & Broken.
570.5'	576'	5.2'	" " "
576'	580.5'	4.7'	Good & Broken.
580.5'	590.5'	8.3'	" " "
590.5'	597.5'	7.0'	Excellent.
597.5'	607.5'	8.0'	"
607.5'	617.5'	6.7'	Excellent & Broken.
617.5'	619.5'	2.1'	Excellent.
619.5'	627.5'	7.9'	"
627.5'	637.5'	9.8'	"
637.5'	647.5'	9.8'	Excellent & Fair
647.5'	657.5'	7.1'	Good
657.5'	660.5'	2.8'	Excellent
660.5'	667.5'	7.2'	"
667.5'	677.5'	9.9'	"
677.5'	687.5'	10.2'	"
687.5'	697.5'	9.1'	Excellent & Fair
697.5'	701.5'	3.1'	Good to Broken
701.5'	706.5'	2.0'	Broken
706.5'	716.0'	9.9'	Good to Excellen
716.0'	726.0'	7.0'	Excellent to Broken.
726.0'	736.0'	9.4'	" " "
736.0'	746.0'	10.1'	Excellent.
746.0'	756.5'	8.8'	"
756.5'	766.8'	10.1'	"
766.8'	776.8'	10.3'	"
776.8'	786.8'	9.1'	"
786.8'	797'	6.2'	"

DIAMOND DRILL HOLE NO 2 (Contd.)

CORE RECOVERY

From	To	Recovery	Condition	From	To	Recovery	Condition
797'	802.7'	5.1'	Excellent & Broken.				
802.7'	812.7'	5.9'	" " "				
812.7'	822.7'	9.8'	Good to Broken.				
822.7'	833'	4.3'	Excellent to Broken.				
833'	840'	6.9'	Excellent.				
840'	843'	3.0'	"				
843'	853'	5.5'	Good to Broken.				
853'	863'	4.6'	Fair to Broken.				
863'	873.2'	10.1'	Excellent & Broken.				
873.2'	883.5'	9.7'	Excellent & Fair				
883.5'	886.5'	0.3'	Very Broken.				
886.5'	892.7'	6.1'	Excellent to Broken.				
892.7'	900'	3.4'	" " "				
900'	904.5'	4.1'	Good & Broken.				
904.5'	914.5'	3.5'	Fair & Broken.				
914.5'	917.5'	1.3'	Broken				
917.5'	919'	1.3'	Fair				
919'	928'	7.6'	Fair & Excellent				
	928' TOTAL	END OF HOLE 433.8'	84.5%				
TOTAL FOR IRON FORMATION		357.5'	82.4%				

DIAMOND DRILL HOLE ND 2

MAGNETIC LOG

At	Deflection	At	Deflection	At	Deflection
197.5°	10°	291°	25°	375°	90°
200°	15°	291.5°	90-°	377.5°	90-°
205°	10°	293°	40°	380°	15°
208.5°	5°	295°	90°	382°	15°
210°	5°	297°	90°	385°	15°
215°a	10°	298°	90-°	387°	20°
220°	10°	300°	90+°	390°	30°
225°	5°	302°	90-°	392.5°	15°
230°	10°-15°	305°	50°	395°	25°
232°	15°	307°	90-°	397°	15°
235°	0°	308°	90-°	400°	90-°
240°	0°	310°	90°	402°	10°
245°	0°	313°	90-°	405°	90-°
246°	90+°	315°	90-°	408°	90-°
246.8°	0°	317°	90-°	410°	5°
247.5°	90+°	320°	20°	412°	15°
249°	90°	325°	20°	415°	10°
251°	90+°	326°	90°	417°	10°
253°	90-°	330°	90°	420°	15°
256°	90-°	332°	20°	422°	30°
257.5°	30°	335°	90-°	425°	90°
258.5°	90°	337°	10°	427°	90-°
262°	90-°	340°	20°	430°	90°
265°	90-°	343°	35°	432°	15°
267°	25°	345°	30°	433°	5°
270°	90°	347°	20°	434°	90°
273°	90°	350°	20°	436°	10°
275°	90+°	352°	20°	437°	90°
277°	35°	355°	20°	438°	90°
279.5°	90+°	357.5°	10°	439°	90-°
280°	45°	360°	15°	443°	90° to 90+°
282.5°	90-°	362°	90-°	445°	35°
285°	90°	365°	20°	448°	90-°
287°	90+°	367°	20°	450°	20°
		370°	90°	451°	90°

DIAMOND DRILL HOLE NO 2

MAGNETIC LOG (Contd.)

At	Deflection	At	Deflection	At	Deflection
453.5°	90°	530°	20°	600°	0°
455°	90-°	532°	90-°	604°	90-°
456.5°	90°	535°	90-°	606°	0°
458°	90+°	538°	0°	607°	0°
459.5°	90+°	540°	90-°	610°	10°
460°	90° to 90-°	542°	0°	611°	90°
462°	90-°	545°	0°	611.5°	90+°
463°	90° to 90-°	548°	0°	613°	90+°
465°	90-°	550°	90°	614.5°	90°
467°	90°	552°	15°	615°	0°
470°	90° to 90° +	555°	30°	619°	90°
472°	90°	557°	0°	620°	15°
473.5°	90°	560°	0°	621°	90°
475°	90°	563°	90+°	623°	90-°
478°	90°	565°	90-°	625°	90° to 90°-
480°	90°	568°	45°	627°	20°
483°	90°	570°	0°	630°	90-°
485°	90°	571°	90-°	631°	90+°
488°	90°	572°	5°	632.5°	90+°
490°	90-°	573°	0°	635°	90+°
495°	90-°	575°	0°	637°	0°
498°	90°	578°	0°	640°	90°
500°	90-°	579°	90°	642.5°	90°
502°	90° to 90+°	580.5°	90°	645°	30°
505°	90-°	581°	0°	647.5°	90° to 90+°
508°	90-°	585°	0°	650°	0°
510°	90° to 90-°	586°	90°	652°	0°
512.5°	90-°	587°	0°	655°	90-°
515°	90-°	589.5°	90°	658°	90-°
518°	90-°	590°	0°	660°	90°
520°	90-°	591°	90°	662°	90°
521.5°	90+°	592°	90°	665°	35°
524°	90-°	595°	90-°	667°	90°
526°	90° to 90-°	597°	90-°	670°	90°
528°	90-°	599°	90-°	672.5°	90-°

DIAMOND DRILL HOLE NO 2

MAGNETIC LOG (Contd.)

At	Deflection	At	Deflection	At	Deflection
675'	90-°	760'	10°	842'	90°
678'	90°	762'	90°	845'	5°
680'	90-°	765'	90°	848'	90°
682'	90° to 90-°	767.5'	90°	850'	15°
685'	35°	770'	90-°	852.5'	90-°
687'	90-°	772.5'	90°	855'	15°
690'	90-°	775'	90-°	858'	90-°
692'	90°	778'	90-°	860'	90-°
695'	90°	780'	15°	862'	90° to 90+°
697'	90-°	783'	10°	865'	90°
700'	10°	785'	25°	867'	90-°
703'	10°	787'	10°	870'	90-°
706'	10°	790'	25°	873'	90°
708'	90-°	792'	90°	875'	90°
710'	25°	795'	90-°	880'	90°
712'	90-°	797'	90°	882'	90°
715'	90-°	800'	30°	885'	90°
717'	90°	802'	90°	886'	5°
720'	90-°	805'	10°	887'	15°
723'	90°	807'	25°	890'	0°
725'	30°	809'	90-°	892'	10°
727'	90°	810'	90-°	895'	5°
730'	20°	811'	90-°	897'	5°
732'	90-°	813'	90°	900'	5°
735'	90-°	815'	90-°	902'	0°
737.5'	90-°	818'	90-°	905'	20°
740'	90°	820'	10°	910'	25°
743'	90-°	822'	90° to 90-°	915'	0°
745'	90-°	825'	90°	917'	5°
748'	90°	828'	90°	920'	10°
750'	10°	830'	90°	923'	0°
752'	90°	833'	15°	925'	0°
755'	90-°	835'	90-°	928'	0°
758'	90-°	837'	90-°	END OF HOLE.	
		840'	90°		

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF DIAMOND DRILLHOLE NO. WB

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Hole Ser. No. DD 20/62

Collar Coords 56800N, 64000E — R.L. 456.0' — Grid Warrambee

Direction — Angle 90° — Depth 600' — Plan Ref.

Date Hole Commenced 8.9.61 — Completed 29.9.61 — Driller G. Speldewinde

Hole Logged by G.R. Heath — On 28.9.61 5.10.61 — Hirer D. of M.

OBJECT: To test gravity "peak" associated with trough in magnetic "high".

RESULT: Iron formation (10-35% iron oxides) intersected from 100' - 144' and 348.5' - 600'.

LOG Comprises: Geological Log
Summary Log
Magnetic Log

From	To	Description SUMMARY LOG
100'	134'	Quartz-felspar-epidote-biotite-martite (35%) metasediment.
134'	144'	Quartz-orthoclase-garnet-epidote-magnetite (20%) metasediment.
144'	348.5'	Quartz-orthoclase-biotite-epidote metasediment with variable magnetite, garnet and hornblende. Extensive granitisation and dislocation
		Magnetite 161.9' - 163.6' 15% 166.6' - 174' 25% 201.1' - 214.3' 10% 223.7' - 224.3' 10-15% 293' - 293.6' 5-10%
		Epidote 148' - 153' 159.8' - 161.9' 200.3' - 200.6' 285.8' - 287.5' 293.6' - 294.4'
		Epidote-orthoclase-amphibole 187.3' - 189.6' 280.6' - 283.1'
		Calcite marble 315' - 321.5' 347.2' - 348.5'
348.5'	385'	Quartz-orthoclase-biotite-magnetite (15%) metasediment with lesser garnet and amphibole.
385'	407.6'	Quartz-orthoclase-biotite-magnetite (30%) metasediment.
407.6'	600'	Quartz-orthoclase-biotite-magnetite-martite (5-20% usually 10-15%) metasediment with lesser garnet, sillimanite and epidote.

DIAMOND DRILLHOLE NO. WD 3 (Contd.) -2-

From	To	Description DETAILED LOG
		CONTINUED FROM WD 6
100'	134'	Somewhat decomposed slightly to moderately concordantly granitised quartz-felspar-epidote-biotite-martite (30-50% usually 35%) metasediment. Opaques possibly manganiferous near top. Attitude 40° to core axis at 110°? " 60° " " " " 120°? " 50° " " " " 130°?
134'	135'	Slightly decomposed quartz-epidote-felspar-magnetite-martite (10%) metasediment with minor garnet and biotite Moderately concordantly and discordantly granitised.
135'	144'	Moderately concordantly and lesser discordantly granitised magnetite (frequently as 1/10" blebs, 20-25%) - garnet (20-25%) - quartz - felspar (orthoclase 35%) metasedimen with minor biotite. Bedding well defined by mineral segregation. Attitude 70° to core axis at 137' " 55° " " " " 139' " 25° " " " " 144'
144'	148.2'	Moderately, dominantly discordantly granitised quartz-orthoclase-epidote-biotite metasediment with minor magnetite and garnet. Fairly homogeneous appearance. Quartz rich band from 145' - 146.2'.
148.2'	153.5'	Dislocated epidote rock with lesser quartz-orthoclase and minor hornblende and biotite. Attitude 50° to core axis at 151'.
153.5'	159.8'	Moderately to severely / discordantly and concordantly granitised quartz-orthoclase-biotite metasediment, with accessory magnetite and epidote. Attitude 45° to core axis at 159'.
159.8'	161.9'	Dislocated epidote rock (somewhat leached), with hornblende, orthoclase and quartz.
161.9'	163.6'	Slightly, dominantly concordantly granitised quartz-orthoclase-magnetite (15%) - biotite - garnet metasedime
163.6'	166.4'	Severely concordantly and lesser discordantly granitised orthoclase (60%) - quartz-epidote-biotite metasediment, with rare garnet.
166.4'	166.6'	Moderately discordantly granitised epidote-orthoclase metasediment, with lesser hornblende and quartz.
166.6'	174'	Slightly concordantly granitised magnetite (25%) - garnet-biotite-quartz-orthoclase metasediment. Attitude 50° to core axis at 169'.
174'	175.2'	Moderately to severely concordantly granitised garnet-magnetite-biotite-quartz-orthoclase metasediment.
175.2'	187.3'	Moderately concordantly and lesser discordantly granitised biotite-quartz-orthoclase metasediment, with minor garnet Attitude 45° to core axis at 180'.

DIAMOND DRILLHOLE NO. WD 3 (Contd.) -3-

From	To	Description DETAILED LOG
187.3'	189.6'	Severely discordantly granitised (dislocated) epidote (decreasing top to bottom) - orthoclase (increasing top to bottom) - quartz metasediment, with rare biotite.
189.6'	195'	Severely discordantly and concordantly granitised quartz-orthoclase-biotite-garnet metasediment. Attitude 60° to core axis at 190'.
195'	196'	Slightly, finely discordantly granitised biotite-quartz metasediment, with lesser garnet and felspars.
196'	201'	Moderately to severely dominantly concordantly granitised quartz-orthoclase biotite metasediment. Attitude 55° to core axis at 200'.
201'	201.1'	Epidote-biotite metasediment, containing minor quartz.
201.1'	212'	Moderately to severely discordantly and lesser concordantly granitised quartz-orthoclase-garnet-magnetite (10%) - biotite metasediment with lesser epidote. Attitude 70° to core axis at 210'.
212'	212.3'	Quartz-epidote-biotite metasediment, containing minor garnet.
212.3'	214.3'	Moderately concordantly granitised magnetite (10%) - garnet-orthoclase-quartz-epidote metasediment.
214.3'	219.2'	Moderately, dominantly concordantly granitised quartz-orthoclase-biotite-garnet metasediment, with accessory magnetite.
219.2'	223.7'	Slightly irregularly granitised quartz-biotite metasediment with lesser orthoclase, and rare garnet porphyroblasts up to 1/10" diameter. Attitude 60° to core axis at 220'.
223.7'	224.3'	Slightly to moderately concordantly granitised garnet-magnetite (10-15%) - orthoclase-quartz-biotite metasedim
224.3'	229.3'	Moderately to severely concordantly and irregularly granitised quartz-biotite-orthoclase (pink to grey) metasediment, with lesser garnet.
229.3'	229.6'	Slightly irregularly granitised quartz-felspar-biotite-epidote metasediment.
229.6'	240.5'	Moderately to severely concordantly and discordantly granitised quartz-orthoclase-biotite metasediment, with lesser garnet (dispersed, and as porphyroblasts up to 1/10" diameter). Attitude 70° to core axis at 230'. " 50° " " " " 240'.
240.5'	240.7'	Slightly granitised quartz-epidote-biotite metasediment, with lesser orthoclase.
240.7'	267'	Moderately to severely concordantly and lesser discordantly granitised quartz-orthoclase (pale fawn) - biotite-epidote metasediment with lesser garnet. Attitude 55° to core axis at 250'.

From	To	Description DETAILED LOG
257'	257.5'	Slightly granitised quartz-felspar-epidote metasediment ("pseudo-porphyritic" appearance).
257.5'	259.8'	Moderately to severely concordantly and lesser discordantl granitised quartz-orthoclase-biotite-garnet (porphyroblasts) metasediment. Bedding contorted. Attitude 40° to core axis at 259'.
259.8'	260'	Quartz-epidote-biotite (and possibly hornblende) metasediment with lesser garnet and orthoclase.
260'	272.8'	Moderately to severely concordantly and discordantly granitised quartz-orthoclase-magnetite (5%) - biotite-garnet (up to 1/5" porphyroblasts) metasediment. Attitude 70° (contorted) to core axis at 270'.
272.8'	273.4'	Slightly concordantly and discordantly granitised quartz-epidote-biotite metasediment, with lesser orthoclase and garnet.
273.4'	276.6'	Moderately to severely discordantly and concordantly granitised quartz-orthoclase-biotite metasediment, with lesser garnet and epidote.
276.6'	277.3'	Slightly discordantly granitised quartz-epidote-biotite metasediment, with lesser orthoclase and garnet.
277.3'	278.8'	Moderately discordantly and concordantly granitised quartz-orthoclase-biotite metasediment, with lesser garnet and epidote.
278.8'	280.3'	Severely discordantly and concordantly granitised quartz-orthoclase-biotite metasediment with rare epidote and garnet. Attitude 50° to core axis at 280'.
280.3'	280.6'	Almost pure epidote, with less than 1/20" quartz veins, and less than 1/16" diameter orthoclase blebs.
280.6'	282.7'	Very homogeneous, fine grained (less than 1/50") orthoclase-epidote-amphibole rock.
282.7'	283.1'	Moderately discordantly granitised epidote (vein) - orthoclase rock, with minor tremolite (?).
283.1'	285.8'	Moderately concordantly and discordantly granitised orthoclase-epidote-quartz metasediment, with lesser biotite.
285.8'	287.5'	Very fine grained homogeneous epidote rock with very minor quartz and orthoclase.
287.5'	293'	Severely discordantly granitised quartz-orthoclase (off-white to 292', pink 292'-293') - biotite metasedim with lesser epidote and garnet. Bedding somewhat contorted. Attitude 55° to core axis at 290'.
293'	293.6'	Fairly homogeneous pyrite-garnet-magnetite (5-10%) -quartz-orthoclase-biotite metasediment.
293.6'	294.4'	Dislocated quartz-epidote rock, with lesser orthoclase.

From	To	Description DETAILED LOG
294.4'	296.7'	Dislocated quartz (90%) rock, with minor ortheclase, epidote and hornblende.
296.7'	297.7'	Moderately concordantly and lesser discordantly granitise quartz-ortheclase-epidote-biotite metasediment. Shows well defined bedding.
297.7'	298.4'	Vein quartz with minor ortheclase biotite and epidote.
298.4'	299.7'	Moderately concordantly granitised quartz-ortheclase-epidote-biotite metasediment.
299.7'	308.6'	Severely concordantly and discordantly granitised ortheclase (light and dark pink) -quartz-epidote-biotite metasediment. Attitude 40°-45° (contorted) to core axis at 300'.
308.5'	309'	Fine grained epidote-biotite rock with lesser ortheclase and rare quartz.
309'	313.3'	Severely discordantly and concordantly granitised quartz-ortheclase-biotite metasediment, with lesser epidote. Attitude 55° to core axis at 310'.
313.3'	313.7'	Epidote-biotite rock with very minor quartz.
313.7'	315'	Moderately concordantly and discordantly granitised quartz-ortheclase-biotite-rock, with lesser magnetite and garnet, and epidote-hornblende from 314.6' - 315'.
315'	321.5'	Virtually pure calcite marble, with irregular epidote, hornblende (?) and calc-silicates (?) from 319.5' - 321.5'. Attitude 40° to core axis at 320'.
321.5'	323.5'	Very severely discordantly granitised quartz (80%) rock with lesser biotite, ortheclase, epidote and hornblende.
323.5'	325'	Quartz-epidote-biotite-amphibole metasediment, with lesser calcite. Contacts rather irregular.
325'	332.5'	Very slightly concordantly and discordantly granitised quartz-felspar-biotite metasediment, with lesser epidote and rare scattered pyrite. Attitude 50°-55° to core axis at 325'. " 45° " " " " 330'.
332.5'	337'	Very severely discordantly granitised (dislocated) quartz-epidote-biotite metasediment, with rare pyrite, hornblende (?) and ortheclase.
337'	341.9'	Severely concordantly and discordantly granitised quartz-ortheclase-biotite metasediment, with rare garnet. Attitude 40° to core axis at 340'.
341.9'	343'	"Aplitic" looking quartz-ortheclase rock, with 10%, 1/10" garnet porphyroblasts.
343'	345'	Moderately to severely discordantly and concordantly granitised quartz-ortheclase-biotite-garnet (up to 1/8" porphyroblasts) metasediment.

From	To	Description DETAILED LOG
345'	345.9'	Very severely discordantly granitised (dislocated) quartz-orthoclase-garnet-epidote rock.
345.9'	347.2'	Moderately concordantly and lesser discordantly granitised quartz-orthoclase-biotite metasediment, with rare garnet
347.2'	348.5'	Virtually pure, very pale green calcite marble.
348.5'	385'	Moderately to severely concordantly and discordantly granitised magnetite (15%) - quartz-orthoclase-biotite metasediment, with lesser garnet and green amphibole, and rare epidote and tremolite. Attitude 65° to core axis at 350'. " 45° " " " " 360'. " 55° " " " " 370'. " 60° " " " " 380'.
385'	407.6'	Slightly to moderately discordantly granitised magnetite (30%) - orthoclase-quartz-biotite metasediment, with lesser epidote and rare garnet. Attitude 60° to core axis at 390'. " 60° " " " " 400'.
407.6'	414.2'	Moderately discordantly and lesser concordantly granitised quartz-orthoclase-magnetite (10-15%) - biotite metasediment with rare green amphibole. Attitude 45° to core axis at 410'.
414.2'	415.5'	Severely discordantly granitised quartz-orthoclase-biotite-magnetite (5%) metasediment, with rare garnet.
415.5'	466.7'	Slightly to moderately concordantly and discordantly granitised quartz-orthoclase-magnetite (15-20%) biotite metasediment, with rare tremolite and epidote. Attitude 50° to core axis at 420' " 65° " " " " 430' " 50° " " " " 440' " 60° " " " " 450' " 55° " " " " 460'
466.7'	468.6'	Moderately to severely discordantly and lesser concordantly granitised quartz-orthoclase-martite (10%) - biotite metasediment with minor epidote. Shows light iron staining. Attitude 60° to core axis at 468.4'.
468.6'	473.9'	Severely discordantly granitised quartz-orthoclase (75-80%) rock, with lesser biotite and magnetite-martite (less than 5%) and rare garnet.
473.9'	475'	Moderately to severely concordantly and rarely discordantly granitised quartz-orthoclase-martite (5%) -biotite metasediment.
475'	510.4'	Moderately to severely dominantly concordantly and lesser discordantly granitised quartz-orthoclase-biotite-garnet-magnetite (5-15%, usually 10%) metasediment, with rare sillimanite and epidote. Attitude 55° to core axis at 480'. " 45° " " " " 490'. " 65° " " " " 500'. " 65° " " " " 510'.

From	To	Description DETAILED LOG
510.4'	533.1'	Moderately to severely discordantly and concordantly granitised metasediment, similar to 475' - 510.4', but containing 10% sillimanite and 10% magnetite. Attitude 50° to core axis at 520'. " 65° " " " " 530'.
533.1'	600'	Dominantly severely discordantly and lesser concordantly granitised quartz-orthoclase (up to 1/2" crystals) -magnetite (frequently cross cutting blebs up to 1/2" diameter, 5-20%, usually 10, possibly 15%) -biotite-garnet metasediment, with lesser epidote and very rare hornblende and sillimanite. Pure quartz bed or vein 575.5' - 575.8'. Prominent ptygmatic folding at 592.4'. Attitude 55° to core axis at 540'. 533.1' to 600' (Contd.) " 50° " " " " 550' " 60° " " " " 560'. " 40° " " " " 570'. " 45° " " " " 580'. " 60° " " " " 590'. " 50° " " " " 600'.
600'		END OF HOLE.

DIAMOND DRILLHOLE NO. WD 3 (Contd.) -8-

CORE RECOVERY

From	To	Recovery	Condition
100'	134'	5.0'	Broken
Reduce		to	NX
134'	137.5'	3.3'	Broken - Fair
137.5'	147'	9.1'	Fair - Excellent
147'	150'	3.1'	Fair - Excellent
REDUCE		TO	BX
150'	160'	9.4'	Fair - Excellent
160'	170'	9.8'	" "
170'	180'	10.0'	Good - Excellent
180'	190'	9.7'	" "
190'	200'	10.1'	Excellent
200'	210'	10.0'	"
210'	220'	9.4'	Excellent - Good
220'	230'	9.7'	Excellent
230'	240'	10.1'	Gen. Excellent
240'	250'	9.8'	Good - Excellent
250'	260'	10.0'	Excellent
260'	270'	9.5'	"
270'	280'	10.2'	"
280'	290'	10.0'	Excellent & Broken
290'	300'	6.2'	" "
300'	306.5'	5.2'	Good & Broken
306.5'	309.5'	1.8'	Broken
309.5'	312'	3.0'	Broken & Excellent
REDUCE		TO	AX
312'	317'	3.8'	Excellent & Fair
317'	317.5'	0.4'	Fair
317.5'	327.5'	9.5',	Good - Excellent
327.5'	337.5'	9.1'	" "
337.5'	347.5'	8.6'	Broken & Excellent

From	To	Recovery	Condition
347.5'	357.5'	10.2'	Excellent
357.5'	367.5'	10.0'	Excellent & Fair
367.5'	377.5'	6.2'	Excellent & Broke
377.5'	387.5'	10.1'	Excellent
387.5'	397.5'	10.0'	Excellent & Fair
397.5'	407.5'	7.8'	" "
407.5'	417.5'	7.9'	" "
417.5'	427.5'	9.8'	Excellent
427.5'	437.5'	5.5'	Excellent & Broke
437.5'	447.8'	7.0'	Excellent
447.8'	458'	10.5'	"
458'	468'	10.2'	"
468'	478'	9.9'	"
478'	488'	10.1'	"
488'	498'	10.2'	"
498'	508'	10.2'	"
508'	518.2'	9.9'	"
518.2'	528.5'	9.8'	Excellent & Fair
528.5'	538.8'	10.0'	Excellent.
538.8'	549'	10.2'	"
549'	559.2'	10.2'	"
559.2'	569.5'	7.1'	Excellent - Fair
569.5'	579.8'	10.2'	Excellent.
579.8'	590'	9.3'	Excellent & Broke
590'	600'	6.5'	" " "
600'		END OF HOLE	

Total recovery 134' - 600':
434.6' = 93%.

DIAMOND DRILLHOLE NO. WD 3 (Contd.) -9-

MAGNETIC LOG

At	Deflection	At	Deflection	At	Deflection
100°	5°	235°	-5°	380°	90+°
"	5°	240°	10°	383°	90°
134°	90-°	240.6°	90-°	385°	90+°
135°	90-°	245°	10°	387.5°	90+°
137.5°	90°	250°	10°	390°	90°
139°	90°	255°	30°	392°	90° to 90+°
141°	90°	260°	90-°	395°	90°
142.5°	90-°	262°	90-°	397°	90+°
144°	90-°	265°	5°	400°	90+°
145°	10°	270°	10°	403°	90°
147°	15°	273°	90-°	405°	90+°
150°	0°	275°	25°	407.5°	90+°
155°	10°	280°	10°	410°	90° to 90+°
160°	0°	285°	15°	413°	90°
165°	-5°	290°	15°	415°	90-°
167°	90°	295°	0°	417.5°	90°
170°	90°	300°	5°	420°	90°
171°	90+°	305°	0°	422°	90+°
172°	90+°	310°	0°	425°	90°
173.9°	90+°	315°	10°	427°	90+°
174.1°	90+°	320°	0°	430°	90-°
175°	90°	325°	5°	432.5°	90°
180°	30°	330°	15°	435°	90°
185°	15°	335°	90°	438°	90°
190°	20°	340°	0°	440°	90+°
195°	15°	345°	20°	442°	90+°
200°	15°	348.2°	90°	445°	90-°
202°	90-°	350°	90°	448°	90°
205°	90°	352.5°	10°	450°	90°
209°	90°	355°	90°	452°	90-°
211.5°	90°	357°	90°	455°	90+°
212.5°	90°	360°	90°	457°	90+°
214°	90°	363°	90-°	460°	90°
215°	10°	366°	90-°	462°	90°
220°	15°	368°	90°	465°	90°
224°	90°- to 90°	370°	90-°	467°	90-°
225°	35°	375°	90°	470°	0°
230°	30°	377.5°	90°	472°	0°

DIAMOND DRILLHOLE NO. #D 3 (Contd.) -10-

MAGNETIC LOG
(Contd.)

At	Deflection	At	Deflection
475'	90-°	538'	90-°
478'	90°	540'	90-°
480'	90-°	542'	90°
482'	90°	545'	90-°
485'	90°	547'	90°
487'	90°	550'	90°
490'	90-°	552'	90°
492'	90°	555'	90°
495'	90-°	558'	90-°
498'	90°	560'	90-°
500'	90+°	562'	90°
503'	40°	565'	90°
505'	20°	570'	90-°
508'	10°	572'	90-°
510'	90-°	575'	90-°
513'	90°	577'	10°
515'	90-°	580'	0°
517'	90-°	583'	90°
520'	90-°	585'	0°
523'	90-°	587'	90-°
525'	90°	590'	90-°
528'	90°	592'	90°
530'	90°	595'	90°
532'	90°	597'	90°
535'	90°	600'	5°
		600'	END OF HOLE

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF DIAMOND DRILLHOLE NO. WD 4

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Hole Ser.No. DD 43/62
Collar Coords 58400N, 62000E	R.L. 460.7'	Grid Warrambee
Direction - Angle 90°	North 460°	Plan Ref.
Date Hole Commenced 13.10.61	Completed 1.11.61	Driller G. Speldewinde
Hole Logged by G.R. Heath	On 31.10.61 & 1.62	Miner D. of M.

OBJECT: To test gravity high coincident with magnetic low.

RESULT: Granitic metasediments with minor epidote and garnet intersected from 114' - 406'. Granitisation extensively developed.

LOG Comprises: Geological Log
Core Recovery and Condition
Magnetic Log

From	To	Description
		GEOLOGICAL LOG
		CONTINUED FROM NO 31
114'	234.6'	Quartz (ave. about 30%) - off-white felspar (ave. about 40%) - biotite (ave. about 30%) semewhat concordantly and discordantly granitised metasediment. Grain size mainly 1/20" - 1/10", rarely 3/4" (felspar).
		Other minerals present: Epidote 117° Garnet (up to 1/4" Porphyroblasts) 198°-199°
		Quartz-felspar rich areas from 145°-146°.3' and 189°-111°. Quartz-felspar rich rock with poorly defined bedding and irregular biotite rich bands from 231.8' - 234.6'.
		Bedding generally about 1/10" thick, moderately well defined.
		132° Minor fold 145° - 166° Contorted bedding 184.3' - 186.3' Good 1/10" bedding.
		Attitude 25° to core axis at 115°. " 35° " " " " 120° " 35°-40° " " " 131.5° " 40° " " " " 139° " 45° " " " " 150° " 45°-50° " " " 160° " 70° " " " " 170° " 55° " " " " 171.5° " 50° " " " " 181° " 30° " " " " 184°

From	To	Description GEOLOGICAL LOG
114' (Contd.)	234.6'	Attitude 20° to core axis at 186'. " 40° " " " " 191' " 40° " " " " 200.5' " 35° " " " " 206' " 55° " " " " 219.5' " 50° " " " " 230'
234.6'	248.5'	Quartz - pale pink orthoclase rock with minor biotite. Bedding obscure due to severe discordant granitisation. Grain size 1/16" - 1/5". Attitude 40°(?) to core axis at 239'.
248.5'	406'	Granitic metasediment similar to 114' - 234.6', but more severely granitised (pale pink orthoclase occurs throughout). Dark pink orthoclase occurs at 257' and 340.5', while a mosaic of 1/8" quartz-orthoclase crystals is present at 328'. 300' - 301', 1/20" quartz-orthoclase bed. Garnet and biotite form up to 1/2" diameter blebs at 259.5', while garnet (as less than 1/5" porphyroblasts) is a rare constituent below 292'. Bedding is generally more distinct than from 114' - 234.6'.
		258' - 269' Severe concordant granitisation, some bedding distortion, less biotite.
		275' - 276.5' As 258' - 269' above.
		299.7' - 301' Severely, mainly discordantly granitised bedding obscure, minor biotite.
		331.5' - 331.8' Biotite 60%, quartz-plagioclase 40%.
		344.5' - 351' Aplitic looking, minor biotite, dark pink orthoclase, bedding distorted or obscure.
		369' - 371' Garnet porphyroblasts up to 1/4" diameter (scattered).
		377.5' - 378' Granitised as 258' - 269'.
		402' - 406' Severely concordantly granitised, dark pink orthoclase.
		Attitude 50° to core axis at 250'. " 35° " " " " 260' " 50° " " " " 270' " 55° " " " " 280' " 45° " " " " 290' " 45° " " " " 299.5' " 45° " " " " 310' " 55°-60° " " " " 319.5' " 30° " " " " 330' " 60° " " " " 340' " 30° " " " " 350' " 45° " " " " 360' " 40° " " " " 370' " 35° " " " " 380'

From	To	Description GEOLOGICAL LOG
248' (Contd.)	406'	Attitude 45° to core axis at 390' 50°-55° " " " " 400' 40° " " " " 406'
406'		END OF HOLE.

MAGNETIC LOG

Deflections zero except for 5°-10° deflections near 390' (due to minor magnetite in biotite rich layers).

CORE RECOVERY

HD 4

From	To	Recovery	Condition
114°	120°	3.2°	Broken - Fair
REDUCE TO BX			
120°	130.3°	8.6°	Fair - Good
130.3°	140.3°	9.9°	Good - Excellent.
140.3°	150.3°	9.3°	" " "
150.3°	160.3°	11.1°	Excellent
160.3°	170.3°	8.6°	"
170.3°	180.3°	10.0°	"
180.3°	190.4°	8.3°	Fair - Excellent.
REDUCE TO AX			
190.4°	200°	4.0°	Broken - Fair
200°	210°	9.9°	Fair - Good
210°	219°	8.8°	Excellent - Fair
219°	229°	8.7°	Good - Excellent.
229°	237°	8.1°	Excellent
237°	244.5°	8.0	"
244.5°	254°	9.5°	"
254°	264°	10.0°	Good - Excellent.
264°	274°	6.2°	Fair - Good
274°	284°	10.0°	Excellent
284°	293.5°	10.1°	Good - Excellent.
293.5°	300°	2.4°	Good - Broken
300°	310.5°	10.1°	Excellent
310.5°	320.5°	10.0°	Excellent
320.5°	330.5°	10.4°	"
330.5°	340.5°	9.9°	Good - Excellent
340.5°	346.5°	2.9°	Good - Fair.
346.5°	356°	9.3°	Excellent.
356°	366°	9.2°	Good - Excellent
366°	376°	9.8°	Excellent.
376°	386°	9.6°	Good.
386°	396°	7.9°	Fair - Good.
396°	406°	8.5°	Excellent - Fair

406° END OF HOLE

Total recovery 117° to 406°:

287.3° = 89%

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP 1

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warrambee Co. Le Hunte — Bore Ser.No.PB 506/62

Collar Coords 57100N, 67000E — R.L. 453.2' — Grid Warrambee

Vertical — Depth 25' — Plan Ref.

Date Bore Commenced 14.7.61 — Completed 22.7.61 — Driller E. Graham

Bore Logged by G.R. Heath — On 25.7.61 — Hirer D. of M.

OBJECT: To test flank of gravity and magnetic anomalies.

RESULT: Quartz sand intersected from 22' - 25'

LOG Comprises Macro and microscopic geological log

From	To	Description DETAILED LOG
		Continuous open tube samples
0'	2.1'	Brown to red-brown very fine grained quartz sand, containing minor clay and gypsum.
2.1'	10'app.	Offwhite and light yellow-brown, near the top, to red-brown near the base, crystalline gypsum (crystals less than ¼" diameter). Somewhat clayey near the top, while the lower contact is gradational, from about 7.5' to 12'.
10' app.	13'	Red-brown, yellow-brown and off-white mottled slightly clayey (less than 10%) quartz, sand, with minor gypsum.
13'	22'	Light grey and lesser red-brown mottled and irregularly banded clay containing variable proportions (5% near the top to 80% near the base) of 1/20" - 1/250" sub-angular to sub-rounded quartz grains.
22'	25'	Very light grey to off-white sub-angular to sub-rounded pure quartz sand, containing scattered 1/1000" black opaque grains. Grain size 1/50" - 1/1000", averaging about 1/200". No visible structure.
	25'	END OF HOLE. Sand flowed into casing as fast as it could be withdrawn.

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IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP2

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warramboo — Co. Le Hunte — Bore Ser. No. PB 514/62

Collar Coords 57200N, 67000E — R.L. 452.3' — Grid Warramboo

Vertical — Depth 22' — Plan Ref.

Date Bore Commenced 22.7.61 — Completed 24.7.61 — Driller R. Graham

Bore Logged by G.R. Heath — On 25.7.61 — Hirer D. of M.

OBJECT: To test flank of gravity and magnetic anomalies

RESULT: Quartz sand intersected from 18' - 22'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
		Continuous open tube samples
0'	2.3'	Brown to reddish-brown slightly clayey very fine quartz sandy loam, containing some gypsum.
2.3'	7'	Crystalline gypsum (up to 1/8" crystals) containing up to 20% red and yellow-brown clay, and up to 60% fine red-brown quartz sand. Clay is most common near the top of the sequence, sand near the base.
7'	13'	Reddish-brown, yellow-brown and dirty grey mottled and irregularly banded, somewhat clayey, 1/200"quartz sand. Grains generally sub-rounded to rounded. Contains occasional limonite nodules, and pebbles formed by siliceous cementation of groups of quartz grains. Banding tends to be roughly parallel to core axis.
13'	18'	Light grey, and occasionally very light red and yellow-bro clay, containing variable proportions of 1/200" sub-rounded quartz grains, either dispersed, or as irregular "veins". Banding again tends to be sub-vertical.
18'	22'	Off-white and shades of very light brown slightly clayey pure quartz sand. Contains a few 1/1000" black opaque grains. Grain size 1:/50" - 1/1000", usually about 1/25 Grains angular to subrounded.
22'		END OF HOLE. Fluid sand.

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IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP 3

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 25 Hd. Warrambee Co. Le Hunte Bore Ser.No. PB 515/62

Collar Coords 57300N, 67000E R.L. 451.2' Grid Warrambee

Vertical Depth 17' Plan Ref.

Date Bore Commenced 24.7.61 Completed 24.7.61 Driller R. Graham

Bore Logged by G.R. Heath On 25.7.61 Miner D. of M.

OBJECT: To test flank of gravity and magnetic anomalies.

RESULT: Quartz sand intersected from 16' - 18'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0'	3'	Continuous open tube samples Brown with lesser red and yellow-brown mottled very sandy (70%) clay loam.
3'	11.5'	Mainly red-brown and yellowish grey-brown mottled and irregularly banded very sandy (65 - 75%) clay. Sand is mainly 1/200" rounded quartz, but gypsum is a minor constituent near the top of the sequence, and limonite nodules up to 1/4" diameter (enclosing quartz grains) occur sporadically throughout.
11.5'	16'	Light grey clay containing 15 - 75% quartz sand (dispersed and veins). Sand mainly 1/150" - 1/300", sub-angular. Minor limonite staining.
16'	18'	Off-white and light brown (various shades) very slightly clayey quartz sand. Grains generally sub-angular to sub-rounded, 1/20" - 1/200", usually 1/50" - 1/100". Limonite occurs as light staining on some grains. No visible structure.
	18'	END OF HOLE. Fluid sand.

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IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP4

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 25 Hd. Warramboo	Co. Le Hunte	Bore Serial No. PB 516/62
Collar Coords 574009N, 679008E	R.L. 450.1'	Grid Warramboo
Vertical	Depth 69'	Plan Ref.
Date Bore Commenced 25.7.61	Completed 27.7.61	Driller R. Graham
Bore Logged by G.R. Heath	On 29.7.61	Hirer D. of M.

OBJECT: To test gravity and magnetic anomalies

RESULT: Decomposed metasediment containing 10-20% martite intersected from 43' - 69'.

LOG Comprises: Macro and microscopic geological log.

From	To	Description DETAILED LOG
		Continuous open tube samples
0'	1'	Brown sandy loam.
1'	5'	Red-brown and grey mottled and irregularly banded very sandy clay (contains 80%, 1/100" - 1/200", well rounded quartz and minor limonite).
5'	7'	Grey and lesser red-brown clayey sand (somewhat similar to 1' - 5'). Contains 95%, rounded, 1/200" quartz grains.
7'	15'	Grey and minor red-brown, irregularly mottled and banded clay, containing 40-70% rounded 1/100" quartz grains.
15'	18'	Light grey-brown slightly clayey sand. Contains 5-10% clay, with 1/100" - 1/200" subrounded quartz grains.
18'	38'	Off-white and grey, mottled, banded (?) and marbled sandy clay. Probably overburden, but may be decomposed metasediment. Contains about 20%, 1/50" - 1/150", sub-angular, irregularly distributed (in lenses and "veins") quartz. Clay is somewhat flaky, and contains bands of dispersed, very fine grained pyrite. Bedding or banding 30° to core axis 20.5' 25° " " " 23.5' 35° " " " 24.5' 30° " " " 28.5' 25° " " " 34.5' 35° " " " 37.5'
38'	40'	Red-brown and yellow-brown mottled and bedded (?) sandy clay. Clay is somewhat flaky, grading to decomposed mica (?) and contains 40% 1/20" - 1/50" angular quartz, and 5-10% nodular and dispersed pyrite. Attitude 35° to core axis at 39.5'.

PERCUSSION BORE NO. WP4 (Contd.) -2-

From	To	Description DETAILED LOG
40'	43'	Grey sandy clay as 18' - 38'
43'	69'	Red-brown, purple-brown, grey and yellow-brown mottled and irregularly bedded decomposed metasediment. Contains 5-60% averaging 10-20% martite, 50% quartz and 30-40% decomposed felspar and mica (flaky clay). Grain size mainly about 1/200". Bedding 1/16" - 6" usually 1/8" - 1/4" thick. Attitude 25° to core axis at 44.5'. 35° " " " " 52.5' 15° " " " " 54.5' 5° " " " " 60.5' 30-40° " " " " 62.5' 40° " " " " 64.5'
69'		END OF HOLE.

PERCUSSION BORE NO. WP 5 (Contd.) -2-

From	To	Description DETAILED LOG
49° (contd.)	86°	Attitude 10° to core axis at 49.5° 30° " " " " 52.5° 20° " " " " 56.5° 15° " " " " 63.5° 15° " " " " 68.5° 20-25° " " " " 70.5° 25° " " " " 71.5° 25° " " " " 76.5° 30° " " " " 81.5° 30° " " " " 83.5° 40° " " " " 84.5°
86°		END OF HOLE.

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IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP6

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. PB 520/62

Collar Coords 57700N, 67000E — R.L. 449.3' — Grid Warrambee

Vertical — Depth 105' — Plan Ref.

Date Bore Commenced 2.8.61 — Completed 10.8.61 — Driller R. Graham

Bore Logged by G.R. Heath — On 10.8.61 — Hirer D. of M.

OBJECT: To test gravity and magnetic anomalies

RESULT: Decomposed metasediment intersected from 13' (?) - 105'.
Contains 10-20% martite 28' - 98', and 5-10% martite 98' - 105'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
		Continuous open tube samples
0	1'	Brown sandy clay loam.
1'	2.5'	Red-brown, grey and yellow-brown irregularly banded and mottled very sandy clay. Contains 70% 1/100" rounded quartz and minor limonite.
2.5'	13'	Mainly off-white with lesser red-brown mottled and banded very slightly sandy clay. Contains minor quartz and scattered limonite nodules up to 1" diameter. Probably saprolite.
13'	28'	Metasediment (?). Red-brown yellow-brown and lesser off-white irregularly bedded (?) and mottled sandy clays. Contain up to 5% 1/100" martite and variable angular quartz. Beds usually less than ¼" thick. Attitude 65° (?) to core axis at 13.5' 40°-45° (?) " " " " 16.5' 25° (?) " " " " 21.5' 65° (?) " " " " 25.5' 60°-65° " " " " 28.5'
28'	98'	Red-brown and yellow-brown decomposed quartz-martite-felsp mica metasediment. Martite content varies from 5% to 50 over short sequences, but probably averages 10-20% for t unit. Grain size usually about 1/100". Bedding general obscure, 1/32" - 2", usually 1/16" - 1/4" thick. Attitude 50° to core axis at 29.5' 35° " " " " 30.5' 30° " " " " 37.5' 55° " " " " 43.5' 70° " " " " 46.5' 30° " " " " 54.5' 50° " " " " 60.5' 35° " " " " 67.5' 35° " " " " 70.5'

PERCUSSION BORE NO. WP 6 (Contd.) -2-

From	To	Description DETAILED LOG
28' (Contd.)	98'	Attitude 45° to core axis at 76.5' 45° " " " " 87.5' 35° " " " " 90.5' 40°-45° " " " " 94.5'
98'	105'	Grey and grey-brown mottled and irregularly bedded decomposed quartz-felspar-martite-biotite metasediment. Martite 5-10% of rock, usually 1/200" or less in diameter. Bedding usually less than 1/8" thick. Attitude 30° to core axis at 104.5'. Below about 85', most samples contain white calcareous nodules up to 1/2" and rarely 1" diameter. These cut bedding planes, and are certainly concretionary (d.f. WR 3).
	105'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP 7

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. PB 527/62

Collar Coords 57800N, 67000E — R.L. 449.5' — Grid Warrambee

Vertical — Depth 125' — Plan Ref.

Date Bore Commenced 10.8.61 — Completed 15.8.61 — Driller R. Graham

Bore Logged by G.R. Heath — On 17.8.61 — Hirer D. of M.

OBJECT: To test gravity and magnetic anomalies.

RESULT: Decomposed itabirite intersected from 49.5' - 50.5' and 119' - 125'.

LOG Comprises: Macro and microscopic geological log
Summary Log

From	To	Description SUMMARY LOG
0	14.5'	Overburden. Mainly white somewhat sandy clay containing nodular limonite.
14.5'	49.5'	Metasediment containing 10-15% martite.
49.5'	50.5'	Decomposed itabirite containing 45% martite.
50.5'	119'	Metasediment containing 15-25% martite.
119'	125'	Martite (and minor magnetite) itabirite containing 40-45% martite.

From	To	Description DETAILED LOG
		Continuous Open Tube Samples
0	1°	Brown sandy clay loam.
1°	3.5°	Red-brown, with lesser yellow-brown and off-white clay containing scattered limonite nodules and 40%, 1/200" rounded quartz.
3.5°	14.5°	Mainly off-white clay (overburden ?) containing scattered limonite nodules up to 2" diameter and 5% (?) subangular quartz (1/50" - 1/100" diameter).
14.5°	21°	Red-brown decomposed metasediment containing 15% martite, 35% quartz, 50% clay (after mica and felspar). Grain size 1/100" - 1/200". Moderately severe limonite staining. Attitude 60° to core axis at 16.5°. 35° " " " " 19.5°.
21°	24°	Off-white and light yellow-brown decomposed metasediment containing 30%, 1/50" quartz, and 1 or 2% martite, with flaky clay.
24°	29°	Mainly red-brown decomposed metasediment similar to 14.5° - 21°. Contains 10% martite, 50% quartz, 40% clay. Grain size about 1/100". Attitude 60° to core axis at 24.5° 45° " " " " 26.5° 40° " " " " 28.5°
29°	49.5°	Light multicoloured laminated decomposed metasediment, containing 10-20% usually 15% martite, 30% quartz, 55% clay. Grain size about 1/200". Bedding well defined, 1/32" - 1/2" usually 1/16" - 1/8" thick. Attitude 65° to core axis at 30.5° 50° " " " " 32.5° 55° " " " " 33.5° 40° " " " " 36.5° 45° " " " " 37.5° 60° " " " " 40.5° 60° " " " " 44.5° 40° " " " " 45.5° 55° " " " " 47.5° 35° " " " " 49.5°
49.5°	50.5°	Dark purplish-grey decomposed itabirite, containing 45% martite, 55% quartz. Grain size 1/50" - 1/100".
50.5°	67°	Mainly red-brown, with lesser off-white and yellow-brown decomposed metasediment, similar to 14.5° - 21°. Contains 5-20% usually 10% martite, 40% quartz, 50% flaky clay. Grain size 1/50" - 1/250", usually less than 1/100". Bedding well defined, similar to 29° - 49.5°. Attitude 10° to core axis at 52.5° 40° " " " " 54.5° 40° " " " " 56.5° 25° " " " " 57.5° 35° " " " " 59.5° 45° " " " " 60.5° 40° " " " " 64.5°

From	To	Description DETAILED LOG
67'	80.5'	Red-brown and off-white mottled decomposed metasediment, similar to 50.5' - 67', but bedding poorly defined. Contains 20-35% usually 25% martite-magnetite, 60% quartz, 80% flaky clay. Grain size 1/20" - 1/50". Attitude 35° to core axis at 68.5' 20°? " " " " 71.5' 40°? " " " " 74.5' 20° " " " " 78.5'
80.5'	115'	Grey-brown and off-white mottled and indistinctly bedded decomposed metasediment. Contains 25-35% magnetite-martite, 30% quartz with recognizable decomposed felspar and mica. Grain size about 1/20". Attitude 25°? to core axis at 81.5' 20° " " " " 83.5' 30° " " " " 86.5' 50° " " " " 90.5' 30° " " " " 94.5' 25°-30° " " " 100.5' 45° " " " " 103.5' 20° " " " " 106.5' 40° " " " " 107.5' 35° " " " " 108.5' 35° " " " " 113.5'
115'	119'	Off-white and very pale multicoloured decomposed metasediment. Contains 10-15% magnetite-martite, 30% quartz, with felspar and mica. Grain size about 1/150". Bedding not well defined, about 1/8" - 1/4" thick. Attitude 50° to core axis at 116.5' 25° " " " " 117.5'
119'	125'	Dark grey decomposed martite (and minor magnetite) itabirite. Contains 30-40% martite-magnetite usually 40-45%, with quartz and minor felspar and mica. Grain size about 1/100". Bedding fairly well defined, less than 1/4" thick. Attitude 20° to core axis at 120.5' 20° " " " " 122.5' 30° " " " " 124.5'
	125'	END OF HOLE. Unable to restrict water inflow.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP 8

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warramboo — Co. Le Hunte — Bore Ser.No. PB 534/62

Collar Coords 56100N, 58000E — R.L. 557.1' — Grid Warramboo

Vertical — Depth 32' — Plan Ref.

Date Bore Commenced 16.8.61 — Completed 19.8.61 — Driller R. Graham

Bore Logged by G.R. Heath — On 19.8.61 — Hirer D. of M.

OBJECT: To test northern flank of gravity and magnetic anomalies.

RESULT: Decomposed metasediment containing 10 - 25% martite and manganiferous oxides intersected from 8' - 22'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
		Continuous Open Tube Samples
0	1'	Brown sandy loam.
1'	8'	Pale yellow-brown sheet laterite becoming somewhat more friable towards the base, containing 40% rounded 1/100" - 1/200" quartz grains and 20%, 1/16" - 1/4" manganiferous limonite (?) nodules (2' - 8' too hard for tube samples).
8'	18'	Dirty red-brown and yellow-brown severely decomposed quartz-felspar-mica-martite (5-10%, disseminated) - manganiferous (1/16" - 1/8" beds and veins (?), 10-20%) metasediment. Slight irregular granitisation. Grain size 1/50" - 1/250". Bedding generally obscure, up to 1/4" thick. Attitude 30° to core axis at 17.5'.
18'	22'	Decomposed metasediment containing 5-10% opaques (intermediate between martite and manganiferous material), 25% biotite and quartz-orthoclase (formed during granitisation). Grain size 1/10" - 1/50". Bedding fairly well defined usually about 1/10" thick. Attitude 45° to core axis at 19.5'. 55° " " " " 21.5'.
22'	32'	Decomposed granitised metasediment, similar to 18' - 22', but less than 1% opaque oxides, and 30 - 35% biotite. Attitude 60° to core axis at 26.5'. 50° " " " " 29.5' 50° " " " " 31.5'
32'		END OF HOLE (Too hard for tube sampling).

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF PERCUSSION BORE NO. WP9

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. PD 539/62

Collar Coords 56000N, 58000E — R.L. 558.3' — Grid Warrambee

Vertical — Depth 115' — Plan Ref.

Date Bore Commenced 19.8.61 — Completed 31.8.61 — Driller R. Graham

Bore Logged by G.R. Heath — On 2.9.61 — Hirer D. of M.

OBJECT: To test gravity and magnetic anomalies.

RESULT: Manganiferous (20-50% usually 30% Mn Oxides) metasediments intersected from 15'-96' (possibly to 112'); 15% Martite 80'-112'.

LOG Comprises Macro and microscopic geological log.

From	To	Description DETAILED LOG
0	1'	Open tube sample. Light yellow-brown sand containing 75% 1/100" - 1/200" well rounded quartz, and 25% 1/8" - 1/4" nodules of dull black manganiferous oxides (hard and compact).
1'	10'	Sludge sample. Hard convoluted pale yellow-brown kunker containing 20-30% manganiferous oxides (as 0'-1') and about 30% rounded quartz. Occurs as a resistant sheet, becoming somewhat nodular towards the base.
10'	15'	Sludge sample. Cuttings similar to 1'-10', but manganese oxides (50%) and kunker (50%) occur, as nodules in a clayey matrix. Minor limonite present.
15'	20'	Sludge sample. Red-brown and dark grey manganiferous decomposed metasediment. Contains 50% manganese oxides (1/2 vitreous, 1/2 earthy), 25% angular 1/50" - 1/100" quartz and 25% decomposed felspar and mica.
20'	24'	Sludge sample. Dull reddish grey-brown material, similar to 15'-20', but containing about 40% manganiferous oxides and 40% quartz.
24'	28'	Sludge sample. Light reddish-brown material, similar to 15'-20', but containing 25% manganiferous oxides and 40% quartz.
28'	30'	Open tube samples. Off-white, light reddish-brown and lesser grey decomposed somewhat granitised metasediment. Contains 20-25% manganese oxides (as up to 1/8" sub-concordant veins and dispersed 1/200" grains, may include some martite), 40-45% quartz, 5% decomposed mica and 30% decomposed felspar. Grain size 1/200" (opaques) to 1/10" (felspar). Bedding not well defined. Attitude 30° to core axis at 28.5°.

From	To	Description DETAILED LOG
30°	51°	Open tube samples. Grey and dull light brown decomposed metasediment. Contains 25-50%. Usually about 35% manganiferous oxides (as beds, dispersed 1/150" - 1/250" grains, discordant and concordant veins and irregular, roughly equidimensional masses up to 2" diameter. About half is dull and earthy, while the remainder is hard and somewhat vitreous, possibly grading into martit 30% quartz, with decomposed felspar and mica. Grain siz mainly 1/100" - 1/150", but dispersed opeques as small as 1/250", and massive opeques up to 1/4". Bedding very well defined in the lower grade material (beds mainly 1/16" - 1/4" thick), but frequently obliterated in the higher grade material. Attitude 30° to core axis at 30.5° " 35° " " " " 33.5° " 35° " " " " 34.5° " 40° " " " " 42.5° " 40° " " " " 46.5°
51°	54°	Open tube samples. Manganiferous decomposed metasediment, similar to 30°-51°, but containing about 20-25% manganiferous oxides. Bedding well defined throughout. Grain size mainly 1/150" - 1/200". Attitude 30° to core axis at 51.5°. " 35° " " " " 53.5°.
54°	67°	Open Tube samples. Manganiferous decomposed metasediment as 30°-51°. Contains 25-60% usually 40% manganese oxide Attitude 40° (?) to core axis at 61.5° " 40°, " " " " 65.5°
67°	70°	Open tube samples. Manganiferous decomposed metasediment as 51°-54°, contains 25%, mainly dispersed, manganese oxides and accessory garnet. Attitude 45° to core axis at 67.5° " 40° " " " " 68.5°.
70°	75°	Sludge sample (too hard to core). Manganiferous decomposed metasediment containing 20-35% manganese oxides. Probably similar to 30° - 51°.
75°	80°	Sludge sample. Decomposed metasediment containing 15% manganese oxides (possibly gradational to martite). 20-25% biotite, 5% garnet with quartz and decomposed felspar.
80°	91°	Open tube samples. Decomposed metasediment (similar to 75° - 80°) containing 25% opeque oxides (1/3" manganiferous, 2/3 martite - possibly manganiferous), 10% garnet, 15% biotite, with quartz and orthoclase. Grain size 1/100" - 1/200" (garnet) to 1/10" (orthoclase and manganese oxides). Bedding fairly well preserved, usually about 1/8" thick. Attitude 30° to core axis at 82.5° " 35° " " " " 87.5° " 25° " " " " 89.5°.

From	To	Description DETAILED LOG
91°	96°	Open tube samples. Off-white and yellow-brown somewhat limonite stained and impregnated metasediment. Contains 15% martite, 5% manganiferous oxides (as less than 1/4" diameter segregations), 10% biotite, 5% garnet, with 35% quartz and 30% decomposed felspar (mainly orthoclase). Grain size about 1/100". Bedding fairly well defined usually 1/16" - 1/4" thick. Attitude 40° to core axis at 91.5° " 35° " " " " 94.5° " 35°-40° " " " " 95.5°
96°	103°	Open tube samples. Mainly yellow-brown, decomposed metasediment containing 15% martite (probably manganiferous), 5% garnet, 10% biotite, with 30% quartz, and 40% orthoclase. Grain size 1/200" (garnet) to 1/4" (orthoclase). Bedding well defined, usually 1/16" - 1/8" thick. Attitude 40° to core axis at 98.5° " 40° " " " " 100.5° " 30° " " " " 102.5°
103°	109°	Open tube samples. Decomposed granitised metasediment, similar in appearance to 96° - 103°, but mainly red-brown in colour. Contains about 15% manganiferous looking martite, 15-20% biotite, less than 5% garnet with quartz and orthoclase. Bedding fairly well defined, but rather lenticular due to concordant granitisation. Grain size 1/200" - 1/4" (as 96°-103°). Attitude 30° to core axis at 104.5° " 40° " " " " 107.5° " 40° " " " " 108.5°
109°	112°	Open tube samples. Off-white, grey and yellow-brown granitised and somewhat limonite stained decomposed metasediment. Contains 25% martite (leached and manganiferous looking in part), 10% biotite, with quartz, orthoclase and accessory garnet. Grain size 1/200" - 1/10" (as 96° - 103°). Bedding not well defined, usually less than 1/4" thick. Rock is possibly granitised itabirite. Attitude 30° to core axis at 110.5°.
112°	115°	Open tube samples. Light reddish-brown decomposed "granite", containing about 5% manganiferous martite, 5% manganiferous martite, 5% biotite, with coarsely crystalline (up to 1/4" crystals) orthoclase and quartz. No visible structure.
115°		END OF HOLE. Hole abandoned after severe caving at 80° - 85° level.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLES NOS. WR1 & WR1A

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. PH 644/61

Collar Coords 58000N, 67000E — R.L. 450.8' — Grid Warrambee

Vertical — Depth 149' — Plan Ref.

Date Bore Commenced 8.5.61 — Completed 18.5.61 — Driller R. Munro, H. Mischlewitz

Bore Logged by G.R. Heath — On 11-18.5.61 — Hirer D. of M.

OBJECT: To test gravity and magnetic "peaks" adjacent to ironstone float containing relict martite.

RESULT: Metasediment containing 10-35%, usually 15-25%, iron oxides intersected 0' - 149'.

LOG Comprises: Detailed macro and microscopic geological log
Summary Log
Magnetic Log

From	To	Description
		SUMMARY LOG
0	80.8'	Decomposed, somewhat granitised metasediment containing 5-40% probably averaging 15-25% iron oxides (mainly martite).
80.8'	105'	Somewhat granitised decomposed martite itabirite containing 25-30% martite. Micas are accessory.
105'	149'	Somewhat granitised metasediment containing quartz, orthoclase, martite (and magnetite below 127') with variable muscovite, biotite, epidote and garnet. 137.5' - 139' quartz (10-70%) - magnetite (30-90%) band. Overall iron oxide content about 10-15%. Generally similar to fresh basement in WR6. Attitude generally 45° to 70° to core axis.

MAGNETIC LOG

Deflection 90° at 130'

" 90° at 145'.

ROTARY DRILLHOLES NOS. MR1 & MR1A (Contd.) -2-

From	To	Description DETAILED LOG
0	10'	Fines 30-40% of cuttings on 12 mesh sieve. Fine angular limonite with minor martite 90%, angular quartz 10%.
10'	20'	Fines 30-40% of cuttings on sieve. Similar to 0' - 10', but less than 5% quartz.
20'	22'	Percussion open tube sample. Red-brown and lesser off-white decomposed metasediment. Grain size about 1/50". Martite and limonite after martite (some nodular limonite) 30-40%, quartz 45%, clay 15-25%. Bedding obscure, possibly 45° to core axis.
20'	30'	Fines 85% of cuttings on sieve. Constituents as 0'-20', but quartz 45-55%.
30'	44'	Fines 95% of cuttings on sieve. Quartz and limonite-martite as 0' - 30'.
44'	45'	Percussion open tube sample. Light multicoloured mottled and laminated decomposed metasediment. Martite-limonite 25-30%, quartz 45-50%, clay 25%. Bedding well defined, 50° to core axis.
45'	50'	Fines 90-95% of cuttings on sieve. Similar to 0' - 44', angular quartz 50%, limonite 25-30%, martite 20-25%.
50'	60'	Fines 95% of cuttings on sieve. Quartz 50-60%, limonite-martite (as 45' - 50') 40-50%.
60'	61'	Percussion open tube sample. Off-white, yellow-brown and red-brown mottled, decomposed granitised, metasediment. Grain size up to 1/4". Quartz 40%, orthoclase 45%, martite 15%. No well defined structure (bedding or granitised bands 70° or 15° to core axis).
60'	70'	Fines 90% of cuttings on sieve. Angular lightly stained quartz 60%, limonite with minor martite 30%, weathered and stained quartz-martite fragments (10-20% martite) 10%. Grain size mainly less than 3/16".
70'	80'	Fines 75% of cuttings on sieve. Angular quartz 50%, martite (non-magnetic) and lesser limonite 35-40%, composites (quartz-martite and below 75', quartz-felspar-martite with less than 20% martite) 10-15%.
80'	80.8'	Percussion open tube sample. Light yellow-brown and off-white decomposed "granite", grain size 1/20". Contains about 5% martite.
80.8'	81.5'	Percussion open tube sample. Off-white and dark purple decomposed martite itabirite. Contains 30-40% martite, 30% decomposed felspar, 30-40% quartz. Grain size about 1/50" - 1/150". Bedding attitude about 45° to core axis.
81.5'	90'	Fines 85% of cuttings on sieve. Angular quartz and quartz-felspar fragments with accessory martite 70-80%, martite with minor limonite 20-30%. Composites have grain size 1/100" - 1/10" and contain less than 25% martite.

ROTARY DRILLHOLES NOS. MR1 & MR1A (Contd.) -3-

From	To	Description DETAILED LOG
90'	100'	Fines 85% of cuttings on sieve. Fines: quartz, pink felspar and quartz-felspar with accessory muscovite and martite 90%, martite with minor limonite and dispersed quartz and felspar 10%. Coarse fraction: dominantly quartzfelspar (1/10" - 1/30") with about 10% martite and accessory micas.
100'	102'	Percussion open tube sample. Off-white and dark purplish-grey decomposed martite itabirite. Contains 40-45% martite, 45% quartz and 10-15% clay. Bedding 45° (?) to core axis.
100'	110'	Mainly quartz-martite and quartz-felspar-martite fragments (usually 10%, occasionally up to 30% martite) with lesser quartz and martite. A few fragments are biotite rich.
110'	120'	Quartz-felspar and quartz-epidote fragments with minor biotite and variable martite (accessory in coarse grained rock, 10-20% in finer grained material).
120'	127'	Mainly quartz-martite (martite 0-30%), with minor limonite-martite and accessory felspar, muscovite and biotite. Fragments somewhat weathered. Grain size: martite less than 1/50", quartz less than 1/10".
127'	128.5'	Fresh basement. Quartz-felspar-martite-garnet and quartz-martite showing some granitisation. Grain size 1/50" (martite-magnetite and garnet) to 1/10" (quartz-felspar). Mica is rare. Average composition: quartz 70%, martite 20%, felspar 5%, garnet 5%. Epidote rare.
128.5'	133.2'	Diamond drill core. Metasediment as 127'-128.5'. Contains 20% martite-magnetite as 1/10" bleb elongated parallel to bedding. Similar in appearance to core at base of MR6.
133.2'	137.5'	Similar to 128.5' - 133.2'. Magnetite-martite generally 15%, rarely up to 30 or 40%.
137.5'	139'	Hard band of quartz (10-70%) - magnetite (30-90%) with accessory garnet. Grain size 1/50" or less.
139'	140'	Cuttings consist of 25% quartz-magnetite (50-75% magnetite) and 75% quartz-pink felspar (up to 70%) - magnetite-martite (less than 20%), with accessory garnet and biotite and rare epidote.
140'	144.3'	Quartz-felspar-martite-magnetite (up to 30%) - garnet with lesser quartz-magnetite and off-white chalcedonic (?) material. Epidote occurs irregularly (up to 60% of some fragments), while biotite is a common minor constituent. Grain size generally less than 1/50", but up to 1/20" in felsic fragments. Average composition approximately 50% quartz, 20% epidote, 10% martitemagnetite, 10% felspar, 5% garnet, 5% biotite.
144.3'	149'	Diamond drill core. Metasediment similar to 128.5' - 133.2' Magnetite-martite about 20%, with abundant quartz, felspar epidote and garnet (c.f. core at base of MR6). Attitude 70° to core axis at 149'.
149'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR2

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warramboo Co. Le Hunte — Bore Ser. No. 644/61

Collar Coords 58400N, 67150E — R.L. 451.2' — Grid Warramboo

Vertical — Depth 66' — Plan Ref.

Date Bore Commenced 19.5.61 — Completed 23.5.61 — Driller H. Nischkewitz

Bore Logged by G.R. Heath — On 23-24.5.61 — Hirer D. of M.

OBJECT: To test gravity and magnetic "peaks".

RESULT: Martite-magnetite itabirite intersected from 0' - 66' (less weathered below 40'). Continued as WD 1.

LOG Comprises Macro and microscopic geological log

From	To	Description SUMMARY LOG
0	11'	Leached secondary looking rock containing mainly limonite and relict martite bands and minor quartz (i.e. weathered itabirite).
11'	40'	Off-white and yellow-brown sandy to very sandy clay, containing less than 1/8" quartz and limonite-martite grains. A few composites containing epidote, mica and garnet occur below 20 feet.
40'	54'	Leached and altered martite-magnetite itabirite. Grain size 1/50" - 1/20". Iron oxides average 50% of rock.
54'	66'	Martite-magnetite itabirite. Magnetism variable (greatest at 66'). Grain size 1/100" - 1/10" averaging 1/50". Iron oxides probably average 40-50% of rock. Biotite is the only other major constituent, while garnet and felspar are accessories.
		Continued as WD 1 to 400'.

ROTARY DRILLHOLE NO. NR 2 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cutting caught on 4 mesh sieve.
0	7'	Fines 50% of cuttings. Limonite with less than 1/4 martit 65%, porous quartz sandstone 10% quartz (angular) 5%.
7'	11'	Diamond drill core. (11" recovery = 23%). Leached, secondary looking quartz-limonite rock with a little relict martite in bands at 40° (?) to core axis. Non magnetic.
11'	20'	Fines 75% of cuttings. Components as 0' - 7', but cuttings somewhat smaller (100% less than 1/4"). Limonite-martite 85%, quartz (angular) 15%, sandstone less than 1%.
20'	22'	Open tube percussion sample. Off-white to yellow clay with less than 20% to 80% quartz and martite-limonite fragments (dominantly less than 1/8" diameter). Bedding variable, 30-90° to core axis. A few (1%) very slightly magnetic grains.
22'	30'	Fines 70% of cuttings. Similar constituents to 0 - 7', but rather smaller (average size about 1/8") and containing 1 or 2% light greyish green opaque mineral. Angular quartz (with rare iron oxide inclusions) 60-70%. Limonite-martite 30-40% (non-magnetic).
30'	40'	Fines 30% of cuttings. Similar components to 0 - 7', but smaller (90% less than 1/8") and containing a few felspar grains and grey-green mineral as 22' - 30'. Quartz 70-80%, limonite-martite 20-30%. The few composites contain a little mica and garnet, which is too small to be retained in sieve.
At 40'		Drilling becomes much harder.
40'	41.5'	Percussion open tube sample. Leached and somewhat stained martite (and possibly magnetite) itabirite. Grain size mainly 1/50" - 1/20" with a few quartz grains larger. Lighter bands contain mica and considerable clay. Bedding variable, about 50° to core axis. Iron oxides (containing less than 5% magnetic particles) 30-70%, averaging about 50%, quartz 30%, clay and mica 20%.
41.5'	50'	Fines 50-60% of cuttings. Constituents similar to 30' - 40'. Quartz 60-70%, martite-limonite 30-40%. Felspar, green mineral, mica accessory. Composites rare (usually quartz-mica). IRON OXIDES RESEMBLING THOSE IN 40' - 41.5' HAVE NOT BEEN RECOVERED. No magnetic particles.
50'	61'	CUTTINGS: Fines 40% of cuttings. Quartz and limonite-martite as 41.5'-50' but containing 2-5% magnetic particles. (Quartz-magnetite composites).

ROTARY DRILLHOLE NO. HR 2 (Contd.) -3-

From	To	Description DETAILED LOG
54°	66°	DIAMOND DRILL CORE. Recovery 54° - 58° 2'5" (59%) 58° - 61° 1'7" (54%) 61° - 66'2 2'11" (59%). This material is too hard to drill with roller bits, but does not core well. Martite-magnetite itabirite containing varying proportions of biotite mica and accessory garnet and felspar. Magnetism variable e.g. deflections 0° - 55° 10° - 56° 15° - 57° 15° - 59° 90-° - 60° 25° - 61° 90° - 63° 30° - 64.5° 90+° - 66°. In general, the less magnetic bands containing more biotite and vice versa. The total core probably contains 40-50% martite-magnetite of grain size 1/100" - 1/10", averaging 1/50". Attitude is variable; bedding is lenticular in some places and obscure in others. Bedding is 45° to core axis at 54.5° " " 45° " " " " 56°. " " 70° " " " " 56.5° " " 45° " " " " 57° " " 55° " " " " 58° " " 50° " " " " 60° " " 65° " " " " 62° " " 65° " " " " 64.5° " " folded " " " " 66° Lineation 15° to leg axis of bedding plane at 59°. The itabirite fractures readily along irregular planes sub-parallel to the bedding.
61°	66°	Sludge. The only cuttings retained in a fly wire screen were 1/16" biotite flakes. This suggests that the rock lost during coring was more micaceous than that recovered.
	66°	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. MR 3

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 25 Hd. Warrambee — Co. Le Hunte — Bore Ser.No. 644/61

Collar Coords 5760ON, 67000E — R.L. 449.2' — Grid: Warrambee

Vertical — Depth 201.7' — Plan Ref.

Date Bore Commenced 24.5.61 — Completed 27.5.61 — Driller H. Mischlewitz

Bore Logged by G.R. Heath — On 24-27.5.61 — Hirer D. of M.

OBJECT: To identify and sample material producing gravity and magnetic "highs".

RESULT: Quartz-epidote gneiss and various coloured clays both with minor dispersed martite-magnetite.

LOG Comprises Macro and microscopic geological logs.

From	To	Description SUMMARY LOG
0	25'(app.)	Yellow brown clay with minor dispersed limonite-martite and quartz.
25'(app.)	50'(app.)	Off-white and grey slightly sandy clay with irregular lenses of sand (quartz and minor martite). A little concretionary calcite occurs after 40'.
50'(app.)	178'	Interbedded purple martite-magnetite clay and multi-coloured, mottled, quartz clay. Beds less than 1/8" to 2" thick. Sand generally less than 1/50". Magnetite rare except 80' - 110'. Concretionary calcite occurs as up to 1/2" nodules, containing dispersed quartz and iron oxides.
178'	201.7'	Quartz-epidote-tremolite rock with minor muscovite and biotite, and dispersed (less than 5%) martite-magnetite Some pink felspar occurs below 200'. Garnet is a comm accessory. Major minerals occur as less than 1" blebs separated by fibrous sillimanite.

ROTARY DRILLHOLE NO. BR 3 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cutting caught on 12 mesh sieve.
0	10°	Fines 85% of cuttings. Limonite (secondary, no martite, non-magnetic) 90%, angular quartz 10%.
10°	20°	Fines 85% of cuttings. As for 0° - 10°, but quartz 20% and non-magnetic limonite with very minor martite 80%.
20°	22°	Percussion open tube sample. Light yellow-brown very plastic clay, with minor dispersed quartz and limonite grains. Bedding obscure and distorted by flow, but possibly 25-30% to core axis at 20.5° and 90° (?) at 21.5°.
20°	30°	Fines 50% of cuttings. As for 0° - 10°, but quartz 65-70%, limonite with minor martite 30-35%. A few magnetic grains, and a few quartz-mica composites.
30°	40°	Fines 75% of cuttings. Very similar to 20° - 30°. Quartz 60-70%, limonite 25-35%, somewhat magnetic martite (frequently pseudomorphs after magnetite) 5%. Composites very rare.
40°	42°	Percussion open tube sample. Offwhite grey and light red-brown slightly sandy "marbled" clay, containing light grey irregular sand bands and "veins" (contorted and lenticular). Sand mainly quartz with minor less than 1/50" non-magnetic iron oxides. Bedding 30° approx. to core axis at 40.5°. " 60°(contorted) " " " 41.5°.
40°	50°	Fines 50% of cuttings. Angular quartz 60-70% (1/2 of this is stained light pink), limonite 15-25%, martite (brittle crushes to red powder, slightly magnetic) 5%, concretionary irregular shaped limestone grains ("micro-nodules") containing dispersed quartz and martite 10%. Composites rare (generally contain very fine grained mica).
50°	60°	Fines 50-60% of cuttings. Constituents as 40° - 50°. Angular quartz (less than 10% stained pink) 40%, calcareous "micro-nodules" 40%, slightly magnetic martite 10%, limonite 10%. Composites very rare. One or two flakes of muscovite present.
60°	62°	Percussion open tube sample. 1/10" - 2" beds of dark purple clay containing abundant 1/50" martite and lesser quartz grains interbedded with off-white clay containing somewhat less quartz and very minor martite. Non calcareous. Bedding 35° to core axis at 60.5° " 35° " " " " 61.5°.
60°	70°	Fines 65-75% of cuttings. Constituents as 40° - 50°. Calcareous "micro-nodules" 50%, quartz 30-35%, limonite 5-10%, slightly magnetic martite 5-10%. Composites very rare.
70°	80°	Fines 60-70% of cuttings. Constituents as 40° - 50°. Calcareous "micro-nodules" (containing somewhat more martite) 45%, white angular quartz 45%, limonite 5%, martite (slightly magnetic) 5%.

From	To	Description DETAILED LOG
60'	62'	<u>Percussion open tube sample</u>. 2" layers of off-white and multicoloured clay containing fairly abundant less than 1/50" quartz and minor martite interbedded with 1" layers of almost pure broken quartz up to 1/3" diameter. The clay is non-calcareous. Bedding 5° (?) to core axis at 60.5' " 50° " " " " 61.5'
60'	90'	Fines 20% of cuttings. Constituents as 40' - 50', but quartz fragments larger (commonly 1/8" - 1/4") and magnetite present. Quartz 70%, calcareous "micro-nodules 15-20%, limonite 5%, martite-magnetite (2/3 magnetite) 5-10%. Magnetite usually contains quartz fragments.
90'	100'	Fines 30-40% of cuttings. Angular quartz fragments (1/8" ave. diam.) 35%, calcite-magnetite-martite composites (grain size 1/100") 40%, calcareous "micro-nodules" 5%, martite (slightly magnetic) 10%, magnetite 10%. A few limonite fragments are also present.
100'	101.5'	<u>Percussion open tube sample</u>. Mainly off-white, yellow-brown and grey mottled clay, with minor martite and fairly abundant 1/100" quartz (particularly in the grey portions). One 1" band of purple clay containing abundant quartz and martite (non magnetic) fragments (c.f 60' - 62') 1/50" diameter. Non calcareous. Bedding 15° to core axis at 100.5' " 40°(?) " " " 101'.
At 96'		Hard band, possibly martite limestone.
100'	110'	Fines 60-70% of cuttings. Components as 90-100'. Quartz 40%, "martite limestone" composites 50%, limonite 3%, calcareous "micro-nodules" 2%, martite-magnetite (1/5 magnetite) 5%.
110'	120'	Fines 30-40% of cuttings. Components as 90' - 100'. Quartz 40%, limestone with included minor quartz and martite 40%, limonite 5%, martite with minor magnetite 5%
120'	122'	<u>Percussion open tube sample</u>. Interbedded less than 1" layers of off-white, light brown and purple clay. The light clay contains moderately abundant quartz and minor martite, while the purple material is martite rich (as 60' - 62'). Non calcareous (no visible "limestone" fragments). Bedding 25° to core axis at 120.5' " 20° " " " " 121.5'
120'	130'	Fines 50-60% of cuttings. Components as 90' - 100'. Quartz 40%, limestone, martite-magnetite limestone and minor "micro-nodules" 50%, martite with minor limonite 10%, magnetite possibly 1%. Limestone fragments well rounded (as in all samples) but rather smaller than 110' - 120' (mainly less than 1/8" c.f. 1/8" - 1/4").
130'	140'	Fines 50-60% of cuttings. Components as 90' - 100', but grain size averaging about 1/16". Quartz 40%, limestone etc. as above 40%, martite with very rare magnetite 15%, limonite 5%. One or two grains of light greenish grey mineral (epidote?) and rare muscovite flakes.

ROTARY DRILLHOLE NO. AR 3 (Contd.) -4-

From	To	Description DETAILED LOG
140°	142°	Percussion open tube sample: Grey and multicoloured mottled clay containing up to 1/2" rounded "limestone" nodules and fairly abundant clay. Iron oxides are restricted to less than 1/10" irregular laminae. Bedding 15° to core axis at 140.5° " 35° " " " " 141.5°
140°	151°	Fines 40-50% of cuttings. Quartz 30-35%, limestone (with dispersed quartz and martite) 50%, limonite 5%, martite with very minor magnetite 10-15%.
151°	162°	Fines 50-60% of cuttings. Constituents as 90° - 100°. Quartz 35%, limestone as above 45%, limonite 5%, martite with very minor magnetite 15%. Rare grains of grey-green mineral.
162°	164°	Percussion open tube sample. Interbedded less than 1" purple ferruginous sandy clay as 60° - 62°, dark brown sand with minor clay and light brown micaceous sandy clay with up to 1/2" limestone nodules. Sand in each case is martite and quartz less than 1/50". Bedding at 162.5°, 30° to core axis " " 163.5°, 20-50° " "
162°	170°	Fines 50-60% of cuttings. Constituents as 90° - 100°. Quartz 35%, limestone ("micro-nodules" etc.) 45-50%, limonite 5%, martite with rare magnetite grains 10-15%.
178° on		Very hard drilling.
170°	180°	Fines 50-60% of cuttings. 170° - 178° As 162° - 170°. 178° - 180° Angular, fresh rock fragments containing 1/20" - 1/100" crystals of quartz, epidote (?), martite, magnetite, garnet, biotite and muscovite micas, and minor felspar. A few fragments (1 or 2%) of sillimanite also present. Iron oxides rarely exceed 20% of chips, usually 5-10%.
180°	185°	Diamond drill core. 9" (15%) recovery. Drilling hard (5ft. in 1½ hrs.) but sounded very rough. Gneiss containing irregular segregations of epidote and quartz up to 1" diameter, separated in many cases by veinlets of fibrous sillimanite. Garnet and mica are common accessories, forming up to 10 or 15% of some quartz bleb Martite and magnetite occurs as dispersed crystals throughout the rock (5%), less than 1/10" spherical bleb and as rare less than 1/10" lenticles and laminae. Andalusite may be present, but could not be definitely distinguished from quartz (some grains show evidence of 90° cleavage). Bedding very obscure, possibly 50° to core axis.
185°	190°	Fines 15-20% of cuttings. Quartz 25%, limonite with very minor martite and magnetite 5%, limestone etc. 1% approximately, composites as 180° - 185° 70% (including 5% which can be picked up with a magnet.) Clay free fines contain 20% iron oxides.
190°	195°	Fines 30-40% of cuttings. Constituents and proportions as 185° - 190°. 10-15% of cuttings picked up by magnet. Fines contain 40% iron oxides.

ROTARY DRILLHOLE NO. MR 3 (Contd.) -5-

From	To	Description DETAILED LOG
195'	200'	Fines 25-30% of cuttings. Constituents and proportions as 185' - 190'. 5-10% of cuttings picked up by magnet. Clay free fines contain 10-15% iron oxides.
200'	201.7'	Diamond-drill core, 1'5" recovery (81%), very hard, used up diamond bit. Quartz-epidote gneiss as 180' - 185', similar appearance, but sillimanite is less abundant and pink orthoclase occurs in the quartz rich blebs. Iron oxide content less than 5% (magnetic deflections 10-25° throughout core). Bedding very obscure, possibly 35° to core axis. Sludge sample - fines 40-50% of cuttings. Quartz and minor potash felspar 50%, limestone "micro-nodules" etc. 15%, limonite with very rare martite-magnetite 5%, composites as above (containing minor pink felspar) 30%. Fines contain 20-25% iron oxides.
	201.7'	END OF HOLE.

SAMPLING NOTE. During diamond drilling, a sample of sludge was obtained by running the mud through a 4 gall., baffle fitted, drum. This sludge was washed free of mud. The resulting sample was treated as usual; 75% passed through the 1/20" - 1/25" screens in the washing tin.

Sludge from diamond drilling: + (1/20" - 1/25"). Similar constituents to 178' - 180'. Quartz 40%, limonite 5%, limestone ("micro-nodules" etc.) 5%. Composites (reef fragments) 50% (epidote 50-60%, quartz 25-35%, martite-magnetite 5%, tremolite 5%, mica less than 5%, garnet less than 5%

- (1/20" - 1/25"). Composites rare. Quartz 40%, magnetite-martite 40%, limonite 5%, limestone 5%, epidote, garnet, mica 10%.

Rotary cuttings - fines 40% of cuttings. Constituents as diamond sludge; quartz 40%, limestone 5%, limonite and minor martite - magnetite 5%, reef fragments (as above) 50%. Fines (clay free) contain 30-40% iron oxides.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. BR 4

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warrambee — Co. Le Haute — Bore Ser. No. 644/61

Collar Coords 58800N, 67150E — R.L. 457.3' — Grid Warrambee

Vertical — Depth 114' — Plan Ref.

Date Bore Commenced 27.5.61 — Completed 29.5.61 — Driller H. Mischlewitz

Bore Logged by G.R. Heath — On 27-29.5.61 — Hirer D. of M.

OBJECT: To identify and sample material producing pronounced gravity and magnetic "lows" north of Anomaly.

RESULT: Various coloured clays overlie bedded quartz-biotite rock with garnet porphyroblasts.

LOG Comprises Macro and Microscopic geological logs.

From	To	Description SUMMARY LOG
0	8'(app.)	Clay containing gypsum and residual sandstone.
8'(app.)	30'(app.)	Yellow brown and off-white slightly sandy clay.
30'(app.)	70'	Grey, mottled, slightly sandy clay with occasional quartz bands.
70'	101'	Somewhat decomposed quartz-biotite rock with variable garnet and epidote.
101'	114'	Fine grained(less than 1/50" mainly) bedded quartz-bioti -epidote-garnet rock. Epidote varies from 50% to 1% of rock. Garnet occurs as up to 1/4" porphyroblasts. Pyrite is accessory.
		ATTITUDE - Mainly 20°-45° to core axis.

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0'	10'	Fines 25% of cuttings. Gypsum crystals (selenite) up to 1/4" diameter 40%, calcareous quartz gypsum sandstone (less than 1/50") 25%, siliceous, clayey and occasionally limonitic quartz gypsum sandstone (less than 1/50") 35%.
10'	20'	Fines 95% of cuttings. Gypsum (as above) 20%, angular quartz fragments 50%, calcareous sandstone (as above) 20% siliceous, clayey and gypsiferous sandstone (as above) 8%, limonite and limonitic quartz sandstone 2% (secondary
20'	22'	Percussion open tube sample. Off-white, pale yellow-brown and occasionally red-brown slightly sandy (less than 1/50 grains) clay, with irregular lenses of yellow-brown very sandy clay and white clay containing less than 5% biotite and non-magnetic iron oxide flecks (less than 1/500" diameter). Bedding 35-40° to core axis at 20.5'. " 55° (lenticular) " " 21.5'.
20'	30'	Fines 70-75% of cuttings. Some constituents as 10'-20'. Quartz 75%, limonite and limonitic quartz sandstone 15%, gypsum etc. 10%.
30'	40'	Fines 70-75% of cuttings. Constituents as 10' - 20'. Quartz 85%, limonite etc. 10%, gypsum etc. 5%, rare grains of very fine grained (less than 1/1000") pyrite(?).
40'	42'	Percussion open tube sample. Grey, light brownish grey and off white mottled clay with minor angular less than 1/50" quartz grains and black flecks as 20' - 22'. One or two lenses of almost pure broken (less than 1/10") quartz. Bedding 20 or 30° (obscure) to core axis at 40.5'. " contorted " 41.5'.
40'	50'	Fines 90% of cuttings. Constituents as 10' - 20' with 5% pyritic (?) material as 30-40'. Quartz 90%, limonite etc. 1%, gypsum, sandstone etc. 4%.
50'	60'	Constituents: . Quartz 90%, gypsum, sandstone etc. 5%, pyritic (?) material 4%, fragments of mica 1% (less than 1/50"), limonite etc. accessory. Fines 90% of cuttings.
60'	62'	Percussion open tube sample. Grey mottled clay as 40' - 42'. Black flecks possibly 5%. Bedding 45° (variable) to core axis at 60.5'. " 45° (contorted) " " " " 61.5'.
60'	70'	Fines 90% of cuttings. Quartz 90%, pyritic (?) material 9%, angular garnet fragments 1%, other minerals (gypsum etc.) accessory.
70'	80'	Fines 90% of cuttings. Sludge darker in colour. Quartz 80%, composites (less than 1/25") quartz-biotite-epidote-garnet 10%, decomposed quartz-mica fragments 3%, pyritic (?) material 5%, limonite etc. 1%, garnet 1%, gypsum etc. accessory.
80'	82'	Percussion open tube sample. Decomposed quartz-biotite-garnet rock with minor epidote and very rare non-magnetic iron oxides. Bedding (less than 5 mm.) due to variations in biotite content. Quartz 40%, biotite 35%, garnet 25%. Bedding 40° to core axis at 80.5'. " 40°-90° (variable) " 81.5'.

ROTARY DRILLHOLE NO. DR 4 (Contd.) -3-

From	To	Description DETAILED LOG
80'	90'	Fines 85% of cuttings. Quartz 40%, garnet 1%, composites (as 70' - 80') 60%. Limonite, gypsum etc. accessory.
90'	100'	Fines 40% of cuttings. Quartz (including 1/3 large (up to 1/4") angular fragments) 30%, garnet 5%, composites (as 70' - 80') 65%.
100'	102'	Percussion open tube sample. Off-white slightly sandy clay and yellow-brown clayey sand irregularly interbedded with epidote (50%) - quartz (20%) - biotite (20%) - garnet (10%) rock, less than 1/50" grain size, no well defined structure. Bedding (possibly flow) 30° to core axis at 100.5' 50°(?) " " " 101.5'
	101'	Drilling much harder (less than 4' per hr.)
	103'	Roller bit.
100'	105'	Fines 60-70% of cuttings. Quartz 25%, rock fragments (as 100' - 102') 70%, gypsum, limonite etc. 5%.
105'	108'	Less than 1% of cuttings retained on 16 mesh sieve. Fines:- quartz 50%, biotite (some bronze) 25%, garnet 15%, epidote 10%.
108'	114'	Diamond drill core. Recovery: 108' - 109.7', 15" - 16" (75-80%); 109.7' - 114', 37½" (75%). Fine grained (mainly less than 1/100") biotite-quartz rock interbedded with 1/20" almost pure quartz layers, containing minor biotite and garnet, and accessory pyrite. Garnet porphyroblasts up to 1/4" diameter occur throughout the rock, although somewhat more abundant in some places (e.g. 113.5' - 114'). Pyrite occurs as thin coatings in some joint planes. Epidote and iron oxides are extremely rare accessories. Bedding 40° to core axis at 109' " 45° " " " " 111' " 30°-35° " " " " 113' " 20° " " " " 114' Bedding generally less than 1" and usually 1/8" - 1/4" thick.
108'	111'	Sludge: only about 1% retained on 16 mesh sieve. Fines - Quartz 60%, biotite 20%, garnet 20%, epidote less than 1%. Minor gypsum, limonite etc.
111'	114'	No mud return (hence no cuttings). Lost 800 galls. in 30. mins.
114'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. NR5

Project: Narramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Narramboo — Co. Le Hunte — Bore Ser. No. 649/61

Collar Coords 56400N, 67000E — R.L. 453.5 — Grid Narramboo

Vertical — Depth 190.5' — Plan Ref.

Date Bore Commenced 30.5.61 — Completed 1.6.61 — Driller H. Mischlewitz

Bore Logged by G.R. Heath — On 30.5-1.6.61 — Hirer D. of M.

OBJECT: To identify and sample material producing magnetic and gravity "lows" south of Narramboo Anomaly.

RESULT: Gypsum and angular quartz sand overlie quartz-biotite gneiss containing abundant felspar.

LOG Comprises Macro and Microscopic geological logs.

From	To	Description SUMMARY LOG
0	12'	Up to 3/4" gypsum (selenite) crystals.
12'	25'	Interbedded gypsum and grey clay (possibly fleur gypsum) with minor angular quartz.
25'	45'	White, poorly sorted, angular, fine to very fine grained pure quartz sand.
45'	110'	Grey slightly clayey quartz sand (similar to 25'-45') containing 1 or 2% less than 1/50" almost non-magnetic iron oxides. Blebs of quartz grains around 80' cemented by fine grained pyrite.
110'	175'	Quartz-felspar somewhat decomposed rock containing variable amounts of muscovite and biotite, and minor pyrite.
175'	181.5'	Decomposed amphibolite or dolerite, consisting of 50% serpentine-chlorite and 50% decomposed felspar.
181.5'	186.0'	Somewhat decomposed quartz-biotite rock with minor felspar and garnet and accessory iron oxides.
186'	190.5'	Quartz-biotite banded gneiss with abundant augens and lenses of off-white and pale pink felspar, and less than 1/4" garnet porphyroblasts. Attitude - Irregular 60° - 70° to core axis.

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 15-20% of cuttings. Gypsum (selenite), up to 3/4", crystals, generally stained reddish, 95%, quartz 5%.
10'	20'	Fines 80-85% of cuttings. Gypsum (as 0' - 10') 80%, slightly calcareous quartz-gypsum sandstone 15% quartz 5
20'	22'	Percussion open tube sample. Very irregularly interbedded light grey slightly sandy (gypsum) clay (fleur gypsum (? and less than 1/2" crystalline selenite in clay matrix.
20'	30'	Fines 75% of sample. Gypsum as 0'-10', 60-70%, quartz (angular, less than 1/10") 30-40%.
30'	40'	Fines 50-60% of sample. Angular quartz (less than 1/10") more than 95%, gypsum and minor limonitic quartz sandsto less than 5%.
40'	42'	Percussion open tube sample. Homogeneous, structureless poorly sorted, angular, fine to very fine grained (mean grain size about 1/200") pure quartz sand (white).
40'	50'	Fines 50% of sample. Slightly greyish angular quartz (les than 3/16") 99%, gypsum etc. 1%.
50'	60'	Fines 50% of sample. Quartz (as 40' - 50') containing less than 1/100" iron oxide inclusions 99% (some grains quite dark grey), gypsum etc. 1%.
60'	62'	Percussion open tube sample. Grey slightly clayey sand, somewhat coarser (1/50" - 1/100") but otherwise similar to 40' - 42' containing 1 or 2% almost nonmagnetic, less than 1/50" iron oxide fragments (as inclusions in quartz grains and free particles). Bedding (?) 80-90° to core axis, visible as variatio in grain size of quartz.
60'	70'	Less than 1% cuttings retained on 16 mesh sieve. Fines:- greyish quartz (as 40' - 50') 99%, martite (non magnetic frequently octahedral) 1%, gypsum etc. accessory.
70'	80'	Fines 40% of cuttings. Quartz (as 40'-50') 99%, martite less than 1%, quartz-pyrite composites (pyritohedra less than 1/500") less than 1%, gypsum etc. accessory.
80'	82'	Percussion open tube sample. Grey-brown sandy clay very irregularly interbedded with greyish clayey sand (as 60' - 62'). Sand contains 1/8" - 1/2" blebs cemented by finely crystalline pyrite. These blebs contain up to 20% pyrite and less than 5% martite. Bedding possibly 20° - 30° to core axis.
80'	90'	Fines 40-60% of cuttings. Grey quartz and pyrite as 70' - 80'. One or two tourmaline grains (rounded) and limonitic quartz sandstone.
90'	100'	Fines 50% of cuttings. Grey quartz and pyrite as 70' - 80'
100'	102'	Percussion open tube sample. Grey brown clay and clayey quartz sand as 80' - 82' (sand somewhat coarser in parts up to 1/8"). Bedding obscure.

From	To	Description DETAILED LOG
100°	110°	Fines 50% of cuttings. Quartz (grey) as 40° - 50° 95%, Quartz-pyrite-martite composites 2-5% (as 70° - 80°), gypsum, slightly limonitic quartz sandstone less than 5%. One or two felspar grains.
110°	120°	Fines 40-50% of cuttings. Grey quartz (30% 1/8" - 1/4") as 40°-50° 90%, quartz-pyrite-martite (as 70° - 80°) 5-10%, gypsum etc. less than 5%, felspar accessory.
120°	122°	Percussion open tube sample. Decomposed quartz-muscovite schist. Quartz greyish and somewhat rounded in places. Mica sometimes bleated and stained black (fine grained pyrite?), showing preferred orientation. Some decomposed felspar. Bedding 70°(?) to core axis at 120.5° " 55°-70° " " " " 121.5°
120°	130°	Fines 40-50% of cuttings. Greyish and white quartz 90%, felspar (white, somewhat decomposed) 1 or 2%, pyrite etc. 5%, somewhat limonitic sandstone 1 or 2%, gypsum etc. 1 or 2%.
130°	140°	Fines 60% of cuttings. Quartz (less than 1/10 grey) 90%, white felspar 10%, pyrite, gypsum etc. accessory.
140°	142°	Percussion open tube sample. Grey mottled decomposed quartz-felspar-biotite-muscovite rock (looks quite "sandy" in parts). Bedding very obscure, possibly 50°-65° to core axis. Appearance generally similar to 120°-122°.
140°	150°	Fines 70% of cuttings. Quartz (grey rare) 95% white felspar less than 5%, gypsum, limonite etc. less than 5% Fines similar, less than pass. 1% martite.
150°	160°	Fines 50-65% of cuttings. Quartz (grey rare) 50-60%, white felspar 40-50%, gypsum, pyrite etc. accessory.
160°	162°	Percussion open tube sample. Light grey 1/50" somewhat decomposed quartz-felspar rock (75% quartz) with very rare mica. Some patches of quartz are quite dark grey, but there is no obvious reason for this. Bedding very obscure, but possibly 55-65° to core axis.
160°	170°	Fines 40-60% of cuttings, quartz (1/10 grey) 85%, white felspar 10%, gypsum, pyrite, limonite etc. 5%. Very rare epidote grains, and chlorite-biotite flakes.
175°		Drilling harder, and dark cuttings appear.
170°	180°	Fines 15% of cuttings. Quartz (as 160° - 170°) 35%, white felspar 5%, serpentine-chlorite-decomposed felspar composites 60%.
180°	182°	Percussion open tube sample. 180° - 181.5°. Decomposed Amphibolite. Grain size generally less than 1/20". Somewhat fibrous serpentine and chlorite after green amphibole 50%, decomposed felspar 50% 181.5° - 182° Broken "buck" quartz. "Amphibolite" shows irregular foliation at about 40° to core axis.
186°		Drilling hard.
187°		Changed to roller bit.

ROTARY DRILLHOLE NO. 5 (Contd.) -4-

From	To	Description DETAILED LOG
	187.5'	Changed to diamond bit.
180'	187.5'	Fines 20% of cuttings. Quartz 50%, serpentinised amphibolite or dolerite (as 175-180') 30%, angular fragments (fresh) of quartz containing biotite, chlorite epidote, garnet and very minor iron oxides 15%, white felspar less than 5%, gypsum etc. less than 5%.
187.5'	190.5'	Diamond drill core. Recovery 3' (100%). Quartz-biotite gneiss, with abundant lenses and less than 1" augens of off-white to opal pink felspar, and scattered less than 1/4" porphyroblasts of pink garnet. Bedding very irregular, but 60°-70° to core axis at 188'. Biotite tends to occur in bands from less than 1/50" to 2" averaging 1/8" thick, and the purer bands frequently contain some chlorite.
	190.5'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. WR 6

Project: Warrambee Aeromagnetic Anomaly			D.M. 664/61
Sec. 24 Hd. Warrambee		Co. Le Hunte	Bore Ser.No. 649/61
Collar Coords 56000N, 64000E		R.L. 456.0'	Grid Warrambee
Vertical		Depth 141.5'	Plan Ref.
Date Bore Commenced 5.6.61		Completed 6.6.61	Driller H. Mischlewitz
Bore Logged by G.R. Heath &		On 5-6.6.61	Hirer D. of M.

OBJECT: To identify and sample material producing gravity "high" in Warrambee Anomaly.

RESULT: Bedrock consists of quartz-felspar-garnet-m ica metasediment containing 15-25% martite-magnetite.

LOG Comprises: Macro and microscopic geological logs.
Magnetic log.

From	To	Description SUMMARY LOG
0	8.5'	Clay containing quartz, limonite and minor martite and calcareous gypsum.
8.5'	20' approx.	Hard limonite rich band (minor quartz and martite).
20' approx.	75'	White, red-brown and yellow-brown mottled and bedded clays containing fairly abundant quartz and limonite-martite (grain size less than 1/50"). Martite increases from 5% to 70% of iron oxides from top to bottom of sequence. Iron oxides occur in irregular less than 3/4" beds and lenses.
75'	121'	Decomposed bedrock, less than 1/4" - 1/8" beds of quartz-felspar-martite-biotite-garnet rock and variable quartz-epidote-martite-magnetite rock. Dip generally 35°-60° to core axis.
121'	125'	Quartz-felspar-martite-magnetite-biotite rock with variable epidote and minor garnet. Contains lenses of coarser grained quartz-orthoclase.
125'	135'	Mainly 1/100" grain size quartz-felspar-biotite "micro granite", with accessory martite-magnetite.
135'	138.6'	1/8" beds of quartz-felspar-garnet-martite-magnetite rock (1/200" grain size) containing about 25% iron oxides. Dip 55°-70° to core axis.
138.6'	141.5'	Similar to 125'-138.6', but only about 15% iron oxides; beds contorted and lenses of interstitial (up to 1") quartz-orthoclase present; bedding due to composition variations much less obvious. A few less than 2" crosscutting tourmaline masses present.

From	To	Description DETAILED LOG
0	10'	N.B. Cuttings caught on 12 mesh sieve. Angular quartz 5-10%, limonite with very minor martite, and fine grained (less than 1/200") quartz-limonite sandstone 30%, calcite and calcareous very fine grained gypsum sandstone 60%, gypsum less than 5%. Fines: 50-60% of cuttings. Iron oxides 20-30% of clay free fines. Hard band (quartz-limonite) 8.5' - 20': used roller bit.
10'	20'	Fines 50-60% of cuttings. Quartz (as 0'-10') less than 5%, gypsum etc. less than 5%, limonite etc. (as 0'-10') more than 90%. Iron oxides 70% of clay free fines.
20'	22'	Percussion open tube sample. Very irregularly interbedded white clay, yellow-brown clay containing fairly abundant less than 1/50" quartz, and red-brown clay containing fairly abundant limonite and relict martite fragments up to 1" in diameter. Bedding: 75°(?) to core axis at 20.5' 40-45° " " " " 21.5'
20'	30'	Fines 50-60% of cuttings. Limonite and very minor martite (as 0'-10') 90-95%, angular quartz 5-10%, gypsum etc. accessory. Iron oxides (mainly limonite) 50-60% of fines
30'	40'	Fines 60% of cuttings. Quartz 50-60%, limonite (as 0'-10') with 1/10-1/5 martite 40-50%. Gypsum etc. accessory. Iron oxides (martite) 60-70% of clay free fines.
40'	42'	Percussion open tube sample. Yellow-brown and off-white mottled very sandy clay (contains mainly 1/50" - 1/100" quartz). Irregular less than 3/4" dark lenses and bands contain abundant 1/50" - 1/100" martite, with occasional red-brown limonitic patches. Bedding irregular and contorted, at 40.5', bedding 40°-45° (variable) to core axis 41.5' " 70°-90° " " " "
40'	50'	Fines 70-75% of cuttings. Quartz 60%, limonite-martite (1/2 martite) 40%, gypsum etc. accessory. Iron oxides 60-70% of clay free fines (dominantly martite).
50'	60'	Fines 80% of cuttings. Quartz 75%, limonite-martite (2/3 martite) 25%, gypsum, calcite etc., accessory. Iron oxides 50-60% of clay free fines (dominantly martite).
60'	62'	Percussion open tube sample. Red and white mottled and irregularly bedded slightly sandy clay. Contains scattered 1/20" quartz grains and minor 1/200" martite. Bedding irregular, but about 45° to core axis at 61.5'.
60'	80'	Negligible fines retained in settling trough.
60'	70'	Fines 80% of cuttings. Quartz 30%, calcareous "micro-nodules" up to 3/8", 30%, manganiferous (?) dull black iron oxides 30%, martite-limonite 9%, orange translucent grains 1% (garnet?).
70'	80'	Fines 70% of cuttings. Quartz 10%, dull iron oxides 60%, quartz-decomposed felspar (?) composites 30%, accessory orange mineral (garnet?).

ROTARY DRILLHOLE NO. MR 6 (Contd.) -3-

From	To	Description DETAILED LOG
60'	62'	Percussion open tube sample. Less than 1/50" somewhat clayey martite interbedded with yellow-brown clayey quartz sand (1/200" - 1/20"). Beds generally less than 1/2" thick. A few gradational beds containing minor mica are also present. Bedding sometimes obscure. but 45° to core axis at 80.5° and 55°(?) " " " " 81.5°
80'	90'	Fines 75% of cuttings. Quartz 60%, limonite, manganiferous oxides etc. 10%, "micro-nodules" etc. 5%, quartz-felspar-martite-biotite-garnet composites, with occasionally abundant epidote 25%.
90'	100'	Fines 50-60% of cuttings. Quartz 30%, pink felspar and quartz-felspar composites 25%, iron oxides 5%, composites as 80'-90' (but epidote rare) 40%.
100'	102'	Percussion Open Tube Sample. Laminated (beds less than 1/1 in most cases) decomposed quartz-felspar-biotite-martite rock, with accessory garnet. Composition variable, but probably averages, quartz 60-70%, felspar 10% (variable), martite 10-15%, biotite 5-10%, garnet 5-10%. Percussion open tube sample - very hard drilling. Grain size about 1/100". Bedding 30°-35° to core axis at 100.5° " 40°-45° " " " " 101.5°
100'	110'	Fines 60% of cuttings. Quartz 30%, quartz-felspar-martite 25%, limonitic material 5%, fibrous sillimanite with interstitial martite 5%, composites as 80'-90' 30%, epidote 5%, "Micro-nodules" etc., accessory.
110'	120'	Fines 50% of cuttings. Quartz-martite-magnetite and quartz-epidote-martite-magnetite fragments picked up by magnet (averaging 30% iron oxides) 10%, quartz 40%, limonite etc. 5%, quartz-epidote-martite and quartz-martite composites with accessory mica, felspar and garn et 40%, sillimanite etc. 5%.
120'	121'	Percussion open tube sample. Decomposed (clayey) quartz-epidote rock, with irregular less than 1/2" blebs of martite-magnetite (1/10 magnetite) and stringers of sillimanite. Overall iron oxides probably less than 10% of rock. Scattered, up to 1", concretionary quartz-limonite pebbles.
	121'	Hard drilling - changed to roller bit.
120'	125'	Fines 15% of cuttings. Fragments still somewhat decomposed Magnetic cuttings (as 110' - 120') 10%, orthoclase and quartz-orthoclase fragments (accessory biotite) 25%, limonite etc. (much appears to be from nearer the top of the hole) 15%, quartz-felspar-martite-biotite fragments with variable epidote and accessory garnet 50% (iron oxides 10-70%, average 20% of these cuttings.)
125'	130'	Fines 20-25% of cuttings. Fragments fresh looking. Homogeneous 1/100" grain size quartz-felspar-biotite fragments (accessory epidote and magnetite-martite) - unstressed "micro-granite" 70%, quartz-orthoclase composites and grains 20%, epidote composites (as 120-125') 10%, limonite etc. accessory.

ROTARY DRILLHOLE NO. WR 6 (Contd.) -4-

From	To	Description DETAILED LOG
130'	135'	Fines 15% of cuttings. "Micro-granite" as 125'-130', 70%, quartz, felspar and composites 10%, quartz-epidote with variable felspar and mica 20%. Accessory limonite, garnet, and green amphibole. Cuttings frequently exceed 1/4" diameter.
135'		Changed to diamond bit.
135'	141.5'	Diamond drill core. Recovery: 135' - 137.25', 27" (100%). 137.25' - 141.5', 50" (98%).
135'	138.6'	Bedded quartz-felspar-martite-magnetite-garnet-biotite rock. Beds 1/50" - 1/2" averaging 1/8" thick, consist of almost pure martite-magnetite, garnet, quartz-felspar and rarely orthoclase. Grain size of garnet and martite-magnetite about 1/200", quartz-felspar up to 1/10", biotite intermediate. Overall composition about quartz-felspar (1/5 (?) felspar) 50%, martite-magnetite 25%, garnet 20%, biotite 5%. Bedding fairly regular. Attitude 55°-60° to core axis at 135' " 65°-70° " " " " 136' " 70° " " " " 137' " 55° " " " " 138' " 55° " " " " 138.5'
138.6'	141.5'	Constituents similar to 135'-138.6', but iron oxide content lower (15% approx. (?)) and differentiation into composition bands not a s sharp. Bedding is obscure in places and contorted around 139'-140'. Felspar content is higher than above, and coarse grained (up to 1/4") pink orthoclase occurs as irregular lenses, particularly in contorted portions (lenses up to 1" thick). Coarsely crystalline tourmaline containing less than 1/10" iron oxide blebs occurs as irregular cross-cutting masses up to 2" long. Attitude 50° to core axis at 139' " 50° (contorted) to core axis at 140' " 30° " " " " " 141' Some serpentine developed in joints and partings in the rock.
141.5'		END OF HOLE.

MAGNETIC LOG

Deflection	15°	at	135.1'
	20°		135.3'
	90-°		135.8'
	90+°		136.3'
	90°		136.6'
	90+°		137.0'
	90+°		138.0'
	90°		138.6'
	90-°		139.0'
	20°		139.5'
	90-°		140.0'
	40°		141.0'
	20°		141.5'

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. DH 7

Project: Warrambee Aeromagnetic Anomaly — D.M. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser. No. 649/61

Collar Coords 56200N, 64000E — R.L. 460.3' — Grid Warrambee

Vertical — Depth 186' — Plan Ref.

Date Bore Commenced 7/6/61 — Completed 9/6/61 — Driller H. Mischlewitz

Bore Logged by G.R. Heath — On 7-9/6/61 — Hirer D. of M.

OBJECT: To identify and sample material producing gravity "high" in the Warrambee Anomaly.

RESULT: Bedrock consists of quartz-felspar-garnet-martite-magnetite-mica metasediment, containing 15-20% martite-magnetite.

LOG Comprises: Macro and microscopic geological log.
Magnetic log.

From	To	Description SUMMARY LOG
0	7.5'	Slightly stained quartz sand.
7.5'	8.5'	Yellow-brown limestone containing fairly abundant 1/300" quartz grains (kunker).
8.5'	30'	Cream coloured flaky clay (possibly gypseous), containing minor quartz and occasional limonite grains.
30'	45'	Yellow-brown and red-brown clay containing minor quartz.
45'	125'	Decomposed quartz-chlorite rock, clayey in part, containing a few martite grains.
125'	167'	Decomposed quartz-epidote-felspar-chlorite-biotite rocks, containing minor limonite, martite and micaceous haematite.
167'	186'	Quartz-felspar-biotite-garnet-epidote-martite-magnetite rock. Proportions of constituents quite variable, but from 181' - 186', martite-magnetite about 15-20%. Grain size mainly 1/20" - 1/50". Attitude (1/8" beds) generally about 70° to core axis.

ROTARY DRILLHOLE NO. NR 7 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 25% of cuttings. Yellow-brown limestone containing 1/300" well rounded quartz grains more than 95%, minor calcareous limonitic sandstone. Iron oxides 20% of fines, quartz 70% of fines.
7.5'	8.5'	Hard limestone band (changed to roller bit).
10'	20'	Fines 70% of cuttings. Limestone as above 90%, limonite containing 1/200" quartz grains 9%, angular quartz 1%. Fines contain 80% quartz (1/2 rounded) 20% limonite etc.
20'	22'	Percussion open tube sample. Off-white (cream) clay showing very light coloured mottling. Consists of 1/100" flakes (possibly gypsum) with a few 1" limonitic sandstone layers. Bedding 90° to core axis at 20.5'. " 0 " " " " 21.5'.
20'	30'	Fines 20-25% of cuttings. Limestone as 0° - 10° 40%, angular quartz 40%, limonite as 10° - 20° 20%. Fines similar, but limestone 20%, quartz 60%.
30'	40'	Fines 60-70% of cuttings. Limestone as 0° - 10° 20%, quartz 70%, limonite as 10° - 20° 10%. Fines more than 95% quartz, minor iron oxides and limestone.
40'	42'	Percussion open tube sample. Yellow-brown and red-brown mottled and irregularly bedded clay (somewhat flaky - decomposed mica schist ?) containing a few less than 1/50" quartz grains. Bedding 20° to core axis at 40.5' " 30°(?) " " " " 41.5'
40'	50'	Fines 60% of cuttings. Limestone as 0° - 10° 10%, limonite as 10° - 20° 25%, quartz 65%. Fines similar, but contain one or two chlorite flakes.
50'	60'	Fines 60% of cuttings. Limestone as 0° - 10° 5%, quartz 80%, limonite as 10° - 20° 15%, a few chlorite flakes and chlorite containing composites. Fines similar but 5% chlorite.
60'	62'	Percussion open tube sample. Somewhat decomposed chlorite-quartz rock, dark grey-green in colour. Chlorite flakes (1/50" - 1/100") more than 95%. Bedding obscure, 20-25° to core axis at 60.5'. " " " " " 61.5'.
60'	70'	Fines 60% of cuttings. Limestone as 0° - 10° 5%, quartz 90%, limonite as 10° - 20° 5%. A few calcareous "micro-nodules". (pass. 2%). Fines similar, but contain 5% chlorite flakes.
70'	80'	Fines 90% of cuttings. Limestone as 0° - 10° 5%, quartz 60%, limonite as 10° - 20° 5%, calcareous "micro nodules" 30%. A few chlorite flakes. Fines similar, 5% chlorite, a few martite grains.

From	To	Description DETAILED LOG
80°	82°	Percussion open tube sample. Clayey quartz-chlorite rock with irregular less than 1/10" limonite stained beds. Grain size about 1/100". Grey-green to yellowish-brown in colour. Bedding 5° to core axis at 80.5°. Bedding 60-65° (variable) to core axis at 81.5°.
80°	90°	Fines 60% of cuttings. Limestone as 0° - 10° less than 5% quartz 50%, limonite as 10° - 20° less than 5%, calcareous "micro-nodules" 40%, chlorite less than 5%. Fines similar.
90°	100°	Fines 85% of cuttings. Limestone as 0° - 10° 1%, limonit as 10° - 20° 1%, chlorite 5%, calcareous "micro-nodules 30%, quartz 63%. Fines similar, but containing a few martite crystals.
100°	102°	Percussion open tube sample. Mottled quartz-chlorite rock (quartz dominant) with a few less than 1/8" beds containing martite grains (purplish interstitial clay). Bedding 40-45° (?) to core axis at 100.5°. " 35-40° " " " " 101.5°.
100°	110°	Fines 80-85% of cuttings. Limestone as 0° - 10° 5%, calcareous "micro-nodules" 35%, limonite less than 5%, chlorite 5-10%, quartz 50%, a few martite (possibly tourmaline) grains. Fines similar with a few garnet grains.
110°	120°	Fines 95% of cuttings. Fibrous sillimanite 30%, quartz 40%, calcareous "micro-nodules" 25%, limonite less than 5%, limestone less than 5%, no chlorite. Fines less than 5% sillimanite.
120°	122°	Percussion open tube sample. First core contains lump of limestone dislodged from 0° level. Mottled grey-green and off-white decomposed quartz-chlorite rock (about 50% of each). Contains irregular beds and lenses in which one or other is dominant. Grain size about 1/200" - 1/100". Bedding variable, about 45° to core axis. Minor limonite staining.
120°	130°	Fines 10% of cuttings. Quartz 70%, felspar 20-25% (mostly white, a few pink orthoclase grains), chlorite-biotite 5%, tremolite less than 5%, a few muscovite, "micro-nodule" and limonite grains. Epidote very rare. Fines 85% quartz, 5-10% chlorite less than 10% felspar.
130°	140°	Fines 75-80% of cuttings. Quartz 75%, felspar (2/3 pink orthoclase) 20%, chlorite-biotite less than 5%. Minor limonite, tremolite etc. Fines similar.
140°	142°	Percussion open tube sample. Irregularly bedded quartz-felspar-epidote-chlorite-biotite somewhat decomposed rock. Minor limonite staining and few martite grains in some beds. Epidote is dispersed, and present as less than 1/2" irregular masses. Grain size about 1/100". Bedding 35-40° to core axis at 140.5° " 50° " " " " 141.5°.
140°	150°	Fines 60% of cuttings. Quartz (including 1/10 grey cherty looking fragments) 70%, epidote (massive looking) 10%, felspar (rarely orthoclase) 10%, chlorite-biotite 5%, limestone 5%. Fines similar, but contain 1 or 2% garnet.

From	To	Description DETAILED LOG
144.3'	144.8'	Hard band (quartz-epidote?).
150'	160'	Fines 80% of cuttings. Quartz (1/10 - 1/5 "cherty") 65%, felspar (rarely orthoclase) 10%, felspar chlorite-biotite composites 10%, epidote (as 140' - 150') 10%, chlorite-biotite 5%. Fines similar, but less felspar and a few grains of garnet and martite.
160'	162'	Percussion open tube sample. Somewhat decomposed quartz-epidote-felspar rock with variable chlorite-biotite and about 2% micaceous haematite. Grain size mainly 1/200" - 1/50", but a few less than 1/4" lenses of up to 1/10" quartz-epidote. Bedding 5° and 25° to core axis at 160.5'. " 30° " " " " 161.5'.
160'	167'	Fines 70% of cuttings. Quartz (rarely cherty) 70% app., quartz-felspar-epidote composites with minor variable mic and garnet 10%, epidote (two types, one fairly massive yellowish-green, the other more crystalline dark grey-green, about 1/2 of each) 10%, garnet 1%, limestone as 0' 10' 1%, "micro-nodules" 2% chlorite-biotite 5%, a few grains of limonite and very slightly magnetic martite. Fines similar, but contain more garnet and a few muscovite grains.
167'	172'	Hard drilling initially - attempted diamond drilling, zero core recover.
167'		Changed to roller bit.
167'	172'	Diamond drill sludge, fines 70% of cuttings. Quartz 80%, quartz-epidote-biotite composites with minor iron oxides 10%, limestone etc. 5%, chlorite-biotite less than 5%, felspar less than 5%, a few grains of quartz-pyrite-martite.
167'	170'	Fines 80% of cuttings. Quartz 80%, schistose quartz-epidot biotite composites (1/50" grain size) 5%, massive epidote fragments containing some quartz and mica 5%, limonite le than 5%, limestone etc. less than 5%, a few grains of felspar, garnet etc., chlorite biotite less than 5%. Fines similar, but 5% garnet and 1 or 2% martite.
170'	175'	Fines 80% of cuttings. Quartz 60%, epidote-quartz-mica composites 10%, composites, quartz with up to 20% biotite and garnet and a few martite-magnetite crystals (picked up by magnet) 10% limonite 5-10% (probably from further up the hole), limestone 5%, chlorite-biotite 5%, epidote, felspar etc. less than 5%. Fines similar, but 5% garnet.
175'	181'	Fines 20-25% of cuttings. Quartz 40-50%, quartz-garnet-biotite composites, with minor martite-magnetite (1/20 grain picked up by magnet) 40-50%, a few epidote, garnet, limestone and limonite grains, and one or two finely crystalline pyrite grains (less than 1/500"). Fines: 70% quartz, 10% garnet, 10% mica, 10% martite-magnetite (4/5 martite), a few pyrite grains.

From	To	Description DETAILED LOG
181'	186'	Diamond drill core, recovery 37" (60-65%). Quartz-felspar-garnet-martite-magnetite-biotite rock, with accessory epidote. Grain size mainly 1/20" - 1/50", although up to 1/4" in some quartz-felspar beds. Very prominent irregular jointing (explains broken core and low recovery). Quartz-felspar 60%, garnet 15%, biotite 5-10%, martite-magnetite 15-20%. Minerals are segregated into relatively pure beds and lenses. Bedding less than 1", usually about 1/8" thick, quite irregular, but fairly constant in attitude. Bedding 70° to core axis at 181.5' " 65-70° " " " " 183'. " 75° " " " " 183.5' " 75° " " " " 185.8'
	186'	END OF HOLE.

MAGNETIC LOG

Deflection at	181.5',	35°
	183' ,	35°
	183.5',	35°
	184' ,	90+°
	184.5',	90-°
	185' ,	90+°

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 8

Project: Warrambee Aeromagnetic Anomaly S — D.M. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser. No. 649/61

Collar Coords: 57600N, 64000E — R.L. 451.2' — Grid Warrambee

Vertical — Depth 128.2' — Plan Ref.

Date Bore Commenced 10.6.61 — Completed 12.6.61 — Driller H. Mischlewitz

Bore Logged by G.R. Heath — On 10-12.6.61 — Hirer D. of M.

OBJECT: To identify and sample material producing magnetic "high".

RESULT: Quartz-orthoclase-epidote interbedded with martite-magnetite-epidote-quartz (containing minor biotite and garnet) occurs as bedrock.

LOG Comprises: Macro and microscopic geological logs. Magnetic logs.

From	To	Description SUMMARY LOG
0	15'	Off-white clay containing abundant limonite (with some martite) and lesser quartz.
15'	110'	Red-brown, yellow-brown and grey sandy to very sandy clays. (bedded). Colour tends to become lighter with depth. Sand mainly 1/50" - 1/200" quartz and martite (with minor magnetite after 60') usually concentrated in less than 1" and usually 1/8" beds. Iron oxide content up to 20%, usually 5-10%. Felspar and mica occur after 80'.
110'	123'	Decomposed quartz-felspar rock, with 5% garnet, 5% martite, variable biotite and epidote (up to 20%, usually less than 5%). Grain size 1/100".
123'	128.2'	Martite-magnetite-epidote and martite-magnetite-quartz interbedded with quartz-epidote and irregular lenticular quartz-orthoclase. Dark beds contain minor garnet and biotite. Grain size mainly 1/100", but orthoclase up to 1/2". Mean composition about: quartz-felspar 45%, magnetite-martite 30-35% (up to 70% in some beds), epidote 15%, garnet 5%, accessory biotite. Abundant irregular jointing. Attitude about 40°-50° to core axis.

ROTARY DRILLHOLE NO. MR 8 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0°	10°	Fairly hard drilling from surface. Fines 95% of cuttings. uQuartz (angular) 40-50%, limonite with minor quartz and martite 50-60%. Fines 30-40% iron oxides.
10°	20°	Fines 90-95% of cuttings. Quartz (as 0° - 10°) 10-15% limonite (as 0° - 10°) 85-90%. Fines: 40% iron oxides (5% slightly magnetic).
20°	22°	Percussion open tube sample. Irregularly bedded very sandy red-brown and yellow-brown clay. Red-brown clay contains mainly 1/50" limonite, with less than 1/4" bands of relict martite and some quartz. Yellow-brown layers contain mainly quartz (less sandy than red-brown) with some limonite. Beds mainly about 1/4", some up to 1". Attitude 40° to core axis at 20.5°. " 30° " " " " 21.5°.
20°	30°	Fines 85% of cuttings. Quartz (more iron stained than above) 20%, limonite (as 0° - 10°) 75-80%, martite (non-magnetic) less than 5%. Iron oxides 50% of fines (1% slightly magnetic).
30°	40°	Fines 90-95% of cuttings. Quartz (as 20° - 30°) 50%, limonite (as 0° - 10°) 45%, martite (as 20° - 30°) 5%. Iron oxides 50% of fines (4/5 slightly magnetic martite)
40°	42°	Percussion open tube sample. Off-white, reddish and brown irregularly bedded and mottled very sandy clay. Martite occurs as dispersed 1/200" - 1/50" grains and as less than 1/20" angular grains in the lighter coloured beds. Iron oxide content probably 5-10%. Bedding 55°-70° to core axis at 40.5° (variable). " 50°-70° " " " " 41.5° "
40°	50°	Fines 90% of cuttings. Quartz (as 20° - 30°) 40%, limonite (as 0° - 10°) 55%, martite (slightly to moderately magnetic) 5%. Fines: 60% martite (as 30° - 40°), 10% limonite, 30% quartz.
50°	60°	Fines 90% of cuttings. Quartz (as 20° - 30°) 70%, limonite (as 0° - 10°) 20%, martite (as 40 - 50°) 10%. Fines: 30-35% martite (possibly some magnetite), 5% limonite, 60-65% quartz.
60°	62°	Percussion open tube sample. Off-white and pale multi-coloured fairly sandy irregularly bedded clay. Sand mainly 1/50" angular quartz, with martite occurring sparsely through the rock, and as occasional 1/8" beds. One 1" slightly clayey quartz-martite bed (1/20" - 1/50" 50% of each. Bedding generally about 1/8" thick. Bedding 55°-75° to core axis at 60.5° (variable). " 60°-70° " " " " 61.5° (").
60°	70°	Fines 85% of cuttings. Quartz 30%, martite with minor magnetite and limonite 10%, calcareous "micro-nodules" 45%, composites (quartz-martite, minor mica) 15%. Fines similar (possibly 15% iron oxides).
70°	80°	Fines 85% of cuttings. Quartz 40%, martite (as 60°-70°) 10%, "micro-nodules" 40%, composites (as 60° - 70°) 10%. Fines: 15-20% iron oxides.

ROTARY DRILLHOLE NO. MR 8 (Contd.) -3-

From	To	Description DETAILED LOG
80'	82'	Percussion open tube sample. Irregularly bedded very sandy grey and light multicoloured clay. Quartz grains generally less than 1/50", but up to 1/20" occur throughout. The grey beds contain up to 80% martite while the light coloured beds contain somewhat decomposed felspar (pink in places). Mica is rather rare. Iron oxide content 10-20%. Appears to be decomposed, low grade itabirite. Bedding up to ½" thick, but generally about ¼". Attitude 45° to core axis at 80.5' " 40-45° (irregular) to core axis at 81.5'.
80'	90'	Fines 90% of cuttings. Quartz 70%, martite (as 60'-70') 10%, calcareous "micro-nodules" 20%, a few grains of sillimanite and mica. Fines contain 25-30% iron oxides.
90'	100'	Fines 85% of cuttings. Quartz 40%, martite-limonite with some magnetite 15-20%, calcareous "micro-nodules" 30%, composites (quartz-martite mainly) 10-15%.
100'	102'	Percussion open tube sample. Clay rock containing quartz, felspar, martite, and biotite, similar to 80'-82', but containing about half as much martite and twice as much mica, and rather more iron stained (yellow-brown in colour). Bedding 45°-50° to core axis at 100.5'. " 60°-65° " " " " 101.5'
100'	110'	Fines 85% of cuttings. Quartz 40%, calcareous "micro-nodu 40%, martite 10% (as 60-70'), composites (quartz-martite 10%.
110'	120'	Fines 90-95% of cuttings. Minerals and proportions as 100'-110', with a few felspar grains and quartz-epidote-martite-garnet composites.
120'	122'	Percussion open tube sample, (very hard). Essentially a slightly decomposed quartz-felspar rock, with up to 5% garnet and martite, and variable (up to 20% usually less than 5%) biotite and epidote. Grain size mainly about 1/100". Bedding generally very obscure, possibly 15°-20° or 30° to core axis at 120.5', 40°(?) to core axis at 121.5'.
120'	126'	Fines 80% of cuttings. Quartz and quartz-orthoclase fragments 40%, dark composites (quartz-epidote-martite-magnetite-garnet rock with minor mica) 45%, limonite, "micro-nodules" etc. 5%. Fines: 40-60% iron oxides.
126'	128.2'	Diamond drill core. Recovery 27" (100%) very broken up. Quartz-epidote and irregular lenticular quartz-orthoclase rock interbedded with martite-magnetite-epidote and martite-magnetite-quartz rocks containing minor garnet and biotite. Orthoclase in quartz-felspar beds up to ½" crystals, but grain size generally about 1/100". Overall composition about: quartz-felspar 45%, magnetite-martite 30-35% (up to 70% in some beds), epidote 15%, garnet 5%, biotite accessory. Abundant irregular jointi (epidote common in joints). Beds vary in thickness fro ⅛"-2", but are generally less than ½". Attitude 55-60° to core axis at 126.3' 35-40° " " " " 126.6' 45-50° " " " " 127' 65° " " " " 127.7' 35-40° " " " " 128.25'
128.25'		END OF HOLE

MAGNETIC LOG

Deflection	15°	at	126'-126.5'
"	90-°	"	126.6'
"	90°	"	127'
"	90°	"	127.7'
"	90+°	"	128.25'

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. #49

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 24 Hd. Warramboo Co. Le Hunte Bore Ser. No. 649/61

Collar Coords: 56600N, 64000E R.L. 452.1' Grid: Warramboo

Vertical Depth: 159' Plan Ref.

Date Bore commenced: 13/6/61 Completed: 15/6/61 Driller: H. Mischlewitz

Bore Logged by: G. H. Heath On 13-15/6/61 Hirer: D. of M.

OBJECT: To identify and sample material producing magnetic "high".

RESULT: Metasediment (low grade itabirite?) containing 15-30% martite-magnetite intersected 70'-156'.

LOG Comprises: Macro and microscopic geological logs
Magnetic logs.

From	To	Description SUMMARY LOG
0'	15'	Off-white and red-brown clay containing abundant quartz and limonite-martite, some kunker.
15'	70'	Pale multicoloured, yellow-brown and dark purple-brown slightly to very sandy bedded clay. Sand is quartz and martite-limonite (usually less than 10%) tending to be segregated in alternate beds, with some felspar after 40' Grain size: quartz 1/20"-1/50"; iron oxides 1/50"-1/100".
70'	100'	Decomposed low grade martite-magnetite itabirite, containing minor biotite and white felspar. Average composition about 70% quartz, 30% martite-magnetite. Grain size 1/50"-1/200", usually less than 1/100".
100'	135'	Broken, fairly coarse grained quartz-orthoclase interbedded with less than 1/25" quartz-felspar-biotite-magnetite-martite. Iron oxide content probably averages about 15%.
135'	156'	Very regularly bedded (1/10" beds) quartz-felspar-martite-magnetite-garnet-biotite rock. Bedding due to mineral segregation. Grain size mainly less than 1/50", but quartz-orthoclase up to 1/5". Composition about 50% quartz-felspar, 25% garnet, 25% martite-magnetite, minor biotite.
156'	159'	Very tough quartzitic rock, bedding parallel to core axis. Virtually all quartz-felspar with accessory garnet, pyrite and magnetite. Poorly defined ¼" bedding.

ROTARY DRILLHOLE NO. MR9 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0°	10°	Fines 80% of cuttings. Limonite and less than 1/50" limonitic quartz sandstone 80%, calcareous less than 1/50" quartz sandstone and kunkar fragments 20%, a few quartz-martite fragments, and angular quartz fragments. Fines: 40% quartz, 50% martite, 10% limonite, some felspar.
10°	20°	Fines 60-70% of cuttings. Quartz (rather iron stained) 75%, limonite with minor martite 25%. A few quartz-martite composites. Fines similar, but 10-15% martite.
20°	22°	Percussion open tube sample. White and pale multicoloured clay containing fairly abundant less than 1/10" quartz, very irregularly interbedded with red-brown and yellow-brown mottled very sandy clay, containing less than ¼" blebs of 1/50" broken martite. Bedding 45°(?) to core axis at 20.5°. " 45°(?) " " " " 21.5°.
20°	30°	Fines 75-80% of cuttings. Quartz (as 10°-20°) 70%, limonite etc. (as 0°-10°) 20%, martite less than 1/10" fragments 10%. Fines: 50% quartz, 30% martite, 20% limonite.
30°	40°	Fines 75-80% of cuttings. Quartz (rather less stained) 65%, limonite 20%, martite (as 20°-30°), 15%. Fines: 40% quartz, 50% martite, 10% limonite, a few grains of decomposed mica.
40°	42°	Percussion open tube sample. Yellow-brown and purplish-grey very sandy bedded clay. Beds, about ¼" thick, are due to segregation of quartz (1/20"-1/50", rather iron stained) and martite (1/50"-1/100"). Sand fraction about 60-70% quartz, 30-40% martite. Bedding 50° to core axis at 40.5° " 60-75° " " " " 41.5°.
40°	50°	Fines 85-90% of cuttings. Constituents and proportions as 30°-40°. A few limestone and weathered felspar grains present. Fines: 60-65% martite (slightly magnetic) with less than 1/10 limonite, 35-40% quartz.
50°	60°	Fines 80% of cuttings. Constituents as 40°-50°, quartz 70%, martite (very slightly magnetic) 20%, limonite 10%. Fines: 60% martite, 30% quartz, 10% limonite, possibly 1% decomposed felspar.
60°	62°	Percussion open tube sample. Off-white and yellow-brown sandy clay, containing mainly 1/50" quartz with less than 1/200" scattered martite, interbedded with somewhat clayey quartz-martite layers ¼"-1" thick. Iron oxide content probably less than 10% for whole rock. Bedding 55° to core axis at 60.5°. " 55°(?) to core axis at 61.5°.
60°	70°	Fines 80% of cuttings. Quartz 60%, limonite 25%, martite 15%. A few quartz-martite composites and felspar grains. Fines: 50% quartz, 45% martite, 5% limonite, a few white felspar and slightly decomposed mica grains.

ROTARY DRILLHOLE NO. MR 9 (Contd.) -3-

From	To	Description DETAILED LOG
70'	80'	Fines 85% of cuttings. Quartz 50%, composites 20% (mainly quartz-felspar-martite and biotite-epidote-martite), biotite 10%, martite 10%, (and 1/10-1/20 magnetite), limonite 10%, a little clean felspar, limestone etc. Fines: 50% quartz, 25% martite and minor limonite, 10% biotite, 15% white felspar.
80'	82'	Percussion open tube sample. Somewhat decomposed itabirite. Quartz-felspar (less than 1/50") interbedded with martite-magnetite (mainly 1/100-1/200") containing some biotite. Martite-magnetite bedded and in less than ¼" layers of blebs. Bedding mainly ¼"-1/16". Composition about 50-60% quartz-felspar, 30-40% martite-magnetite, 10% biotite. Bedding 40°-45° to core axis at 80.5'. " 10° " " " " 81.5'.
80'	90'	Cuttings contain 70% fines. Quartz and quartz-felspar 50%, quartz-felspar-martite-magnetite-biotite composites 25%, martite and about 1/10 magnetite 25%. Fines: 60-65% martite-magnetite (less than ½ magnetite), quartz and felspar 15-20%, minor biotite.
90'	100'	Fines 30% of cuttings. Quartz 40%, quartz-martite-magnetite composites 35%, felspar (white) 5%, quartz-felspar-biotite-martite-magnetite 20%. Fines: 70% martite-magnetite (50+% magnetite) 30% quartz-felspar, minor biotite.
100'	102'	Percussion open tube sample. Very hard drilling. Slightly decomposed quartz-martite-magnetite rock (itabirite), with minor felspar and biotite. Minerals not as sharply segregated as previously (hence bedding more obscure). Composition: quartz-felspar 75-85%, martite-magnetite 15-25%. Grain size mainly less than 1/100". One ¼" vein of cross-cutting, almost pure epidote occurs in the core. Beds 1/16"-¼", usually about ⅛". Attitude 20° (approx.) to core axis at 101.5'
100'		Fairly hard - changed to roller bit.
100'	110'	Fines 35% of cuttings. Quartz and felspar 30%, composites (mainly quartz-martite-magnetite, some quartz-felspar-martite-magnetite) 65%, minor mica, limonite and limestone. Fines: 35% quartz, 55% martite-magnetite, 5% white felspar, 5% biotite.
110'	120'	Fines 50% of cuttings. Constituents and proportions similar to 100-110'. Fines contain a few yellow-orange garnet crystals.
120'	125'	Attempted diamond drill core. Only 1⅝" (2%) recovery. Fairly coarse grained (up to ¼") quartz-felspar (dirty pink) interbedded with about 1/25" quartz-white felspar-biotite-magnetite-martite layers up to ¼" thick. Iron oxides only 5-10%. Attitude about 10°-20° to core axis.
120'	130'	Fines 25% of cuttings. Constituents and proportions similar to 100-110'. Fines similar, but biotite 10% and no garnet.

ROTARY DRILLHOLE NO. MR9 (Contd.) -4-

From	To	Description DETAILED LOG
130'	135'	Fines 40% of cuttings. Coarse dirty pink felspar (or andalusite) with minor quartz, biotite and epidote 40%. Quartz-martite-magnetite-felspar-biotite (less than 1/50") 30%, quartz 20%, mica 5%, minor white felspar (?), iron oxides, limestone. Fines: 60% quartz-felspar, 30% martite-magnetite, 10% mica, minor epidote, etc.
135'	140'	Fines 60-70% of cuttings. Quartz 20% quartz-felspar-martite-magnetite-garnet-biotite (grain size less than 1/50") 60%, felspar (white, pink, dirty pink and grey) 10%, light yellowish-green epidote 10%, minor iron oxides and mica. Fines: 10% iron oxides.
140'	145'	Fines 30-40% of cuttings. Constituents and proportions similar to 135'-140', but garnet more prominent in composites and fines, serpentine is fairly common, and felspar is less abundant. Fines 20% iron oxides.
145'	150'	Fines 30% of cuttings. Similar to 140'-145', but garnet & magnetite more prominent in composites. Fines: 50% quartz-felspar, 30% magnetite-martite, 20% garnet, minor mica.
153'	157'	Attempted <u>diamond drill core</u>. Recovery 5" (16%) Very regularly bedded quartz-felspar-martite-magnetite-garnet-biotite rock. Bedding due to mineral segregation Grain size mainly less than 1/50", but up to 1/5" in some quartz-orthoclase bands. Composition quartz-felspar 50%, garnet 25%, magnetite-martite 25%, minor biotite, and fairly abundant serpentine along joints and partings Bedding 1/25"-½" thick, averaging about 1/10". Attitude 35° and 45° to core axis on the two pieces of core recovered.
157'	159'	<u>Diamond drill core</u>. Recovery about 15" (60%) very broken up. No point in proceeding, as drilling parallel to bedding planes. Rock extremely tough homogeneous rock. Essentially a quartzite with some greenish slightly softer mineral (possibly epidote) and accessory garnet, pyrite and magnetite. Grain size about 1/50". Bedding about ½", but very poorly defined. Attitude 0°-10° to core axis throughout. Bluish mineral present on fracture planes.
	159'	END OF HOLE

<u>MAGNETIC LOG</u>

Deflection 15-20° at 81.5'
" 10 " 90.5'
" 20° " 101.5'
" 35° " 120' - 125'
" 90 or 90- " 153' - 157'
" less than 10° 157' - 159'

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. MR.10

Project: Warrambee Aeromagnetic Anomaly — D.H. 664/61

Sec. 24 Hd. Warrambee — Co. Le Hunte — Bore Ser. No. 650/61

Collar Coords. 55500N 64000E — R.L. 460.9' — Grid Warrambee

Vertical — Depth: 231' — Plan Ref.

Date Bore Commenced: 19/6/61 — Completed: 26/6/61 — Driller: H. Mischlewitz

Bore Logged by: G. H. Heath — On: 19-27/6/61 — Hirer: D. of M.

OBJECT: To test material adjacent to gravity and magnetic anomalies.

RESULT: Decomposed quartz-felspar rock 45'-231'+

LOG Comprises: Macro and microscopic geological logs.

From	To	Description SUMMARY LOG
0'	11'	Surface sandy loam overlying clay and yellow-brown kunker.
11'	45'	Very slightly clayey pure quartz sand. Poorly sorted, average grain size 1/75"-1/200", grains fairly well rounded. Highly indurated band, 42'-42.5' due to interpenetration - cementation by silica.
45'	150'	Light grey slightly to very sandy somewhat flaky clay. Bedded (decomposed bedrock). Contains angular 1/20"-1/100" quartz and minor pyrite. Martite is a rare accessory.
150'	231'	Somewhat decomposed quartz-white felspar-chlorite-biotite rock. Quartz-orthoclase lenses and augens occur near the base, but bedding is fairly regular throughout. Grain size less than 1/10". Garnet and hornblende are rare accessories. Attitude 20°-70° to core axis, mainly about 30°.

ROTARY DRILLHOLE NO. NR 10 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0'	10'	Fines 70% of cuttings. Kunkar fragments (yellow-brown limestone with up to 40%, 1/50" quartz grains) 90%, limonite containing abundant 1/50" quartz grains 5%, angular quartz grains 5%. Fines: 60% quartz (mainly rounded), 30% kunkar, 10% limonite-martite (1/10 martite).
10'	20'	Fines 75% of cuttings. Kunkar (as 0'-10') 30%, limonite (as 0'-10') 30%, slightly clayey quartz sandstone (rounded grains, grain size about 1/200",,clay cement very slightly calcareous) 40%. Fines as 0-10', but iron oxides 50% martite (derived from upper part of run).
20'	22'	Percussion open tube sample. Structureless slightly clayey pure quartz sand. Grain size variable 1/50"-1/100", with grains commonly 1/200"-1/20". Cement very slightly calcareous. Grains generally fairly well rounded, but angular grains are quite common.
20'	30'	Fines 80-85% of sample. Kunkar (as 0'-10') 20%, slightly clayey quartz sandstone 30% (as 10'-20'), limonite (as 0'-10') 30%, quartz grains (angular to rounded) 20%. Fines: 60% quartz, 15% kunkar, 15% clay containing fine sand, 10% limonite and minor martite. A few garnet grains.
30'	40'	Fines 95% of cuttings. Quartz (mainly angular, a few grey grains) 90%, kunkar 5%, clayey quartz sandstone (as 10'-20') 5%, minor limonite. Fines: 95% quartz (mainly angular, less than 1/5 rounded), minor limonite, kunkar etc.
40'	42'	Attempted percussion open tube sample Zero recovery. Hard band at 42' damaged tube.
42'		Hard band, roller bit 1" in 15 mins. Diamond drill, 42'-42.5', 50% (3") recovery. Hard band ends 42.5'.
42'	42.5'	Highly indurated quartz sandstone. Mean grain size about 1/200", but very poorly sorted, and grains up to 1/10" diameter are quite common. Induration appears to be due to grain interpenetration, rather than deposition of introduced silica. The only observed mineral besides quartz is very minor(much less than 1%) pyrite. Grains are generally fairly angular. No structure visible in the core.
40'	50'	Fines 55% of cuttings. Quartz (angular to somewhat rounde as 20'-30') 30%, kunkar fragments (as 0'-10') 50%, quartz sandstone (as 10'-20') 20%. Minor limonite. Fines more than 95% angular quartz. Minor limonite, kunkar and sandstone.
50'	60'	Fines 60% of cuttings. Quartz (as 20'-30') and quartzite fragments 55%, kunkar (as 0'-10') 10%, quartz sandstone (as 10'-20') 25%, limonite and limonitic quartz sandstone (as 0'-10') 10% (martite very rare). Fines as 40'-50'.

From	To	Description DETAILED LOG
60'	62'	Percussion open tube sample. Off-white to very light grey somewhat flaky clay containing scattered 1/20"-1/100" angular quartz grains and very rare martite and pyrite grains. Bedding very obscure, possibly 30° to core axis at 60.5' and 60(?)° to " " " 61.5'.
60'	70'	Fines 70-75% of cuttings. Quartz (a few rounded and grey grains, l mainly as 20°-30') 50%, kunkar 15%, quartz sandstone 15%, limonite (as 0°-10°) 20%. Fines almost all quartz (99%) with minor limonite.
70'	80'	Fines 70% of cuttings. Cuttings smaller than before, rarely larger than 1/10". Angular quartz, (rare iron oxide inclusions) 95%, quartz sandstone 3%, kunkar 2%, rare limonite. Fines 100% quartz, rare pyrite (?) grains.
80'	82'	Percussion open tube sample: Off-white to light grey sandy clay, similar to 60'-62', but containing more quartz and pyrite, and possibly decomposed mica. Bedding very obscure. Attitude 55 (?)° to core axis at 80.5' and 55 (?)° " " " " 81.5'
80'	90'	Fines 60% of cuttings. Constituents and proportions as 70'-80'. Very rare very fine grained (less than 1/1000") pyrite (?). Fines as 70'-80', very rare martite grains.
90'	100'	Fines 50-60% of cuttings. Constituents as 70'-80', but quartz 99%. Fines as 70'-80'.
100'	102'	Percussion open tube sample. Light grey sandy clay as 80'-82', but possibly somewhat more flaky. Attitude possibly 55 (?) to core axis at 100.5' and 50°(?) " " " " 101.5'
100'	110'	Fines 40% of cuttings. Constituents as 70'-80'. Quartz 98%, pyrite 1%, minor sandstone and kunkar. Fines as 70'-80' (possibly 1% pyrite).
110'	120'	Fines 60% of cuttings. Constituents as 70'-80', proportions similar to 90'-100'. Fines as 70'-80' (less pyrite than 100'-110').
120'	122'	Percussion open tube sample. Light grey sandy clay as 80'-82', with a few less than ¼" black pyritic (and possibly graphitic) beds. Bedding 45-50° to core axis at 120.5'. and 65-75° " " " " 121.5'.
120'	130'	Fines 60% of cuttings. Quartz more than 95%, minor kunkar, quartz sandstone and limonite. Rare pyrite grains. Fines as 70'-80'.
130'	140'	Fines 40% of cuttings. Quartz more than 95%, pyrite, limonite, sandstone, kunker each about 1%. Fines 99%+ quartz, rare martite, pyrite etc.
140'	142'	Percussion open tube sample. 140'-141' light grey clay containing abundant quartz as 80'-82'. 141'-142' Same colour, but quartz fragments very rare. Bedding (due to slight staining) very contorted. Bedding 30(?)° to core axis at 140.5' and 40° (contorted) to core axis at 141.5'.

ROTARY DRILLHOLE NO. NR 10 (Contd.) -4-

From	To	Description DETAILED LOG
140'	150'	Fines 40% of cuttings. Quartz more than 95%, minor pyrite, quartz sandstone and kunkar. Fines almost the same as coarse fraction.
150'	160'	Fines 50% of cuttings. Quartz (½ containing biotite inclusions less than 1/100") 80%, white felspar 18%, pyrite 1 or 2%. Fines: 65% quartz, 30% felspar, 5% biotite-chlorite.
160'	162'	Percussion open tube sample. Decomposed silvery grey-green and off-white mottled quartz-felspar-biotite-chlorite rock. Composition approximately 60% quartz and felspar and 40% biotite-chlorite. Attitude 75(?)° to core axis at 160.5' and 65-70° " " " " 161.5'
160'	170'	Fines 30% of cuttings. Constituents and proportions as 150'-160', but grain size rather larger. Fines: 80% quartz, 15-20% felspar, minor pyrite and biotite.
170'	180'	Fines 10% of cuttings. Quartz and quartz-mica composites 65%, white felspar 35%, minor sandstone etc. Fines: 80% quartz, 10-15% felspar, 5-10% biotite-chlorite.
180'	182'	Percussion open tube sample. Decomposed quartz-felspar-chlorite-biotite rock similar to 160'-162', but biotite-chlorite rarer, and even absent from some beds. Average composition about 20% biotite-chlorite. Attitude 85(?)° to core axis at 180.5' and 45° " " " " 181.5'
180'	190'	Fines 30% of cuttings. Constituents and proportions as 170'-180'. Fines: 70% quartz, 25% felspar, 5% chlorite-biotite.
190'	202'	Fines 30% of cuttings. Grain size coarse (commonly larger than ¼"). Quartz and quartz-mica composites 55-60%, white felspar 40-45%. Fines: 70% quartz, 25% felspar, 5% chlorite-biotite.
202'		NMB diamond drill core attempted. Complete failure due to sand in circuit jamming between inner and outer barrels.
200'	205'	Fines 80% of cuttings. Very few cuttings retained on 12 mesh sieve. Kunkar, fine quartz sandstone and quartz fragments (from further up the hole). Fines: more than 95% quartz, minor felspar, mica, martite, pyrite.
205'	210'	Fines 95% of cuttings. Small amount of cuttings on 12 mesh sieve is debris from further up the hole (as 200'-205'). Fines as 200'-205'.
210'	215'	Negligible material retained on 12 mesh sieve. Fines: quartz 80%, quartz-mica composites 15%, white felspar 5%, minor biotite-chlorite, pyrite etc.
215'	220'	Negligible cuttings retained on 12 mesh sieve. Fines: Quartz 60%, quartz-mica 30-35%, felspar 5-10%, a few mica flakes and pyrite grains.

ROTARY DRILLHOLE NO. MR 11 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0°	10°	Fines 25% of cuttings on sieve. Light yellow-brown kunker (calcareous quartz sandstone, grains mainly 1/200"). 75%, white clayey and somewhat siliceous quartz sandstone 5% (grain size as in kunker), limonitic quartz sandstone (grain size as kunker) 10%, angular quartz fragments 10%. Clay free fines: 60%, sub-rounded to rounded quartz (lightly iron stained), 40% kunker.
10°	20°	Fines 90-95% of cuttings on sieve. Kunker (as 0°-10°) 30%, limonite (as 0°-10°) 20%, quartz (similar to 0°-10°, but more rounded) 45%, white sandstone (as 0°-10°) 5%. Fines: 80% quartz, 15% kunker, 5% limonite.
20°	22°	<u>Percussion open tube sample.</u> White and light yellow-brown mottled very slightly sandy clay. Few scattered quartz grains and rare limonite particles in coloured patches.
20°	30°	Fines 95% of cuttings on sieve. Constituents as 0°-10°. Quartz (as 10°-20°) 40%, white sandstone 5%, kunker 25%, limonite 30%. Fines: 80% angular quartz, 10% limonite, 10% kunker.
30°	40°	Fines 90% of cuttings on sieve. Quartz (mainly angular, a few white well rounded as 10°-20°) 70% kunker (as 0°-10°) 20%, limonite (as 0°-10°) 10%. Fines: more than 95% angular quartz (as 20°-30°) minor kunker, limonite etc.
40°	42°	<u>Percussion open tube sample.</u> Light grey-brown sandy clay, showing irregular poorly defined bedding. Contains fairly numerous 1/20"-1/50" quartz grains. Attitude 30°(?) to core axis at 40.5° and 40° " " " " 41.5°
40°	50°	Fines 85% of cuttings on sieve. Quartz (¾ angular) 40%, kunker 40%, limonite 20%. Fines as 30°-40°, but one or two felspar grains (white).
50°	60°	Fines 95% of cuttings on sieve. Quartz almost all angular, 90%, kunker 10%, a few limonite grains and some pyrite. Fines as 30°-40°.
60°	62°	<u>Percussion open tube sample.</u> Sandy clay similar to 40°-42°, but somewhat greyer and showing more distinct bedding. One off-white and red-brown sandy lens (1" diam.). Quartz and extremely rare pyrite (?). only sand particles. Attitude 40° to core axis at 60.5° and 70°-90° " " " " 61.5°
60°	70°	Fines 95% of cuttings on sieve. Quartz (angular) 85%, kunker 5%, limonite 5%, pyrite (very finely crystalline) 5%. Fines same constituents, but more than 99% quartz.
70°	80°	Negligible material retained on 16 mesh sieve. Fines: more than 98% quartz, 1 or 2% pyrite, minor kunker and limonite.

From	To	Description OF DETAILED LOG
80'	81'	Percussion open tube sample. Grey sandy to very sandy clay. Similar to 40'-42', but somewhat flaky, and pyritic (as 60'-61', up to ¼" nodules)
80'	90'	Fines 90-95% of cuttings on sieve. Quartz (99% angular) 75-80%, pyrite 10-15% kunker 5%, limonite 5%. Fines: more than 95% quartz, minor kunker and limonite, a few grains of pyrite and decomposed mica (?).
90'	100'	Fines 90-95% of cuttings on sieve. Constituents and proportions as 80-90'. Fines: more than 95% quartz, minor pyrite, kunker and limonite.
100'	101'	Percussion open tube sample. Interbedded grey and dark grey sandy clay, similar to 40-42', contains quartz (mainly 1/50") and pyrite (as 60-61') from less than 1/1000" to ½" (produces dark colour). Attitude 25-30° to core axis at 100.5'.
100'	110'	Fines 85% of cuttings on sieve. Constituents as 80-90', pyrite 5%, quartz 90%, kunker 3%, limonite 2%. Fines as 90-100'.
110'	120'	Fines 75% of cuttings on sieve. Constituents as 80-90'. Pyrite 10%, quartz 85%, kunker and limonite less than 5% A few grains of decomposed felspar. Fines similar, but more than 95% quartz.
120'	121'	Percussion open tube sample. Bedded (1/16"-¼" beds) quartz decomposed felspar-decomposed (chlorite-biotite) rock. Grain size about 1/20". White felspar up to ¼". Attitude 0-20° to core axis at 120.5'. " 0° " " " " 121.5'.
120'	130'	Fines 85-90% of cuttings on sieve. Quartz (angular) 85-90%, pyrite 5-10%, decomposed white felspar about 5%, a few limonite grains. Fines similar, but 1/5 of quartz grains contain biotite inclusions.
130'	141'	Fines 70% of cuttings on sieve. Quartz 40%, white felspar (fairly fresh, up to ½" crystals) 45%, pyrite 5%. Fines: 75% quartz, 20% felspar, 5% pyrite, a few mica flakes.
141'	142.6'	Diamond drill core. Recovery 1.6' (100%). Medium to coarse grained (1/20"-¼") quartz-orthoclase-biotite rock showing poorly preserved bedding. Appears to be a metasediment containing metasomatically introduced or developed orthoclase. Epidote is a constituent of the less altered portions, while garnet is a rare accessory. Pyrite occurs in fractures and joints. Minerals do not show appreciable preferred orientation. Attitude 30° to 40° to core axis.
	142.6'	END OF HOLE

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. WR 12

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 512/62
Collar Coords 55400N, 58000E	R.L. 547.3'	Grid Warrambee
Vertical	Depth 146.7'	Plan Ref.
Date Bore Commenced 29.6.61	Completed 1.7.61	Driller H. Mischlewitz
Bore Logged by G.R. Heath	On 1.7.61	Miner D. of M.

OBJECT: To test magnetic and gravity anomalies

RESULT: Quartz-felspar-martite metasediment with minor biotite and garnet intersected from 0' - 146.7'. Iron oxide content 20-25%.

LOG Comprises Macro and microscopic geological logs.

From	To	Description SUMMARY LOG
0	4'	Sandy loam (surface soil).
4'	8'	Yellow-brown very hard lumbar containing scattered limonit fragments and 1/100" quartz.
8'	125'	Decomposed quartz-felspar-martite rock, heavily impregnate with limonite in places. Contains about 20% iron oxides (1 or 2% magnetite near the base).
125'	146.7'	Less decomposed quartz-felspar-martite-biotite-garnet rock. Contains about 25% iron oxides. Beds mainly 1/10" thick. Grain size mainly 1/50" - 1/20". Very slightly (5° deflections) magnetic. Attitude usually 45° to core axis.

ROTARY DRILLHOLE NO. MR 12 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught in 16 mesh sieve.
0	10'	Fines 10% of cuttings on sieve. (0' - 4' sandy soil, 4' - 8' kunker, 8' - 10' rock). Yellow-brown slightly sandy (1/100" quartz) limestone (kunker) 40%, limonite (containing minor quartz and martite) 20%, rock fragment (1/20" - 1/50" quartz - decomposed felspar-martite) 40%. Fines: 20% rounded quartz, 30% rock fragments, 30% limonite and martite (1/3 martite), 20% kunker.
10'	20'	Fines 10% of cuttings on sieve. Limonite-martite (as0' - 10') 10%, rock fragments (as 0' - 10') containing 5-20%, usually 10-15% iron oxides 90%. Fines: 45% quartz (as 0' - 10'), 35% martite with minor limonite, 20% rock fragments (as 0' - 10').
20'	30'	Fines 15% of cuttings on sieve. Rock fragments (as 0' - 10') over 95%, iron oxide content usually 10% minor quartz and limonite. Fines: 45% quartz (mainly angular) 45% martite and minor limonite, 10% rock fragments.
30'	35'	Negligible cuttings retained on 16 mesh sieve. Fines: 60% martite with minor limonite and extremely rare magnetite, 35% quartz (as 20'-30'), 5% rock fragments.
35'	40'	<u>Cuttings.</u> Negligible material retained on 16 mesh sieve. Quartz 70% (2/3 rounded) martite (as 30'-35') 25%. 5% rock fragments. <u>Diamond drill core:</u> Recovery 2.3' (40%). Decomposed limonite stained bedded (¼" beds) quartz-decomposed felspar-martite rock, with minor decomposed mica (?) and cross-cutting masses of secondary quartz-limonite. Grain size about 1/80". No magnetic iron oxides (0° deflection). Iron oxides 15-20%. Attitude 50° to core axis at 34.5°. " 45° " " " " 38.5° " 25° " " " " 39.5°
40'	50'	Fines 25% of cuttings on sieve. Rock fragments (as 0'-10' over 90% (iron oxide content 5-10%). Minor quartz and limonite. Fines: 70% martite and minor limonite, 20% rock fragments, 10% angular quartz.
50'	60'	Fines 25% of cuttings on sieve. Decomposed rock fragments (as 0'-10') more than 90% (iron oxide content 5-10%). Minor quartz and limonite. Fines 60% limonite-martite (with 2% magnetite), 30% angular quartz, 10% rock fragme
60'	65'	<u>Diamond drill core</u> Recovery 0.8' (16%). Decomposed quartz-felspar-martite rock. Similar to 35'-40', but rather coarser grained (up to ¼", usually 1/20"-1/50"), more decomposed and limonite impregnated. Iron oxide content 20-25% (negligible magnetite). Attitude about 45° to core axis.
65'	70'	Fines 70% of cuttings on sieve. Quartz (angular) 50%, limonite-martite (1/5 martite) 40%, composites (limonite impregnated) 10%. Fines: 50% angular stained quartz, 50% limonite-martite (½ of each), minor rock fragments.
70'	80'	Fines 30% of cuttings on sieve. Similar to 60'-70'. Quartz 50-60%, limonite and quartz-limonite with minor martite 40-50%, minor rock fragments (as 0'-10'). Fines: 60% quartz, 15% martite, 25% limonite (including impregnated rock fragments.

From	To	Description DETAILED LOG
80'	90'	Fines 75% of cuttings on sieve. Angular stained quartz 40%, limonite-martite 20%, rock fragments (limonite stained) 40%, similar to 60'-70'. Fines: 60% quartz, 30% martite with lesser limonite, 10% composites (as coarse fraction).
90'	95'	Fines 90% of cuttings on sieve. Quartz (as 60'-70') 45%, limonite-martite (1/5 martite) 35%, rock fragments (2/3 limonite impregnated) 20%. Fines: 70% quartz, 30% martite-limonite (½ of each).
95'	100'	Attempted diamond drill core, zero recovery.
95'	100'	Fines 95% of cuttings on sieve. Quartz 60%, limonite-martite (2/3 martite) 30%, composites (as 0'-10') 10%. Fines: 65% martite and minor limonite (with rare magneti 35% quartz, minor decomposed felspar.
100'	101'	Percussion open tube sample. Decomposed bedded (1/16"-2" beds) quartz-martite-mica rock, with minor felspar. Grain size 1/100" - ¼" usually 1/20"-1/50". Martite segregated in beds, content ranging from less than 5% to 60%, probably averaging 10-20%. Attitude 30° to core axis at 100.5'.
100'	110'	Negligible cuttings retained on 16 mesh sieve. Fines: 70% martite (including 1 or 2% magnetite and minor limonite), 30% quartz, minor decomposed felspar.
110'	120'	Fines 90% of cuttings on sieve. Quartz (2/3 "cherty" and limonite stained) 80%, limonite and minor martite 10%, rock fragments similar to 0'-10', 10% (5-10% iron oxides). Fines: 40% quartz, 35% martite (minor limonite and magnetite), 5% quartz+decomposed felspar and mica-martite fragments.
120'	130'	Fines 90% of cuttings on sieve. Constituents and proportions as 110'-120'. Fines: 60% quartz, 30% martit (as 110'-120') 10% composites (as 110'-120').
130'	140'	Fines 70% of cuttings on sieve. Quartz 50%, martite-limonite 10%, quartz-martite (1/50", commonly stained) 25%, rock fragments (as 0'-10') 15%. Fines: 50% quartz (angular, a few lemon yellow grains), 35% martite (minor magnetite and limonite), 5% garnet, 5% biotite, 5% commonly decomposed white felspar.
140'	143'	Fines 65% of cuttings on sieve. Quartz 40%, martite-limonite 10%, quartz-martite and rarely garnet 30%, rock fragments as 0-10', 20%. Fines: 60% martite (with rare magnetite), 25% quartz, 10% biotite, 5% garnet.
143'	146.7'	Diamond drill core. Recovery 1.6' (40%) quartz-felspar (55%) - martite (25%) - biotite (10%) - garnet (10%) rock, rather decomposed. Bedded (about 1/10" beds) grain size 1/100" - ¼", usually 1/20" - 1/50". Very slightly magnetic in parts (5° deflection). Core is badly broken up along joints and lpartings. Lineation approximately parallel to long axis of bedding. Attitude 45°-50° to core axis throughout.
146.7'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. MR 13

Project: Warrambee Aeromagnetic Anomaly		D.M. 664/61
Sec. 24 Hd. Warrambee	Co. Le Hunte	Bore Ser. No. 512/62
Collar Coords: 55250N,58000E	R.L. 525.9'	Grid: Warrambee
Vertical	Depth: 197'(928')	Plan Ref.
Date Bore Commenced: 3/7/61	Completed: 6/7/61	Driller: T. Jervis & H. Mischlewitz.
Bore Logged by: G. R. Heath	On 4-6/7/61	Miner: D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULTS: Granitised quartz-felspar-biotite-magnetite, martite (20%?) metasediment intersected from 15'-197'.

Continued as MR 3 to 928'.

LOG Comprises Bore and microscopic geological logs.

From	To	Description SUMMARY LOG
0'	0.5'	Sandy loam.
0.5'	3.5'	Yellow-brown sheet kunker with included quartz and limonite.
3.5'	15'	Limonite-martite with minor decomposed metasediment.
15'	70'	Decomposed quartz-felspar-martite metasediment heavily impregnated with limonite.
70'	180'	Light yellow-brown and multicoloured bedded clays (decomposed metasediment) containing 15-45% martite, averaging 20-25%.
180'	197'	Severely granitised quartz-plagioclase-biotite-magnetite-martite rock. 90% of rock is quartz-orthoclase-biotite "granite". Unaltered metasediment contains 10-15% iron oxides.
		Attitude 15° - 55° to core axis, usually about 35°.

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0°	10°	Fines 25% of cuttings on sieve (0°-0.5° sandy soil, 0.5°-3.5° kunkar, 3.5° on limonite). Light yellow-brown limestone (kunkar) containing 10-20% 1/50"-1/100" quartz 70%, limonite containing scattered (5%) 1/100" quartz and minor martite 30%. A few composites. Fines: 10% kunkar, 45% limonite, 40% martite, 5% angular iron stained quartz.
10°	20°	Fines 25% of cuttings on sieve. Kunkar (as 0°-10°) 15%, 1/50" grains size quartz-martite-decomposed felspar 5%, limonite (similar to 0°-10°, but contains more martite) 80%. Fines: 5-10% angular quartz, 40% martite, 50% limonite (including completely impregnated clay and decomposed rock), a few quartz-martite-decomposed felspar fragments.
20°	30°	Fines 20% of cuttings on sieve. Kunkar (as 0°-10°) 15%, rock fragments (as 10°-20°, containing 5-20% martite, and rather limonite stained) 25%, limonite (as 10°-20°) 60%. Fines: 20% quartz, 20% rock fragments, 60% martite with minor limonite.
30°	40°	Fines 20% of cuttings on sieve. Limonite (as 0°-10°) 60%, decomposed quartz-felspar fragments (off-white, minor iron oxides), 40%, minor kunkar. Fines: 75% limonite-martite, 5% quartz, 20% rock fragments (mainly limonite stained).
at	40°	Attempted percussion open tube sample. Unsuccessful due to settling of abundant heavy cuttings (up to 1" limonite and kunkar fragments).
40°	50°	Fines 75% of cuttings on sieve. Martite-limonite 80%, kunkar 5%, off-white rock fragments 5%, light yellow-brown limonite stained and impregnated decomposed rock fragments (only quartz identifiable) 30%. Fines similar to coarse fraction, but contain 10% angular quartz.
50°	60°	Fines 85% of cuttings on sieve. Martite-limonite 70-80%, kunkar 5%, stained rock fragments (as 40°-50°) 15-25%. Fines similar, but contain 5% white rock fragments, and 10% unstained angular quartz.
60°	62°	Percussion open tube sample. Light yellow-brown clay (decomposed rock ?) containing less than 20% fine grains (less than 1/100") limonite-martite and minor quartz. Contains irregular ½" beds (veins?) of broken limonite with minor martite. Attitude (?) 30° to core axis at 61.5°.
60°	70°	Fines 75% of cuttings on sieve. Martite-limonite 85%, off-white rock fragments 5%, kunkar 5%, yellow-brown rock fragments (as 40°-50°) 5%. Fines: 30% angular quartz, 20% yellow-brown rock fragments, 5% white rock fragments, 45% limonite-martite.
70°	80°	Fines 85% of cuttings on sieve. Limonite with minor martite 95%, kunkar 5%, minor rock fragments and angular quartz. Fines: 60% angular quartz (½ iron stained), 40% martite-limonite (½ of each), minor rock fragments etc.

From	To	Description DETAILED LOG
80'	81'	Percussion open tube sample. Yellow-brown and multi-coloured clay containing abundant (50-60%) irregularly distributed 1/20"-1/50" sand. Sand is 60% quartz, 40% martite. Bedding very obscure, possibly 45° to core axis.
80'	90'	Fines 95-98% of cuttings on sieve. Limonite and minor martite 80%, rock fragments 5%, kunkar 5%, angular quartz 10%. Fines: 50-60% martite, 40-50% quartz, minor limonite, one or two white decomposed rock fragments.
90'	100'	Fines 95-98% of cuttings on sieve. Quartz (angular lightly stained) 40%, martite 40%, quartz-martite composites with minor limonite 20%. Fines: 55% martite, 45% angular quartz.
100'	101'	Percussion open tube sample. Alternating ¼"-½" beds of off-white and red-brown mottled clay, and slightly clayey 1/20"-1/100" quartz-martite sand. Sand 50% of rock, contains 60-70% quartz, 30-40% martite. Attitude 35° to core axis at 100.5'.
100'	110'	Fines 97% of cuttings on sieve. Quartz 30%, martite-limonite 50%, kunkar 5%. Fines: quartz (angular, lightly stained) 40%, martite and very minor magnetite 60%.
110'	120'	Fines 98-99% of cuttings on sieve. Quartz 75%, martite with minor limonite 25%. Fines: 50% quartz, 50% martite (1 or 2% magnetite).
120'	121'	Percussion open tube sample. Bedded clay and quartz-martite similar to 100'-110'. Sand 50-60% of rock, contains about 40% martite (mainly 1/50"). Attitude 35° to core axis at 120.5'.
120'	130'	Fines more than 98% of cuttings on sieve. Angular, fairly clean quartz 60%, kunkar 5%, limonite-martite 35%, rare quartz-martite composites. Fines: 65% martite (including 3% magnetite and minor limonite).
130'	140'	Fines 98% of cuttings on sieve. Clean angular quartz 65% (one or two grains contain mica), martite (one or two magnetite grains) 5%, limonite 10%. Fines: 40-50% martite (1 or 2% magnetite, minor limonite), 50-60% quartz.
140'	141'	Percussion open tube sample. Dull multicoloured very sandy clay, similar in appearance to 80'-81'. Sand 60-70% of rock, consists of 65% martite, 35% quartz. Bedding 30-35° to core axis at 140.5'.
140'	150'	Fines 80% of sample on sieve. Quartz (frequently containing up to 10% martite) 80%, martite 20%. Fines: 60% quartz, 40% martite, minor limonite.
150'	160'	Fines 85% of cuttings on sieve. Quartz (as 140'-150') 90%, martite 10%. Fines: 70% quartz, 30% martite (with minor magnetite), a few flakes of fairly fresh looking biotite.

From	To	Description DETAILED LOG
160'	162'	Percussion open tube sample. Clayey decomposed quartz-biotite-martite rock interbedded with up to ½" relatively pure quartz beds. Grains size 1/50"-1/100" in dark purple-brown beds, up to ¼" in quartz beds. Martite probably 20% of rock. Low grade decomposed itabirite. Attitude 20-25° to core axis at 160.5°, and 15-20° " " " " 161.5°.
160'	170'	Fines 80% of cuttings on sieve. Quartz (as 140'-150') 85% martite 15%, a few decomposed mica, epidote and felspar fragments. Fines: 60% quartz, 40% martite and minor magnetite, a few biotite flakes.
170'	180'	Fines more than 95% of cuttings on sieve. Quartz (inclusions rare) 90-95%, martite 5-10%, a few quartz-mica-martite composites. Fines: 70% quartz, 20% martite and minor magnetite, 5% decomposed felspar, 5% biotite, minor epidote.
180'	181'	Percussion open tube sample. Decomposed quartz-felspar-biotite metasediment, containing less than 5% martite. Bedding (up to 2" thick) due to varying amounts of biotite. Grain size about 1/20". Attitude 40° to core axis at 180.5'.
180'	190'	Fines 90% of cuttings on sieve. Quartz 55%, white, to grey felspar 30%, martite 5%, composites (mainly quartz-martite) 10%. Fines: 75%quartz, 20% martite (2% magnetit 5% white felspar, minor biotite.
190'	193'	Fines 5% of cuttings on sieve. Virtually all fresh rock fragments consisting of quartz, pink orthoclase and martite-magnesite (5-10%). Grain size 1/20"-1/50". Fines: 60% quartz, 30% orthoclase, 10% martite and minor magnetite.
193'	197'	Diamond drill core, recovery 2.5' (62%). Almost completel granitised metasediment. The core is 9/10 "granite" (quartz-orthoclase rock with 1 or 2% biotite, grain size about 1/15", light grey epidote (?) possibly white felspar, occurs with quartz in irregular veins.) The remaining metasediment is bedded quartz (10%) - white felspar (45-50%) - biotite (20%) - magnetite-martite (10-15%) rock, grain size 1/50". Magnetic deflection 25° at 196.5'. Bedding 55°(?) to core axis at 196.5'.
	197'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 14

Project: Warrambee Aeromagnetic Anomaly D.H. 664/61

Sec. 24 Hd. Warrambee Co. Le Hunte Bore Ser.No.PB 520/62

Collar Coords 55400N, 58000E R.L. 533.4' Grid Warrambee

Vertical Depth 171' Plan Ref.

Date Bore Commenced 6.7.61 Completed 8.7.61 Driller T. Jarvis & H. Nischkewitz

Bore Logged by G.R. Heath On 12.7.61 Hirer D. of M.

OBJECT: To test magnetic "high" on gravity plateau.

RESULT: Metasediments containing 20-35% magnetite-martite were intersected from 2.5' to 171'.

LOG Comprises Macro and Microscopic geological logs
Magnetic Log.

From	To	Description SUMMARY LOG
0	0.5'	Light brown sandy loam.
0.5'	2.5'	Sheet, grading to nodular laterite.
2.5'	165'	Multicoloured decomposed metasediment, containing 5-30%, usually about 20%, iron oxides. Decomposed felspar present from 3.5', magnetite from 70', biotite from 120', garnet from 130'. Grain size 1/32" - 1/200". Epidote is a minor constituent from 150' on.
165'	171'	Fresh quartz-felspar-martite, magnetite (20-60%, usually 30-35%) - garnet-biotite metasediment. Grain size 1/32" 1/100". Beds usually less than 1/4" thick.
		Attitude 20° - 30° to core axis throughout most of the core, but 50° at bottom.

MAGNETIC LOG

Deflection 90° at 170.5'.

ROTARY DRILLHOLE NO. BR 14 (Contd.)

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 15% of cuttings on sieve. (0'-0.5' sandy loam, 0.5' - 2.5' kunker, 2.5' + weathered rock). Yellow-brown limestone containing fairly abundant quartz and limonite (kunker) 30%, limonite and minor martite 20%, rock fragments (decomposed iron stained quartz-felspar-martite 1/50" grain size) 50%. Fines 85% martite-magnetite (1/2 of each), 10% angular quartz, 5% decomposed felspar.
10'	20'	Fines 10% of cuttings on sieve. Constituents and proportions as 0-10'. Fines: similar to 0-10', rather more martite than limonite.
20'	21'	Percussion open tube sample. Bedded decomposed metasediment. Clay containing 60% sand, which consists of 1/3 martite, 2/3 quartz. Grain size 1/50". Beds mainly 1/16" - 1/8" thick off-white and red-brown, containing varying amounts of iron oxides. Bedding 5° - 10° to core axis at 20.5'.
20'	30'	Fines 70% of cuttings on sieve. Kunkar 20%, limonite (minor martite) 20%, rock fragments (similar to 0-10', but less iron oxides) 60%, minor quartz. Fines: 80% martite (minor limonite), 5% angular quartz, 15% rock fragments.
30'	40'	Fines 15% of cuttings on sieve. Martite 20%, limonite 20%, kunker 10%, rock fragments (as 20-30%) 50%. Fines as 20' - 30'.
40'	40.5'	Percussion open tube sample. (Poor sample due to alternating hard and soft bands). Decomposed quartz-felspar metasediment containing minor iron oxides.
40'	50'	Fines 70% of cuttings on sieve. Limonite-martite 35%, off-white decomposed quartz-felspar 20%, limonite impregnated material 25%, kunkar 10%. Fines: 15% angular quartz, 15% off-white rock fragments, 20% light yellow-brown limonite impregnated material, 50% limonite-martite.
50'	60'	Fines 60% of cuttings on sieve. Constituents as 40'-50', limonite-martite 35%, off-white rock fragments 5%, limonitic rock fragments 60%. Fines: 10% quartz, 10% white rock fragments, 30% impregnated (limonitic) rock fragments, 40% limonite-martite.
at 60'		Attempted percussion open tube sample: zero recovery.
60'	70'	Fines 50% of cuttings on sieve. Limonitic rock fragments 60%, limonite-martite 40%, minor quartz and white rock fragments. Fines: 20% clear angular quartz, 5% white rock fragments, 35% limonitic rock fragments, 40% limonite-martite (1/2 of each).

ROTARY DRILL HOLE NO. NR 14 (Contd.) -3-

From	To	Description DETAILED LOG
70'	80'	Fines 99% of cuttings on sieve. Limonite, martite, angular quartz and limonite impregnated rock fragments. Fines: 35% quartz, 60% magnetite-martite (1/5 magnetite) 5% rock fragments of limonite.
80'	81'	Percussion open tube sample Off-white and light brown decomposed metasediment. Sand sized material (1/100" - 1/200") 40% of rock, consisting of 45% martite (with minor magnetite) 55% quartz. Beds 1/16" - 1/4" thick, 30° to core axis at 80.5'.
80'	90'	Fines 90% of cuttings on sieve. Quartz, hunker, limonite-martite, rock fragments. Fines 60% quartz, 20% limoniti rock fragments, 20% martite-magnetite (as 70' - 80').
90'	100'	Fines 99% of cuttings on sieve. Quartz and limonite-martite. Fines 60% quartz, 30% magnetite-martite (1/20 magnetite), 10% limonite and rock fragments.
100'	101'	Percussion open tube sample. Brown and off-white decomposed metasediment, similar to 80'-81' but darker in colour and coarser grained (1/50" grain size). Sand sized material 75% of rock, consisting of 40% quartz, 40% martite. Attitude 30° to core axis at 100.5'.
100'	110'	Fines 99% of cuttings on sieve. Limonite-martite and quartz. Fines: 70% quartz, 30% martite (minor magnetite) 10% limonite and limonitic rock fragments. A few decomposed felspar grains (?).
110'	120'	Fines 90% of cuttings on sieve. Quartz 50% (equidimensional, lightly stained) limonite-martite 45%, some rock fragments (including decomposed mica). Fines 75% quartz (3/4 stained) 15% rock fragments (some fresher than above, a little decomposed felspar), 10% limonite-martite.
120'	121'	Percussion open tube sample Dark red decomposed quartz-martite-biotite metasediment. Grain size 1/50". Contains 50-60% quartz, 20-25% biotite, 20-25% martite. Attitude 20° to core axis at 120.5'.
120'	130'	Fines 70% of cuttings on sieve. Quartz 5%, white and off-white rock fragments 5%. Dark brown quartz-iron oxide composites 50%, dull black (manganiferous?) iron oxides 40%. Fines 30% quartz, 30% martite (minor dull oxides and magnetite) 5% white rock fragments. 35% quartz-iron oxide composites.
130'	140'	Fines 90% of cuttings on sieve. Quartz 65%, "manganiferous" iron oxides 10%, martite 5%, limonite and rock fragments 20%. Fines: 30% martite with minor magnetite, 15% garnet, 5% felspar, 50% quartz, minor decomposed mica.

ROTARY DRILL HOLE NO. MR 14 (Contd.) -4-

From	To	Description DETAILED LOG
140'	141'	Percussion open tube sample. Decomposed quartz-martite-biotite-garnet metasediment. Grain size 1/100" - 1/200". Average composition 40% quartz, 30% martite, 15% biotite, 15% garnet. Beds 1/8" - 1" thick, 20° to core axis at 140.5'.
140'	150'	Fines 50% of cuttings on sieve. Rock fragments, about 55% quartz-orthoclase, 45% quartz-epidote-martite-biotite-garnet (1/200"). Slightly decomposed. Fines: 60% quartz-felspar (mostly orthoclase) 20% martite-magnetite 20% rock fragments (as coarse fraction).
150'	160'	Fines 20% of cuttings on sieve. Slightly stained quartz-martite-biotite-garnet-epidote metasediment fragments 60%, quartz orthoclase 20%. Fines: similar to coarse fraction, a few serpentine fragments present.
160'	170'	Fines 10% of cuttings on sieve. Metasediment fragments. Similar to 150'-160', but epidote more abundant, quartz-orthoclase rare, and a little sillimanite present. Fines similar to coarse fraction. Magnetite-martite content about 25-30%.
160'	165'	Diamond drill core. Recovery 0.5' (10%). Very slightly decomposed quartz (10%) - orthoclase (30-35%) - biotite (30%) - martite (5-10%) - garnet (15%) - epidote (5%) metasediment. Grain size 1/200", beds less than 1/4" thick; not well defined; 55° to core axis at 164'.
170'	171'	Diamond drill core. Recovery 0.75' (75%). Metasediment similar to 160'-165'. Martite-magnetite 20-50% (average 30-35%), garnet 15%, biotite 15%, quartz-felspar 30-35%. Grain size 1/50" - 1/100". Beds mainly less than 1/4" thick. Attitude 55° to core axis at 170'. Magnetic deflection 90° at 170'-171'.
	171'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 15

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 24 Hd. Warrambee Co. Le Hunte Bore Ser.No. PH 520/62

Collar Coords 56400N, 58000E R.L. 548.6' Grid Warrambee

Vertical Bearth 117° Plan Ref.

Date Bore Commenced 8.7.61 Completed 11.7.61 Driller T. Jarvis & H. Mischlewitz

Bore Logged by G.R. Heath On 13.7.61 Miner S. of M.

OBJECT: To test material adjacent to gravity and magnetic "highs".

RESULT: Granitised metasediment ("granitic gneiss") was intersected from 4' - 117'. No significant iron minerals.

LOG Comprises Macro and microscopic geological logs

From	To	Description SUMMARY LOG
0'	2'	Light brown sandy loam.
2'	4'	Light yellow-brown sheet and nodular kunkar.
4'	117'	Metasediment. Decomposed 4'-100'. Contains quartz, plagioclase (?), and biotite, with lenses and augens of quartz-orthoclase. Grain size 1/20" - 1/100", usually 1/50". Minor (2%) martite present near the top of the sequence. Attitude 0°-65° to core axis.

ROTARY DRILL HOLE NO. MR 15 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0'	10'	Fines 50% of sample on sieve. Kunkar (off-white to yellow-brown limestone containing scattered 1/200" quartz grains) 40%, sandy loam (break up readily) 10%, decomposed rock fragments (off-white and dull red clay containing 1/200" quartz) 50%. Fines: 30% angular quartz, 30% rock fragments, 40% kunkar.
10'	20'	Fines 60% of sample on sieve. Angular quartz (some with adhering decomposed felspar) 50%, kunkar 10%, rock fragments (as 0'-10') 40%. Fines: 65% quartz, 30% rock fragments (as 0-10'), 5% kunkar.
20'	21'	Percussion open tube sample. Red and white mottled and irregularly bedded very sandy clay (decomposed metasediment). Contains 60% sand sized material, up to 1/10" diameter, consisting of 98% quartz-decomposed felspar, 2% martite. Beds 1/16" - 3/8" thick, 5°-10° to core axis at 20.5'.
20'	30'	Fines 50% of cuttings on sieve. Angular quartz 35%, rock fragments (as 0-10') 60%, kunkar 5%. Fines 100% quartz grading to rock fragments.
30'	40'	Fines 70% of cuttings on sieve. Constituents and proportions as 20'-30'. Fines: quartz-rock fragments as 20'-30'.
40'	41'	Percussion open tube sample. Off-white, with irregular iron stained patches, decomposed "granite". Consists of 1/20" quartz grains (10%) scattered through white clay (decomposed felspar). Bedding obscure, possibly 45° to core axis at 40.5'.
40'	50'	Fines 60% of cuttings on sieve. Angular quartz 50%, rock fragments (as 0'-10') 40%, kunkar 10%. Fines similar to 20'-30', with a few grains of decomposed mica.
50'	60'	Fines 85% of cuttings on sieve. Angular quartz 75%, rock fragments (as 0'-10') 20%, kunkar 5%. Fines 95% angular quartz (some adhering decomposed rock), 5% rock fragments (as 0'-10').
60'	61'	Percussion open tube sample. Light yellow-brown decomposed metasediment, consisting of 1/50" quartz and decomposed felspar, with decomposed biotite in some beds. Bedding 1/8" - 1/2" thick, 0° to core axis at 60.5'.
60'	70'	Fines 85% of cuttings on sieve. Angular quartz 75%, rock fragments (as 0'-10' & 60'-61') 25%. Fines similar to 50'-60', with some decomposed biotite.
70'	80'	Fines 50% of cuttings on sieve. Pink and white, very slightly decomposed felspar 50%, angular quartz 25%, rock fragments (as 60'-70') 25%. Fines: 15% felspar, 30% rock fragments, 10% limonitic fragments, 45% angular quartz.

LOG OF ROTARY DRILL HOLE NO. WR 15 (Contd.)

From	To	Description DETAILED LOG
70'	80'	Fines: 15% felspar, 30% rock fragments, 10% limonitic fragments, 45% angular quartz.
80'	81'	Percussion open tube sample. Red-brown and yellow-brown laminated, decomposed metasediment. Consists of 1/100" grains, 40% quartz-decomposed felspar, 60% decomposed mica, with accessory iron oxides. Beds 1/32" - 1/8" thick; 25° to core axis at 80.5'.
80'	90'	Fines 30% of cuttings on sieve. Pink and lightly stained felspar 80%, quartz and rock fragments 15%, limonite and limonitic fragments 5%. Fines: 60% felspar, 35% quartz, 5% fresh looking biotite.
90'	100'	Fines 20% of cuttings on sieve. Constituents and proportions similar to 80'-90', but limonite rare, and quartz-felspar composites fairly common. Fines: as 80'-90' with a few limonite fragments.
100'	110'	Fines 10% of cuttings on sieve. Felspar 45%, quartz 25%, 1/100" grain size quartz-white felspar-biotite fragments 30%. Fines: 30% composites (as coarse fraction) 10% biotite 35% felspar, 25% quartz.
110'	112'	Fines 30% of cuttings on sieve. Quartz and orthoclase 60% rock fragments (as 100'-110') 40%. Fines similar to 100'-110'.
112'	117'	Diamond drill core. Recovery 2' (40%). Quartz (30%) - felspar (50%) - biotite (20%) metasediment, containing abundant quartz-orthoclase lenses, irregular masses and augens up to 1½" diameter. Looks like a typical granite gneiss. Metasediment grain size 1/30" - 1/50", beds 1/20" - 1/8" thick, 45°-55° to core axis.
	117'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 16

Project: Warrenboo Aeromagnetic Anomaly D.M. 664/61

Sec. 24 Hd. Warrenboo Co. Le Hunte Bore Ser.No.FR 520/62

Collar Coords 55900N, 59000E R.L. 557.5' Grid Warrenboo

Vertical Depth 150' Plan Ref.

Date Bore Commenced 12.7.61 Completed 14.7.61 Driller H. Mischlewitz & T. Jarvis

Bore Logged by G.R. Heath On 14.7.61 Miner B. of M.

OBJECT: To test material underlying surface manganiferous float adjacent to gravity and magnetic "highs".

RESULT: Decomposed metasediment containing manganiferous oxides (similar to surface float) 3-50', and martite 50-150'.

LOG Comprises Macro and microscopic geological logs.

From	To	Description SUMMARY LOG
0	1.5'	Light brown sandy loam.
1.5'	3.0'	Light yellow-brown sheet and nodular hunker containing abundant manganiferous iron oxide fragments and nodules.
3.0'	50'	Decomposed quartz-felspar-mica metasediment containing 15-40% bedded and cross cutting masses of soft, dull, manganiferous iron oxides. Grain size about 1/20".
50'	80'	Decomposed metasediment similar to 3'-50', containing 10-15% iron oxides (manganiferous and martite).
80'	150'	Quartz-martite (magnetite-rare) - epidote-garnet metasediment, with minor variable biotite. Contains 25-35% martite with minor manganiferous material and magnetite. Metasomatic quartz-orthoclase (as less than 1/2" lenses and irregular beds) forms about 25% of the rock. Grain size 1/100" - 1/200". Beds usually less than 1/8" thick. Bedding attitude increases from 50° to the core axis above 80', to 65° to the core axis below 140'.

ROTARY DRILL HOLE NO. MR 16 (contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 10% of cuttings on sieve. Kunkar (55%) containing abundant (45%) dull black, fairly soft manganiferous oxides (brown streak). Fines: 70% quartz (1/2 well rounded) 20% kunkar, 10% dull iron oxides, a few decomposed rock fragments (as MR 15).
10'	20'	Fines 50% of cuttings on sieve. Kunkar 60%, dull manganiferous oxides 40%, a few decomposed rock fragments, with secondary calcite and iron oxides. Fines: 10% quartz, 10% rock fragments, 30% manganiferous oxides, 50% kunkar.
20'	21'	Percussion open tube sample. Brown and dull multicoloured decomposed metasediment. Grain size 1/50", contains 60% quartz, 15% dull, soft, manganiferous oxides, 25% clay (after felspar and mica). Beds 1/32" - 1/8" thick, 50° to core axis at 20.5'.
20'	30'	Fines 75% of cuttings on sieve. Rock fragments (as 20'-21') 30%, dull manganiferous oxides 30%, kunkar 40%, a few angular quartz grains. Fines: 20% quartz, 10% kunkar, 25% manganiferous oxides, 45% rock fragments (as 20'-21').
30'	40'	Fines 95% of cuttings on sieve. Kunkar 10%, angular quartz 40%, manganiferous oxides 30%, rock fragments 20%. Fines: 35% iron oxides (1/2 martite, 1/2 manganiferous), 15% kunkar, 15% rock fragments, 35% quartz.
40'	41'	Percussion open tube sample. Very light brown decomposed metasediment containing irregular masses and beds of dull black manganiferous oxides. Grain size 1/20" - 1/4". Consists of 60% manganiferous oxides 30% quartz, 10% clay. Beds 1/8" - 1/2" thick, 50° to core axis.
40'	50'	Fines 90% of cuttings on sieve. Manganiferous oxides 55%, quartz 25%, decomposed rock fragments 20%. Fines: 45% iron oxides (as 30'-40'), 30% quartz, 25% rock fragments.
50'	60'	Fines 90-95% of cuttings on sieve. Manganiferous oxides 60%, quartz 10%, rock fragments 10%. Fines as 40'-50'.
60'	61'	Percussion open tube sample. Off-white and light reddish and yellowish brown decomposed metasediment. Contains 1/100" - 1/200" quartz 75%, manganiferous oxides and some martite 10%, decomposed felspar (clay) 15%. Beds 1/16" - 1/4" thick, 40°-50° to core axis.
60'	70'	Fines over 95% of cuttings on sieve. Manganiferous oxides 60%, quartz 30%, rock fragments (as 60'-61') 10%. Fines as 40'-50'.
70'	80'	Fines over 95% of cuttings on sieve. Constituents and proportions as 60'-70', a few grains of decomposed felspar. Fines: 30% dull manganiferous oxides, 50% angular quartz, 20% decomposed rock fragments (containing some magnetite).

From	To	Description DETAILED LOG
80'	81'	Percussion open tube sample Grey and off-white decomposed metasediment, hard drilling. Consists of 1/50" - 1/100" quartz 65% (including somewhat decomposed felspar), slightly decomposed biotite 20%, manganiferous oxides and martite 15%. Beds mainly 1/8" thick, 50° to core axis at 80.5°.
80'	90'	Fines over 95% of cuttings on sieve. Manganiferous oxides (with some martite) 40%, quartz 20%, orthoclase 30%, rock fragments (quartz-felspar-magnetite-martite) 10%. Fines: 45% iron oxides (15% manganiferous, 20% martite, 10% magnetite), 15% quartz, 25% felspar (mainly orthocla 15% composites (fairly fresh).
90'	100'	Fines 90% of cuttings on sieve. Manganiferous oxides 30%, quartz-orthoclase fragments 50%, quartz-magnetite-martit with minor garnet and biotite (1/200") 20%. Fines: 35% iron oxides (1/2 magnetite) 5% biotite, 5% garnet, 55% quartz-orthoclase.
100'	110'	Fines 90-95% of cuttings on sieve. Iron oxides 25% (1/2 martite-magnetite, 1/2 manganiferous), rock fragments 75 (mainly fairly coarse grained quartz-orthoclase, with lesser quartz-garnet-martite-magnetite (minor biotite)). Fines: 20% iron oxides (mainly magnetite - martite), 60% quartz - orthoclase (with minor iron oxides), 20% quartz-garnet-magnetite-martite.
110'	120'	Fines 85% of cuttings on sieve. Iron oxides 30% (2/3 manganiferous) rock fragments (as 100'-110') 70%. Fines as 100'-110'.
120'	130'	Fines 90-95% of cuttings on sieve. Iron oxides (mainly manganiferous) 35%, rock fragments (as 100'-110', with a few fragments of almost pure mica) 65%. Fines: 30% iron oxides (1/3 manganiferous, 1/3 martite, 1/3 magnetite), 60% rock fragments (virtually all quartz orthoclase).
130'	140'	Fines over 95% of cuttings on sieve. Iron oxides quartz-orthoclase- and quartz-magnetite-martite-garnet-biotite as 100'-110'. Fines: 15% iron oxides (as 120'-130'), 10% garnet, 5% biotite, 40% quartz, 30% orthoclase.
140'	144'	Diamond drill core. Recovery 0.5' (12%). Slightly decomposed metasediment containing up to 1/2" thick lenses of quartz-orthoclase (crystals up to 1/10" in diameter). Metasediment 1/100" - 1/200" grain size, 30% quartz, 30% epidote, 25% magnetite-martite, 15% garnet. Beds 1/32" to 1/8" thick, 60° to core axis at 144'.
140'	150'	Fines 60% of cuttings on sieve. Iron oxides 10%, rock fragments 90% (mainly quartz-orthoclase, quartz-garnet-magnetite-martite and epidote-garnet-magnetite-martite). Fines similar to coarse fraction.
150'	154'	Fines 70% of cuttings on sieve. Iron oxides 5%, quartz-orthoclase 30%, metasediment 65%. Fines: 30% quartz, 20% orthoclase, 20% epidote, 20% iron oxides, 5% garnet, 5% biotite.

ROTARY DRILLHOLE NO. MR 16 (Contd.) -4-

From	To	Description DETAILED LOG
154'	158'	Diamond drill core. Recovery 2.1' (52%). Compact metasediment containing about 25% lenticular and irregularly bedded (up to 1/2", usually less than 1/4" wide) quartz-orthoclase. Metasediment 1/100" - 1/200" grain size, 30-35% martite (magnetite rare), 15% garnet, 20% epidote, 30-35% quartz. Beds usually less than 1/10" thick, attitude 65° to core axis.
	158'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR17 & WR17A

Project: Warramboo Aeromagnetic Anomaly			D.M. 664/61
Sec. 24 Hd. Warramboo	Co. Le Hunte		Bore Ser.No.PB 520/62
Collar Coords 55800N, 62000E	R.L. 479.2'		Grid Warramboo
Vertical	Depth 182', 187'		Plan Ref.
Date Bore Commenced 15.7.61	Completed 18.7.61		Driller T. Jarvis
Bore Logged by G.H. Heath	On 17-18.7.61		Hirer D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: Itabirite grading down into metasediment containing 20-25% martite-magnetite was intersected from 125' - 185'.

LOG Comprises: Macro and Microscopic geological logs
Magnetic logs

From	To	Description SUMMARY LOG
0'	3' ½	Light brown sandy loam.
3'	6'	Light yellow-brown nodular, grading to sheet kunkar. Contains minor limonite.
6'	41'	Overburden. White clayey fine quartz sandstone and light multicoloured mottled and irregularly bedded slightly sandy clays. Strongly impregnated with limonite for the first 20' or so.
41'	65'	Decomposed metasediment containing irregular 1/4" lenses of quartz-martite. Overall iron oxide content 5-10%.
65'	125'	Decomposed purple-brown and grey-brown metasediment (possibly itabirite). Consists of alternating martite rich and poor beds. Martite content 20-40%, averaging 25-30%. Sand sized particles (mainly 1/50" - 1/150") 70-80% rock.
125'	185'	Martite-magnetite itabirite grading down into a quartz-felspar-martite-magnetite-epidote metasediment. Martite-magnetite content decreases from 40% near the top to 20-25% near the base. Grain size mainly about 1/200". Beds well defined, 1/2" - 1/32" thick (finer towards base).
185'	187'	Coarse grained (up to 3/4" crystals) quartz-orthoclase-tourmaline-epidote-martite (10%) metasomatic pegmatite. Attitude variable, 15° to 55° to core axis.

ROTARY DRILLHOLE NO. WR 17 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 50% of cuttings on sieve. Kunkar (yellow-brown limestone fragments with 5% dispersed quartz grains) 98%, limonite nodules (less than 1/4"), somewhat darker in colour than usual 2%. Fines: 60% quartz (rounded to well rounded), 30% kunkar, 10% limonite with a little martite.
10'	20'	Fines 40% of cuttings on sieve. Kunkar 25%, limonite 30%, white non-calcareous clay containing 60% sub-angular to rounded, 1/250" quartz, 45%. Fines: 30% quartz, 30% kunkar, 20% limonite, 20% white sandstone (as coarse fraction).
20'	21'	Percussion open tube sample. Structureless clay or decomposed rock completely impregnated with siliceous limonite.
20'	30'	Fines 60% of cuttings on sieve. Kunkar 15%, limonite 35%, white sandstone (as 10'-20') 50%. A few quartz-martite composites, 1/100" grain size. Fines: 40% limonite, 25% quartz, 5-10% kunkar, 25-30% white sandstone.
30'	40'	Fines 55% of cuttings on sieve. Kunkar 10%, white sandstone 10%, quartz (mainly angular) 5%, limonite (generally containing 50%, 1/100" quartz) 75%. Fines: 5% kunkar, 15% quartz, 80% limonite with a few martite grains.
40'	41'	Percussion open tube sample. Grey and light yellow-brown mottled and irregularly bedded slightly sandy clay. Contains about 10%, 1/20" angular to subangular quartz grains. Possibly overburden. Bedding 45% to core axis at 40.5'.
40'	50'	Fines 85% of cuttings on sieve. Angular quartz 15%, kunkar 25%, white sandstone 15%, limonite 45%. A few martite grains. Fines: 60% angular quartz, 35% limonite, 5% kunkar and white sandstone. A few quartz-martite fragments.
50'	60'	Fines 95% of cuttings on sieve. Angular quartz 50%, limonite 30%, kunkar 15%, white sandstone 5%. A few martite-quartz grains. Fines: 85% angular quartz, 10% limonite (and 1/5 martite), 5% kunkar and white sandstone. A few grains of decomposed mica, and very fine grained (1/1000") pyrite.
60'	61'	Percussion open tube sample. Grey-brown and light grey irregularly bedded fairly sandy clay, with up to 1/4" irregular lenses of pure sand. Clay contains about 15%, 1/250" quartz-martite sand (1/2 of each), while the lenses contain 70% quartz, 30% martite, grain size 1/200" - 1/500". Overall iron oxide content 5-10%. Probably decomposed bedrock. Bedding 30° to core axis at 60.5'.
60'	70'	Fines 90% of cuttings on sieve. 50% angular quartz, 15% calcareous "micro-nodules" containing 10% fine grained martite, 15% kunkar, 15% limonite, 5% white sandstone, a few grains of finely crystalline pyrite. Fines: 55% quartz, 20% "micro-nodules", 10% limonite, 5% martite, 5% kunkar, 5% fine grained pyrite.

ROTARY DRILLHOLE NO. MR 17 (Contd.) -3-

From	To	Description DETAILED LOG
70'	80'	Fines 85% of cuttings on sieve. Quartz 50%, "micro-nodules" 30%, martite and quartz-martite 10%, kunkar 5%, limonite 5%. Fines: 50% quartz, 35% "micro-nodules", 15% martite, minor kunkar, limonite, decomposed mica etc.
80'	81'	Percussion open tube sample. Purple-brown, grey and light yellow-brown mottled and irregularly bedded decomposed metasediment. Consists of about 30% clay, 70% 1/100" - 1/200" diameter sand. Sand is 30-80% averaging 70% quartz, 20-70% averaging 30% martite. Bedding 45° to core axis at 80.5'.
80'	90'	Fines over 95% of cuttings on sieve. 45% angular quartz, "micro-nodules" 40%, martite 10%, limonite, kunkar, white sandstone 5%. Fines: 30% martite (slightly magnetic), 30% angular quartz, 40% "micro-nodules", minor limonite and kunkar.
90'	100'	Fines 85% of cuttings on sieve. Angular quartz 40%, "micro-nodules" 40%, martite 15%, minor limonite, kunkar etc. 5%. Fines 30% martite, 30% "micro-nodules, 40% angular quartz. Rare limonite and cherty looking material.
100'	101'	Percussion open tube sample. Purple-brown and very light greyish yellow-brown decomposed metasediment (itabirite?) similar to 80'-81'. Rock 30% clay, 70%, 1/50" sand. Clay includes several 1/8" - 1/4" cross-cutting veins of decomposed epidote. Sand 50-60% martite, 40-50% quartz. Beds about 1/4" thick, 20° to core axis 100.5'.
100'	110'	Fines 85% of cuttings on sieve. Quartz 45%, "micro-nodules" 45%, martite 5%, limonite etc. 5%. Fines 40% quartz, 40% "micro-nodules", 20% martite, minor limonite decomposed felspar etc.
110'	120'	Fines 75% of cuttings on sieve. Angular quartz 45%, "micro-nodules" 45%, martite 5%, decomposed quartz-felspar-martite composites, grain size 1/120", 5%. Fines: 50% quartz, 30% "micro-nodules" 20% martite, a few composites (as coarse fraction).
120'	121'	Percussion open tube sample. Purple-brown and very light greyish yellow-brown decomposed metasediment similar to 80'-81'. Contains 20% clay and 80%, 1/10" - 1/50" sand. (Clay includes minor decomposed epidote.) Sand is 30% martite, 70% quartz. Bedding obscure, possibly 30-35° to core axis.
120'	130'	Fines 85% of cuttings on sieve. Quartz 45%, "micro-nodules" 45%, martite 5%, rock fragments (1/50" - 1/100" grain size quartz-martite and quartz-epidote) 5%. Fines: 40% quartz, 40% "micro-nodules", 15% martite (and minor magnetite), 5% rock fragments, garnet, epidote etc.

ROTARY DRILLHOLE NO. 17 (Contd.) -4-

From	To	Description DETAILED LOG
130'	140'	Fines over 95% of cuttings on sieve. Quartz 50%, "micro-nodules" 40%, martite 5%, quartz-epidote and quartz-martite-magnetite 5%. Fines: 40% "micro-nodules", 35% angular quartz, 15% martite-magnetite, 10% rock fragments and slightly decomposed pink and white felspar.
140'	141'	Percussion open tube sample. Slightly decomposed martite-magnetite itabirite. Contains 40% martite-magnetite, 60% quartz with minor decomposed epidote, biotite and orthoclase. Grain size about 1/200". Beds 1/8" - 1/2" thick, 15° to core axis.
140'	150'	Fines 90% of cuttings on sieve. Angular quartz 50%, grey felspar 10%, "micro-nodules" 30%, martite 2%, rock fragments (quartz-biotite and quartz-epidote-martite-magnetite mainly) 8%. Fines: 60% quartz, 20% "micro-nodules", 10% martite-magnetite, 10% rock fragments as coarse fraction.
150'	160'	Fines 90% of cuttings on sieve. Quartz 60%, grey to pink felspar 20%, rock fragments (mainly metasediment containing variable quartz, epidote, biotite, magnetite-martite, and quartz-orthoclase fragments. Minor tremolite, "micro-nodules" etc. Fines similar to 140' - 150'.
160'	161'	Percussion open tube sample. Slightly decomposed quartz-martite magnetite-felspar-epidote-biotite metasediment similar in appearance to 140'-141'. Grain size 1/100" - 1/200". Contains 30% martite-magnetite, 15% biotite, 15% epidote, 40% quartz felspar. Beds 1/8" - 1/2" thick, 15° to core axis at 160.5'.
160'	170'	Fines 90% of cuttings on sieve. Quartz 45%, "Micro-nodules" 15%, kunkar and limonite 10%, rock fragments (1/2 quartz-biotite, 1/2 magnetite-martite (30%) - quartz-biotite, minor epidote) 30%. Fines: 20% martite-magnetite, 5% biotite, 10% "micro-nodules", 65% quartz and min or felspar.
170'	180'	Fines 70% of cuttings on sieve. Kunkar 25%, angular quartz 25%, rock fragments (2/3 to 3/4 quartz-martite-magnetite with minor biotite and epidote, 1/4 to 1/3 quartz-biotite-martite, with minor orthoclase. Grain size in both cases 1/50" - 1/100") 50%, minor limonite and "micro-nodules". Fines: 25% magnetite-martite, 10% "micro-nodules", 5% biotite, 60% quartz, quartz-martite and minor orthoclase.
	MRITA	
180'	184'	Fines 60% of cuttings on sieve. Quartz (and rare orthoclase) 40%, "micro-nodules" 10%, kunkar, limonite, etc. 5%, rock fragments (martite-magnetite 20-40%, with quartz, orthoclase, biotite and epidote. Grain size 1/100" - 1/200") 45%. Fines similar to coarse fraction.

ROTARY DRILLHOLE NO. NR 17A (Contd.) -5-

From	To	Description DETAILED LOG
184'	187'	Diamond drill core. Recovery 0.6' (20%) Quartz (30%)-white felspar (probably plagioclase, 10%) - epidote (35-40%) - martite, magnetite (20-25%) metasediment. Grain size 1/150" - 1/200". Bedding well defined, less than 1/10" thick, 40^0-55^0 to core axis. Metasediment contains minor lenticular quartz-orthoclase, and at about 185', grades down into metasomatic pegmatite containing up to 3/4" crystals of quartz, orthoclase, tourmaline, epidote and martite (5-10%).
	187'	END OF HOLE

MAGNETIC LOG

AT	DEFLECTION
140.5'	90-^{0}
160.5'	90-^{0}
184'	90-^{0}
185'	90^0

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 10

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 12 Hd. Warrambee Co. Le Hunte Bore Ser.No. PB 521/62

Collar Coords 58200N, 49000E R.L. 567.2' Grid Warrambee

Vertical Depth 260.5' Plan Ref.

Date Bore Commenced 19.7.61 Completed 25.7.61 Driller T. Jarvis

Bore Logged by G.R. Heath On 20-26.7.61 Hirer D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: Martite bearing metasediments were intersected from 6' to 240' containing 25 - 30% Martite from 6 - 150' and 5 - 30% martite and 5 - 30% manganese oxides 150 - 240'.

LOG Comprises Macro and microscopic geological log.

From	To	Description SUMMARY LOG
0'	1'	Light brown sandy loam.
1'	6'	Light yellow-brown kunkar containing 20-30% 1/100" - 1/200" rounded quartz and minor limonite.
6'	150'	Decomposed quartz-felspar-martite metasediment with variable mica and minor magnetite near the base. Martite content varies from 5% to 50%, averaging about 25-30% throughout the sequence. Rock at 120' is comparable with a decomposed itabirite.
150'	240'	Decomposed metasediment similar to 6'-150', but containing 5-30% martite and 5-30% manganiferous iron oxide. Several sequences (e.g. 180'-190', 210'-230') contain 50-60% iron oxides (possibly itabirites).
240'	260.5'	Interbedded biotite-quartz-epidote, biotite-felspar-sillimanite-garnet and quartz-epidote-biotite-garnet metasediments. Contain accessory martite and pyrite. Attitude 0^0 - 60^0, usually 25^0 - 40^0 to core axis.

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 Mesh Sieve.
0'	10'	Fines 50% of cuttings on sieve. Kunkar (light yellow-brown limestone containing 20-30%, 1/100" - 1/200" well rounded quartz grains, includes 5% black, ferruginous, cherty, fragments) 60%, limonite (fine grained; contains about 10%, 1/150" rounded quartz) 30%, decomposed metasediment fragments (1/150" - 1/200" quartz-martite-limonite-clay, containing about 15% martite) 10%. Fines 65% kunkar, 10% limonite, 5% rock fragments, 10% quartz (1/2 rounded), 10% martite-magnetite.
10'	20'	Fines 40% of cuttings on sieve. Kunker 5%, concretionary limonite 5%, rock fragments (1/2 as 0'-10', 1/2 quartz-clay (decomposed felspar) containing dispersed limonite and negligible martite) 90%. Fines 75% limonite-martite, 15% rock fragments (as coarse fraction), 5% quartz, 5% kunker.
20'	21'	Percussion open tube sample. Off-white and light red-brown mottled and bedded decomposed metasediment. Consists of 30% quartz, 5-10% martite, with decomposed felspar grading to clay. Grain size 1/20" - 1/50". Beds 1/16" - 1/4" thick, 20° to core axis at 20.5'.
20'	30'	Fines 80% of cuttings on sieve. Kunker 5%, limonite 5-10%, rock fragments (similar to 0' - 10', containing about 20% iron oxides) 85-90%, a few grains of fresh looking quartz-biotite-martite (5-10%). Fines: 40% quartz (mainly angular), 30% limonite-martite, 30% rock fragments.
30'	40'	Fines 80% of cuttings on sieve. Limonite, kunkar etc. 5%, rock fragments (decomposed) as 20'-30', 95%. Fines 35% quartz, 25-30% martite and martite rich fragments, 35-40% rock fragments containing 20% or less martite.
40'	41'	Percussion open tube sample. Off-white, red-brown, purple-brown and light yellow-brown mottled and irregularly bedded decomposed metasediment. Consists of about 25-30% martite, 20% quartz with clay and limonite. Limonite impregnation virtually complete in some places. Bedding 1/16" - 1/2" thick, strongly contorted, possibly 0° - 20° to core axis.
40'	50'	Fines 90% of cuttings on sieve. Limonite, kunkar etc. 5%, rock fragments (virtually all strongly impregnated with limonite) 95%. Fines 25% limonite-martite, 25% quartz, 15% light coloured rock fragments, 35% limonite impregnated rock fragments.
50'	60'	Fines 90% of cuttings on sieve. Quartz 40%, limonite and totally limonite-impregnated rock fragments 40%, kunkar 5%, light coloured rock fragments 15%, a few martite fragments. Fines: quartz 70% (mostly iron stained), limonite and limonitic rock fragments 20%, martite 5-10%, light coloured rock fragments less than 5%.

ROTARY DRILLHOLE NO. MR 18 (Contd.) -3-

From	To	Description DETAILED LOG
60'	61'	Percussion open tube sample Brown and yellow-brown mottled and very obscurely bedded decomposed metasediment. Consists of 30% martite-limonite, 30% quartz, 40% clay (decomposed felspar and possibly mica). Grain size about 1/50". Bedding obscure, possibly 25°-30° to core axis.
60'	70'	Fines 85% of cuttings on sieve. Quartz 55%, limonite and impregnated rock fragments 40%, off-white rock fragments 5%. Fines: 65% quartz, 20% limonite, 10% martite, 5% off-white rock fragments.
70'	80'	Fines 90% of cuttings on sieve. Quartz 60%, limonite and limonitic rock fragments 30%, off-white and light multi-coloured rock fragments 5%, martite 2%, kunkar 3%. Fines: 50% quartz, 25% martite, 25% limonite and limonitic rock fragments.
80'	81'	Percussion open tube sample Yellow and red-brown mottled and faintly bedded decomposed and strongly limonite impregnated metasediment, similar to 60' - 61'. Contains 40% (?) quartz, 40% (?) limonite and minor martite, 20% clay (decomposed felspar and mica). Grain size 1/20" - 1/100". Bedding obscure, possibly 45° to core axis.
80'	90'	Fines 90-95% of cuttings on sieve. Quartz 40%, kunkar 10%, limonite and limonitic rock fragments 50%, a few off-white rock fragments. Fines: 40-50% quartz, 25-30% martite, 25-30% limonite and limonitic rock fragments.
90'	100'	Fines 90-95% of cuttings on sieve. Quartz (about 1/4m of grains containing minor martite) 60%, limonite and limonitic rock fragments (usually containing about 30% martite) 40%. Fines 40% quartz, 25% martite, 25% limonite and limonitic stained and impregnated rock fragments.
100'	101'	Percussion open tube sample. Light multicoloured bedded decomposed metasediment, some beds fairly strongly limonite impregnated. Contains 60% quartz, 10% martite, 30% clay. Grain size 1/150" - 1/200". Beds mainly 1/16" - 1/8" thick. Bedding contorted, 35° or 65° to core axis.
101'	119'	No cuttings returned, water-mud-bran mixture lost at rate of over 100 galls. per ft. drilled.
119'	120'	Percussion open tube sample. Yellow-brown and purple-brown bedded and somewhat mottled decomposed metasediment (possibly itabirite). Contains 50% martite, 40% quartz, 10% decomposed mica (and minor felspar). Grain size about 1/100". Bedding 1/16" - 1½" thick, 25° - 30° to core axis at 119.5'.
119'	124'	Negligible cuttings retained on sieve. Fines 60% quartz, 40% martite with minor limonite.
124'	130'	No cuttings returned (as 101' - 119').

ROTARY DRILLHOLE NO. NR 18 (Contd.) -4-

From	To	Description DETAILED LOG
130'	133'	Percussion open tube samples Yellow-brown, purple-brown and lesser off-white decomposed metasediment (similar to, but contains less iron than 119' - 120'). Contains 10 - 20% martite (individual beds contain 5-80%), 50-60% quartz, 30% clay (decomposed felspar and lesser mica). Beds 1/16" - 3/4" thick, usually 1/8" - 1/4". Attitude 25° to core axis at 130.5' " 30° " " " " 131.5' " 15-25° " " " " 132.5'
130'	140'	No cuttings returned.
140'	141'	Percussion open tube sample Off-white, yellow-brown (and rarely purple-brown) decomposed metasediment (similar to 130' - 133') Consists of 2-5% dispersed martite, 60% quartz, 35-38% decomposed felspar and mica. Grain size about 1/100". Beds 1/32" - 1", usually 1/10" thick. Attitude 20° to core axis at 140.5'.
140'	147'	No cuttings returned.
147'	148'	Percussion open tube sample Yellow-brown and dark brown to black decomposed metasediment. Contains 5-10% magnetite-martite (up to 100% of some irregular beds), 60% quartz, 30-35% decomposed felspar (orthoclase ?) and minor mica. Grain size 1/100" mainly, but 1/20" in one metasomatic (?) quartz-decomposed orthoclase (?) irregular 1/4" - 1/2" bed. Beds mainly 1/16" - 1/4" thick, attitude 25° to core axis at 147.5'.
147'	260.5'	No cuttings returned.
160'	161'	Percussion open tube sample Off-white, yellow-brown and black mottled and thinly bedded decomposed metasediment. Contains 20-25% iron oxides (martite and manganiferous material), 30% quartz, 40-45% decomposed felspar and lesser mica. Grain size mainly about 1/50". Bedding mainly about 1/8" thick. Attitude 30-35° to core axis at 160.5'.
169'	170'	Percussion open tube sample Decomposed metasediment containing 25% martite and manganiferous material (as 160' - 161'). Attitude 30-35° to core axis at 169.5'.
184'	185'	Percussion open tube sample Decomposed metasediment, similar to 160' - 161', but containing 50% iron oxides (30% manganiferous, 20% martite). Attitude 20° to core axis at 184.5'.
200'	201'	Percussion open tube sample. Yellow-brown and lesser off-white and black mottled and irregularly bedded decomposed metasediment similar to 147'-148'. Contains 5-10% iron oxides (mainly manganiferous), 40% quartz, 50-55% decomposed felspar and minor mica. Grain size about 1/50". Bedding irregular and obscure, about 30° to core axis at 200.5'.

ROTARY DRILLHOLE NO. MR 18 (Contd.) -5-

From	To	Description DETAILED LOG
214'	215'	Percussion open tube sample Yellow-brown and black decomposed metasediment (decomposed itabirite?) similar to 119'-120'. Contains 50-60% iron oxides (mainly manganiferous), 30% quartz, 10-20% slightly decomposed felspar and lesser mica. Grain size 1/50" - 1/100". Beds somewhat contorted 1/32" - 1/4" thick, 40° to core axis at 214.5'.
226'	227'	Percussion open tube sample Decomposed itabirite (?) similar to 119' - 120'. Contains 50% iron oxides (2/3 martite 1/3 manganiferous), 35% quartz, 15% decomposed felspar and biotite. A little decomposed orthoclase (metasomatic ?). Bedding obscure, possibly 0° or 30° to core axis at 226.5'.
237'	238'	Percussion open tube sample Decomposed quartz (55%) - felspar (15%) - biotite (15-20%) -martite (10-15%)metasediment (grain size 1/200"), with patches and irregular beds of 1/20" quartz-decomposed orthoclase. Bedding somewhat irregular, about 40° to core axis.
247'	248'	Percussion open tube sample Somewhat decomposed epidote (80%) quartz (20%) rock, with minor dispersed biotite and a few felspar crystals. Grain size about 1/20". Bedding very obscure, possibly sub-parallel to core axis.
258'	260.5'	Diamond drill core. Recovery 2.3' (90%). Somewhat decomposed quartz-felspar-epidote-biotite-garnet metasediment, with minor sillimanite, and accessory pyrite and martite. Three principal rock types irregularly interbedded. (1) Coarse grained (1/10" - 1/4") quartz (40%) - epidote (30%) - biotite (20%) - garnet (10%) rock, all constituents well crystalline. (2) Finer grained (1/50") biotite (40%) - epidote (40%) - quartz, felspar (20%) rock with accessory pyrite and martite. Biotite shows preferred orientation. (3) Biotite (40%) - felspar, sillimanite (30%) -, epidote (20%) - garnet (10%) rock. Biotite, sillimanite and felspar, show very pronounced preferred orientation, (crystals 1/20" long, 1/100" - 1/200" wide) while the garnet occurs as rhombic dodecahedral porphyroblasts up to 1/4" diameter. Attitude: sub-parallel, to 50° to core axis.
260.5'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 19

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 10 Hd. Warramboo	Co. Le Hunte	Bore Ser.No. 521/62
Collar Coords 61300N, 45000E	R.L. 509.8'	Grid Warramboo
Vertical	Depth 245'	Plan Ref.
Date Bore Commenced 26.7.61	Completed 28.7.61	Driller H. Mischlewitz
Bore Logged by G.R. Heath	On 26-28.7.61	Hirer D. of M.

OBJECT: To test magnetic "high" associated with gravity anomaly

RESULT: Metasediment containing 15-20% magnetite-martite was intersected from 200'-245'.

LOG Comprises Macro and Microscopic geological logs.
Magnetic Log.

From	To	Description SUMMARY LOG
0	1'	Brown sandy loam.
1'	6'	Off-white to light yellow-brown nodular and sheet kunker, containing 1/200" rounded quartz and minor limonite.
6'	40'	Grey and red mottled and banded sandy (40%) clay. Contains rounded, 1/200", quartz grains. Some impregnation with limonite and silica (e.g. 36' - 39'). Overburden.
40'	75'	Overburden (?). White and lightly stained clay containing 10% fairly angular quartz and 1% martite. Irregular, minor silicification has occurred.
75'	95'	Decomposed metasediment (?). Dark grey and brown mottled and irregularly bedded (?) clay containing 30% sub-angular quartz and 5% pyrite.
95'	200'	Decomposed metasediment. Grey and brown mottled and bedded clay near the top to slightly decomposed rock at the base. Top similar to 75' - 95', but whole sequence contains very finely crystalline pyrite fragments with 5-30%, 1/100" - 1/200" & garnet crystals. The fresher samples contain 60% quartz-felspar, 20% garnet, 20% biotite. & included.
200'	245'	Somewhat decomposed quartz-felspar (50-55%) - epidote (15%) - magnetite-martite (15-20%) - garnet (10%) - biotite (5%) metasediment. Grain size mainly about 1/100". Attitude generally obscure, 65° to core axis at the base.

MAGNETIC LOG

Deflection 90-° at 240'-245'.

ROTARY DRILLHOLE NO. MR 19 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0'	10'	Fines 65% of cuttings on sieve. (0'-1' sandy loam). Off-white to light yellow-brown kunkar, containing about 1/5 rounded, 1/200" quartz grains 99%, limonite nodules 1% (less than 1/10" diameter). Fines: 30% quartz (2/3 well rounded), 10% martite (remanie?), 5% limonite, 55% kunkar.
10'	20'	Fines 99% of cuttings on sieve. Kunkar 70%, rounded quartz 30%. Fines: 65% wellrounded quartz, 10% kunkar, 5% martite-limonite (4/5 martite).
20'	21'	Percussion open tube sample Light grey and brick-red mottled and irregularly bedded clay, containing irregular patches of 90%, rounded 1/200" - 1/250" quartz grains. Average sand content of core is about 40%. Colour banding is sub-horizontal, while bands of varying clay content are sub-vertical.
20'	30'	Fines 60% of cuttings on sieve. Kunkar (calcareous quartz sandstone) 20%, white siliceous clayey quartz sandstone (1/200" rounded grains) 30%, brown and yellow-brown limonitic sandstone 50% (1/200" rounded grains). Fines: 30% kunkar, 30% clayey quartz sandstone, 40% limonitic quartz sandstone.
36'	39'	Hard band - changed to roller bit.
30'	40'	Fines 40% of cuttings on sieve. Kunkar 5%, clayey quartz sandstone 20%, limonitic quartz sandstone 10%, silicified decomposed rock fragments (?) (quartz and decomposed felspar ?), red and off-white, 65%. Fines similar to coarse fraction.
40'	50'	Fines 60% of cuttings on sieve. Kunkar 30%, limonitic quartz sandstone 10%, quartz (sub-angular) 10% white clay containing sub-angular quartz 40%, silicified fragments (as 30'-40') 10%. Fines: 60% mainly angular quartz, 10% kunkar, 10% limonitic sandstone, 10% clay with quartz, 10% siliceous clayey material.
50'	51'	Percussion open tube sample White, very lightly stained clay containing about 10%, 1/50" angular quartz grains and 1%, 1/200" scattered martite grains. Very indistinct bedding, due to variations in quartz content, at 20° to core axis.
50'	60'	Fines more than 95% of cuttings on sieve. Angular quartz 70%, kunkar 15%, limonitic quartz sandstone 10%, siliceous and clayey quartz sandstone 5%. Fines similar to coarse fraction, but contain 60% quartz.
60'	61'	Percussion open tube sample. White to off-white clay (as 50' - 51'). Faint banding at 40° to core axis at 60.5°.

ROTARY DRILLHOLE NO. WR 19 (Contd.) -3-

From	To	Description DETAILED LOG
60'	70'	Fines 95% of cuttings on sieve. Angular quartz 70%, kunkar 10%, limonitic sandstone 15%, clayey and siliceous sandstone 5%. Fines similar to coarse fraction.
70'	80'	Fines 90-95% of cuttings on sieve. Angular quartz 85%, kunkar 10%, limonitic sandstone etc. 5%, one or two grains of extremely finely crystalline pyrite (less than 1/1000"). Fines similar to coarse fraction.
80'	81'	Percussion open tube sample Dark grey and brown mottled and irregularly banded clay containing about 30% dispersed 1/50" quartz (sub-angular) and perhaps 5% dispersed very fine grained pyrite. Irregular banding is sub-parallel to core axis.
80'	90'	Fines 90-95% of cuttings on sieve 60% angular quartz, 10% limonitic sandstone, 10% clayey sandstone, 10% siliceous fragments, 10% kunkar etc. (1 or 2% pyrite). Fines similar, but contain a few flakes of biotite, and white decomposed felspar (?).
90'	100'	Fines 90-95% of cuttings on sieve. Angular quartz 85%, pyrite (very finely crystalline containing 1/100" - 1/200" angular quartz) 10%, kunkar etc. 5%. A few grains of decomposed felspar (?). Fines: 90% quartz, 5% pyrite, 5% kunkar etc. Minor felspar (?) and 1 grain of garnet(?).
100'	101'	Percussion open tube sample Dark grey and brown mottled clay (similar to 80'-81') contains 40-50% sand (1/100") including perhaps 5% somewhat rounded garnet, and dispersed pyrite. Any banding present is sub-parallel to core axis.
100'	110'	Fines 95% of cuttings on sieve. Quartz (including 10% "quartzite" - 1/200" crystalline fragments) 75%, pyrite (containing up to 30% 1/100" quartz and rare grains of 1/100" - 1/200" garnet) 25%, kunkar etc. 5%. Fines: 80% quartz, 15% pyrite, 2-5% garnet, 2-5% decomposed felspar (?).
110'	120'	Fines 90-95% of cuttings on sieve. Angular quartz (about 1/5 of fragments carrying 5-10%, 1/100" - 1/200" garnet crystals, and a few "quartzite" fragments - 1/200" grain size) 70%, very fine grained pyrite carrying minor quartz, and up to 30% garnet (as in quartz) 25%, limonitic sandstone etc. 5%. Fines: 85% quartz, 10% garnet, 5% pyrite, a few decomposed felspar (?) grains. Some garnet grains somewhat rounded.
120'	121'	Percussion open tube sample Dark grey and brown mottled and irregularly banded very sandy (60%) clay, similar to 80'-81' (probably decomposed bedrock). Contains, 20% 1/100" - 1/200" somewhat rounded garnet, 40% mainly angular quartz (1/20" - 1/200") and dispersed pyrite (possibly 5%). Banding (bedding ?) 5° to core axis at 120.5'.
120'	130'	Fines more than 95% of cuttings on sieve. Quartz 80%, grey felspar 10%, pyrite 10% (all contain about 10%, 1/100" - 1/200" garnet). Fines: 25% garnet, 5% pyrite, 5% felspar, 65% quartz.

ROTARY DRILLHOLE NO. MR 19 (Contd.) -4-

From	To	Description DETAILED LOG
130'	140'	Fines 99% of cuttings on sieve. Fragments of quartz, garnetiferous pyrite and kunkar. Fines: 20% garnet, 15% grey and white felspar, 5% pyrite, 60% quartz.
140'	141'	Percussion open tube sample Grey, grey-brown and reddish decomposed metasediment (similar to 120'-121'). Contains 20% clay, 5-10% pyrite, 30% garnet (up to 80% in patches), 40-45% quartz (and possibly felspar). Grain size mainly 1/40" - 1/100". Bedding indistinct and irregular, possibly 10-25° to core axis.
140'	150'	Fines 99% of cuttings on sieve. Quartz 40%, pyrite 40%, kunkar 10%, felspar 10%. Fines: 25% garnet, 5% pyrite, 20% grey and white felspar, 50% quartz.
150'	160'	Fines more than 95% of cuttings on sieve. Quartz 45%, garnetiferous pyrite 45%, grey felspar 10%. Fines: 25% garnet, 5% pyrite, 10% grey and white felspar, 60% quartz, a few biotite flakes.
160'	161'	Percussion open tube sample. Grey mottled decomposed metasediment, containing less clay (less than 5%) than the overlying material. Consists of 70% quartz-felspar, 15% garnet, 15% somewhat decomposed biotite, with minor dispersed pyrite. Grain size 1/50" - 1/150". Bedding indistinct, possibly 40° to core axis.
160'	170'	Fines more than 95% of cuttings on sieve. Quartz 70%, garnetiferous pyrite 20%, grey felspar and some pyrite impregnated quartz 10%. Fines: 30% garnet, 15% grey felspar and quartz containing very fine pyrite inclusions, 5% pyrite, 50% quartz.
170'	180'	Fines more than 95% of cuttings on sieve. Quartz (many fragments containing up to 40%, 1/150" garnet) 50%, garnetiferous pyrite 25%, grey felspar and pyritic quartz 25%, one or two biotite flakes. Fines: 30% garnet, 10% grey felspar, 5% biotite, 5% pyrite, 50% quartz.
180'	181'	Percussion open tube sample Decomposed quartz, felspar 60% - garnet 20% - biotite 20% metasediment similar to, but less decomposed than 160'-161'. Grain size 1/150" for most of the garnet, up to 1/10" for some quartz fragments. Bedding obscure, possibly 25° core axis.
180'	190'	Fines 95% of cuttings on sieve. Quartz 40%, garnetiferous pyrite 20%, quartz-felspar (grey) - garnet composites (with rare biotite) 40%. Fines: 20% garnet, 10% biotite, 5% pyrite, 15% felspar, 50% quartz.
190'	200'	Fines 85% of cuttings on sieve. Quartz (containing up to 20% garnet) 50%, quartz-felspar-biotite-garnet fairly fresh rock fragments (grain size 1/50" - 1/150") 50%. Fines: 20% garnet, 10% biotite, 25% grey felspar, 45% quartz, accessory magnetite. Some garnet grains are attracted by an alnico magnet.

ROTARY DRILLHOLE NO. NR 19 (Contd.) -5-

From	To	Description DETAILED LOG
At	200'	No percussion sample, changed to roller bit.
200'	210'	Fines 85% of cuttings on sieve. Quartz and quartz garnet 60%, fresh rock fragments (quartz, felspar (60-65%) - garnet (15-20%) - biotite (10%) - magnetite (10%), grain size about 1/100") 40%, minor epidote and pyrite. Fines: 70% quartz-felspar, 15% garnet, 10% biotite, 5% magnetite.
210'	220'	Fines 85% of cuttings on sieve. Quartz and rock fragments, similar to 200'-210', but containing about 5% epidote. Fines: 75% quartz-felspar, 10% garnet, 10% biotite, 5% magnetite, minor epidote.
220'	230'	Fines 90% of cuttings on sieve. Quartz and rock fragments generally similar to 200'-210', but garnet and biotite more abundant, and some fragments contain up to 30% magnetite. Fines: 20% garnet, 10-15% magnetite, 10% biotite, 55-60% quartz-felspar.
230'	240'	Fines 80% of cuttings on sieve. Quartz and quartz-garnet 30%, rock fragments (similar to 200'-210', but containing 30% epidote) 70%. Fines: 60% quartz, 10% garnet, 10% epidote, 10% biotite, 10% magnetite.
240'	245'	Diamond drill core. Recovery 2.0' (40%). Somewhat decomposed quartz, felspar (50-55%) - magnetite, martite (15-20%) - garnet (10%) - biotite (5%) - epidote (15%) metasediment. Grain size 1/10" (in some purer quartz beds) to 1/150" (garnet and magnetite). Bedding well defined, mainly about 1/8" thick. Attitude variable (bedding somewhat contorted), but usually about 65° to core axis.
	245'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. NR 20

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 10 Hd. Warramboo — Co. Le Hunte — Bore Ser. No. 521/62

Collar Coords 63200N, 45000E — R.L. 550.2' — Grid Warramboo

Vertical — Depth 198' — Plan Ref.

Date Bore Commenced 29.7.61 — Completed 1.8.61 — Driller T. Jarvis

Bore Logged by G.R. Heath — On 30.7.61-1.8.61 — Hirer D. of M.

OBJECT: To test magnetic "highs" on gravity anomaly.

RESULT: Itabirite (30-60% martite) overlain and underlain by metasediments containing less than 10% iron oxides was intersected from 130'-175'.

LOG Comprises Macro and Microscopic geological logs.

From	To	Description SUMMARY LOG
0	6'	Light yellow-brown fine quartz sand.
6'	10'	Light yellow-brown nodular and sheet kunkar containing 30% 1/100" - 1/200" rounded quartz.
10'	30'	Overburden. Yellow-brown clay containing 60%, 1/200" rounded quartz, and scattered (5-10%), 1/4" diameter limonite nodules.
30'	130'	Decomposed red-brown, yellow-brown and grey quartz-felspar-mica-martite metasediment. Contains 5-10% iron oxides (95% martite, 5% magnetite). Grain size 1/150" - 1/250". Impregnating and nodular limonite occur throughout, and minor secondary silicification has occurred.
130'	175'	Decomposed itabirite containing 30-60% martite, 30-60% quartz, and 10% decomposed biotite or felspar. Grain size 1/100" - 1/200". Bedding well defined, 1/10" - 1/20" thick.
175'	198'	Quartz - felspar-biotite-epidote metasediment containing 1-2% martite - magnetite (and haematite), and rare serpentine and garnet. Grain size 1/100" - 1/250". Bedding lenticular, less than 1/2" thick.

Attitude increases from 30° to core axis at 100', to 50-60° at 195'.

MAGNETIC LOG

Deflection 5-10° (over small areas) at 193'-198'.

ROTARY DRILLHOLE NO. WR 20 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0'	10'	Fines 90% of cuttings on sieve. Light yellow-brown kunkar containing 30%, 1/100" - 1/200" rounded quartz 98%, sub-rounded quartz 1%, limonite (less than 1/8" nodules) 1%. Fines: garnet etc. residue from WR 19.
10'	20'	Fines 95% of cuttings on sieve. Kunkar 95%, limonite 5% (as 0'-10'). Fines: 70% rounded quartz, 15% kunkar, 15% residue from WR 19 (garnet and magnetite).
20'	21'	Percussion open tube sample. Yellow-brown very sandy (80%) clay, containing 80%, 1/200" rounded quartz and 5-10% scattered, less than 1/4" diameter limonite nodules. No visible structure.
20'	30'	Fines 80% of cuttings on sieve. Red-brown and yellow-brown limonite containing 1/100" angular quartz and scattered martite grains 90%, kunkar 10%. Fines: 60% limonite, 20% rounded quartz, 20% kunkar.
30'	40'	Fines 40% of cuttings on sieve. Rock fragments (red-brown and white, 1/100" - 1/200" quartz-decomposed felspar-decomposed mica) 70%, limonite (as 20'-30') 20%, kunkar 10%. Fines similar to coarse fraction.
40'	41'	Percussion open tube sample Red-brown with lesser off-white and yellow-brown, mottled and obscurely bedded decomposed metasediment. Contains 5% martite, 30%, 1/150" quartz, 65% decomposed felspar and lesser mica. Bedding obscure, but possibly 20° to core axis.
40'	50'	Fines 40% of cuttings on sieve. Limonite 15%, decomposed rock fragments (composition as 40'-41') 85%. One or two grains of fresh quartz (70%) - garnet (10%) - biotite (15%) - magnetite (5%) rock. Grain size 1/100" - 1/200". Fines similar to coarse fraction, but contain about 10% angular quartz.
50'	60'	Fines 80% of cuttings on sieve. Limonite and rock fragments as 40'-50'. Fines similar, but contain about 20% angular quartz, and a few magnetite grains.
60'	61'	Percussion open tube sample Red-brown decomposed quartz (40%) - mica (30%) - martite (5-10%) - felspar (20-25%) metasediment, grain size about 1/150". Contains scattered small limonite nodules. Bedding not well defined, but possibly 45° to core axis.
60'	70'	Fines 95% of cuttings on sieve. Limonite and completely limonite impregnated rock fragments 60%, quartz 10%, rock fragments (as 60'-61', generally somewhat limonite impregnated) 30%. Fines: 80% rock fragments, 10% angular quartz, 30% limonite, 10% kunkar, 30% martite-magnetite (1/10 magnetite).
70'	80'	Fines 95% of cuttings on sieve. Limonite, quartz and rock fragments as 60'-70'. Fines 30% rock fragments, 10% quartz, 50% limonite and limonite-martite, 10% martite-magnetite.
80'	81'	Too hard for percussion sample.

From	To	Description DETAILED LOG
80'	90'	Fines 30% of cuttings on sieve. Rock fragments 5%, kunkar 5%, limonite, with minor limonite-martite and rare magnetite 90%. Fines: 30% quartz, 10% kunkar, 20% decomposed rock fragments (1/200" quartz, martite (10%), decomposed felspar), 20% limonite, 20% martite and rare magnetite.
90'	100'	Fines 85% of cuttings on sieve. Angular quartz 30%, rock fragments 25%, kunkar 5%, limonite with minor martite and rare magnetite 40%. Fines: 20% martite with minor magnetite, 40% angular quartz, 20% rock fragments, 20% limonite.
100'	101'	Percussion open tube sample Yellow-brown, grey and red-brown bedded decomposed metasediment. Consists of 75% clay (somewhat flaky), 15% angular quartz, 10% martite (segregated in 1/10" beds). Grain size about 1/250". Bedding well defined, 1/16" - 2" thick, 30° to core axis.
100'	110'	Fines 90-95% of cuttings on sieve. Quartz 20%, kunkar 5%, rock fragments 10%, limonite with minor martite 65%. Fines: 30% martite and minor magnetite, 30% angular quartz, 5% kunkar, 15% rock fragments, 20% limonite.
110'	120'	Fines more than 95% of cuttings on sieve. Quartz 60%, martite and minor magnetite 20%, limonite 20%. Fines: 50% quartz, 40% martite with minor magnetite and specular haematite, 10% limonite etc.
120'	121'	Percussion open tube sample Light brown laminated and somewhat mottled decomposed metasediment. Consists of 10% martite, 30% quartz, 60% clay (about 1/2 still recognisable as decomposed mica and felspar). Grain size about 1/200". Bedding fairly well defined, usually about 1/10" thick, 20° - 25° to core axis.
120'	130'	Fines over 95% of cuttings on sieve. Quartz 40%, martite and minor magnetite 15%, limonite 45%. Fines: 45% martite and minor magnetite, 45% quartz, 10% limonite etc.
130'	140'	Fines over 95% of cuttings on sieve. Somewhat decomposed and silicified quartz - haematite - martite (5-20%) - felspar fragments (1/50" grain size 30%, quartz 45%, limonite etc. 25%. Fines: 65% quartz, 10% rock fragments (as coarse fraction), 25% martite with minor limonite, magnetite and haematite.
140'	141'	Percussion open tube sample. Decomposed itabirite containing 60% martite, 30% quartz, 10% clay (decomposed felspar). Grain size 1/100" - 1/200". Bedding fairly well defined, mainly about 1/10" - 1/20" thick, 25° to core axis.
140'	150'	Fines over 95% of cuttings on sieve. Quartz 60%, rock fragments as 130'-140' 25%, limonite and minor martite 15%. Fines: 20% martite and minor limonite and magnetite, 20% rock fragments, 60% quartz. Rare grains of garnet and decomposed felspar.

LOG OF ROTARY DRILLHOLE MR 20 (Contd.) -4-

From	To	Description DETAILED LOG
150'	160'	Fines 99% of cuttings on sieve. Quartz (minor included martite) 90%, limonite 10%, one or two grains of martite. Fines: 80% quartz, 15% martite, 5% limonite, a few rock fragments and decomposed felspar grains.
160'	161'	Percussion open tube sample Decomposed itabirite, similar to 140' - 141', but containing 30-35% martite, 10% biotite and 55-60% quartz. Grain size mainly 1/100" - 1/200". Bedding well defined, mainly about 1/16" thick, 30° to core axis.
160'	170'	Fines more than 95% of cuttings on sieve. Quartz 80%, limonite and a few martite fragments 10%, rock fragments (mostly similar to 130'-140', but a few quartz-martite) 10%, one or two grains of epidote. Fines: 75% quartz, 25% martite and minor magnetite, a few grains of decomposed felspar etc.
170'	180'	Fines more than 95% of cuttings on sieve. Quartz (mainly with minor included biotite and martite) 90%, limonite etc. 5%, rock fragments (fairly fresh looking 1/200" quartz-biotite-martite) 5%. Fines: 75% quartz, 20% martite and minor magnetite, 5% limonite, a few grains of biotite and decomposed felspar.
180'	181'	Percussion open tube sample. Fresher than preceding samples (no clay). Somewhat decomposed quartz (25%) - felspar (45%) - biotite (30%) metasediment, containing accessory to minor (1 or 2%) martite and haematite. Grain size mainly less than 1/200", but some biotite and quartz crystals up to 1/50" diameter. Bedding sub-parallel to core axis, but very indistinct.
180'	190'	Fines 60% of cuttings on sieve. Quartz (with minor biotite and felspar) 30%, Rock fragments (mainly fresh looking quartz-biotite-martite, with minor epidote, garnet and haematite) 65%, limonite etc. 5%. Fines similar to coarse fraction.
190'	193'	Fines 20% of cuttings on sieve. Rock fragments (4/5 quartz - biotite with minor magnetite-martite, 1/10 quartz-epidote-haematite, 1/10 quartz-garnet-magnetite-martite with minor biotite, grain size about 1/50" - 1/150" in all cases) 80%, quartz and quartz-felspar 15-20%, minor limonite etc. Fines: 10% garnet, 15% martite and minor magnetite, 20% biotite, 15% epidote, 40% quartz-felspar. Minor haematite and limonite.
193'	198'	Diamond drill core. Recovery 4.5' (90%). Quartz (20%) - white felspar (30%) - biotite (30%) - epidote (20%) metasediment, with minor irregularly dispersed martite-magnetite (possibly 1 or 2%). Grain size mainly about 1/100". Serpentine is prominent in some joint planes. Bedding is generally 1/8" - 1/2" thick and somewhat lenticular in nature. Attitude is consistently 50° - 60° to the core axis. Jointing appears to be somewhat irregular.
	198'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. WR 21

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 10 Hd. Warramboo Co. Le Hunte Bore Ser.No. 521/62

Collar Coords 61600N, 43000E R.L. 507.8' Grid Warramboo

Vertical Depth 208' Plan Ref.

Date Bore Commenced 2.8.61 Completed 3.8.61 Driller T. Jarvis

Bore Logged by G.R. Heath On 2-3.8.61 Hirer D. of M.

OBJECT: To test "highs" in gravity and magnetic anomalies.

RESULT: Metasediment containing 0-15% usually 5-10% iron oxides intersected from 70'-208'.

LOG Comprises Macro and Microscopic geological logs.

From	To	Description SUMMARY LOG
0	5'	Light yellow-brown sandy loam.
5'	15'	Light yellow-brown kunkar containing 20-30% 1/200" rounded quartz.
15'	25'	Yellow-brown slightly clayey (10%) rounded 1/200" - 1/250" quartz sand.
25'	70'	Red-brown, yellow-brown and offwhite clay containing rounded quartz and limonite grains. Siliceous and limonitic in part. Probably overburden.
70'	208'	Metasediment containing quartz, iron oxides (martite and haematite above 140', magnetite and martite below), biotite, epidote, garnet, felspar. Iron oxide content: less than 1% to 15%, usually 5-10%. Grain size mainly about 1/100". Attitude 10-45° to core axis.

LOG OF ROTARY DRILLHOLE NO. NR 21 (Contd.) -2-

From	To	Description DETAILED LOG
0	10'	N.B. Cuttings caught on 12 mesh sieve. Fines over 95% of cuttings on sieve. Light yellow-brown kunkar containing 20-30%, 1/200" rounded quartz, 95%, residue from NR 20, 5%. Fines: 70% rounded quartz, 20% kunkar, 10% biotite etc. (from NR 20).
10'	20'	Fines 90% of cuttings on sieve. Kunkar 100% (minor residue from NR 20). Fines as 0'-10'.
20'	21'	Percussion open tube sample Yellow-brown (orange), subangular to well rounded, well sorted, slightly clayey (10%) pure 1/200" - 1/250" quartz sand. No visible structure.
20'	30'	Fines 85% of cuttings on sieve. Kunkar 20%, yellow-brown and red-brown clayey, limonitic and rarely calcareous material containing 20-40%, 1/200" rounded quartz 80%, a few quartz grains. Fines: 40% rounded quartz, 40% sandy claystone (as coarse fraction), 15% kunkar, 5% residue from NR 20.
30'	40'	Fines 50% of cuttings on sieve. Claystone (as 20'-30', but 1/2 fragments off-white, not iron stained) 90%, porous limonite 5%, kunkar 5%. Fines: 20% rounded quartz, 10% kunkar, 5% residue from NR 20, 65% sandy claystone (2/3 off-white).
40'		Too hard for percussion sample.
40'	50'	Fines 80% of cuttings on sieve. Quartz (mainly rounded) 5%, kunkar 5%, sandy claystone to siliceous clayey sandstone (similar to 20'-30', but more siliceous, and only 1/10" iron stained. Fines similar to coarse fraction, but 40% mainly angular quartz.
50'	60'	Fines 95% of cuttings on sieve. Quartz (angular) 30%, limonite 30%, siliceous clayey sandstone 35%, kunkar 5%. Fines: 90% angular quartz, 10% limonite, a few sandstone fragments.
60'	61'	Percussion open tube sample. Red-brown and white mottled, and yellow-brown clay containing 30% somewhat rounded quartz (1/50") and 2-5% limonite (and some martite (?)). Banding (may be bedding) 80° - 90° to core axis.
60'	70'	Fines more than 95% of cuttings on sieve. Quartz 45%, siliceous clayey sandstone 50%, kunkar 5%, one grain of very finely crystalline pyrite. Fines: 80% quartz, 15% limonitic material, 5% finely crystalline pyrite.
70'	80'	Fines more than 95% of cuttings on sieve. Quartz (some grey) 85%, limonite 5%, sandstone 5%, kunkar 5%, one or two grains finely crystalline pyrite. Fines: 85% quartz, 5% pyrite, 5% calcareous "micro-nodules", 5% haematite-limonite.
80'	81'	Percussion open tube sample Off-white and light purplish-brown mottled and irregularly bedded decomposed metasediment. Consists of 50% clay, 45% angular quartz (1/50" - 1/8") and 2-5% martite with limonite-haematite. Bedding 35° to core axis.

LOG OF ROTARY DRILLHOLE NO. NR 21 (Contd.) -3-

From	To	Description DETAILED LOG
80'	90'	Fines 90-95% of cuttings on sieve. Quartz 85%, sandstone 5%, limonite 5%, pyrite 5%, one or two biotite flakes. Fines: 70% quartz, 15% "micro-nodules" 5% limonite-haematite, 5% pyrite, 5% sandstone.
90'	100'	Fines 90-95% of cuttings on sieve. Calcareous "micro-nodules" (usually contain 10% haematite or martite, and minor quartz and pyrite) 50%, quartz 45%, limonite and sandstone 5%. Fines: 40% quartz, 40% "micro-nodules", 10% haematite-martite, 10% pyrite.
100'	101'	Percussion open tube sample. Pale fawnish-grey and light purple-brown decomposed metasediment (similar to 80'-81') contains about 5% iron oxides and scattered "micro-nodules". Bedding obscure, possibly 15° to core axis.
100'	110'	Fines 60% of cuttings on sieve. "Micro-nodules" (haematitic) 60%, quartz 35%, limonite etc. 5%. Fines: 45% "micro-nodules", 40% quartz, 10% haematite (and martite?), 5% limonite sandstone etc., pyrite rare.
110'	120'	Fines 60% of cuttings on sieve. Haematitic "micro-nodules" 65%, quartz 35%. Fines: 60% quartz, 30% "micro-nodules", 10% haematite (and martite?).
120'	121'	Percussion open tube sample Grey-green and purple-brown, laminated decomposed quartz (20%) - epidote (30%) - biotite (20%) - felspar (15%) - martite haematite (15%) metasediment. Grain size about 1/100". Bedding well defined 1/32" - 1/8", usually 1/16" thick, 10° to core axis.
120'	130'	Fines 80% of cuttings on sieve. Angular quartz 30%, haematite "micro-nodules" 65%, limonite etc. 5%. Fines: 50% angular quartz, 50% "micro-nodules", minor biotite and epidote.
130'	140'	Fines 80% of cuttings on sieve. Quartz 30%, "micro-nodules" 55%, limonite etc. 5%, quartz-felspar 5%, rock fragments (1/100" quartz-garnet-biotite) 5%, minor pyrite. Fines: 30% "micro-nodules", 40% quartz and quartz-felspar, 10% garnet, 10% biotite, 5% epidote, 5% magnetite.
140'	141'	Percussion open tube sample Somewhat decomposed grey-green metasediment. Contains 25% epidote, 15% biotite, 15% garnet, 45% quartz and minor felspar, iron oxides are accessory. Grain size about 1/75". Bedding not well defined, possibly 40° - 45° to core axis.
140'	150'	Fines 90-95% of cuttings on sieve. Quartz and quartz-felspar 45%, "micro-nodules" 25%, limonite etc. 10%, rock fragments (as 130'-140') 20%. Fines: 5% magnetite (some martite-haematite), 50% quartz and quartz felspar, 15% garnet, 10% biotite, 20% "micro-nodules", minor epidote.
150'	160'	Fines 80% of cuttings on sieve. Quartz-felspar 50%, "micro-nodules" 20% rock fragments (similar to 130'-140') 20%, biotite 5%, limonite etc. 5%. Fines: 40% magnetite, 20% garnet, 30% quartz-felspar (minor biotite), 10% "micro-nodules".

LOG OF ROTARY DRILLHOLE NO. MR 21 (Contd.) -4-

From	To	Description DETAILED LOG
	160'	Too hard for percussion sample.
160'	170'	Fines 95% of the negligible cuttings retained on sieve. Generally similar to 150'-160'. Fines: 45% quartz-felspar, 20% garnet, 25% magnetite, 10% biotite.
170'	180'	Fines 99% of cuttings on sieve. Similar to 150'-160'. Fines: 15% magnetite (minor martite), 15% garnet, 15% biotite, 55% quartz and minor felspar.
180'	190'	Fines 85-90% of cuttings on sieve. Quartz-felspar 50%, rock fragments (about 1/5 containing garnet and magnetite, the remainder quartz-felspar-biotite) 40%, biotite 5%, limonite etc. 5%. Fines: 25% biotite,m 10% magnetite, 10% garnet, 50% quartz-felspar, 5% limonite, "micro-modules" etc.
190'	200'	Fines 90-95% of cuttings on sieve. Quartz-felspar 50%, biotite 5%, "micro-modules" 10%, limonite etc. 5%, rock fragments (similar to 180'-190') 30%. Fines: 20% garnet, 15% biotite, 5% magnetite-martite, 60% quartz-felspar.
200'	204'	Fines 75% of cuttings on sieve. Rock fragments (virtually all quartz-felspar-biotite with accessory magnetite and garnet) 55%, quartz-felspar 35%, biotite 5%, limonite etc. 5%. Fines: 15% garnet, 20% biotite, 5% magnetite-martite, 60% quartz-felspar.
204'	208'	Diamond drill core. Recovery 0.4' (10%). Quartz-felspar (60%) - garnet (0-20%) - biotite (10-25%) - magnetite-martite (5-10%) metasediment. Grain size 1/100" - 1/200". Bedding well defined, somewhat lenticular. Attitude 10^{0} to 45^{0} to core axis.
	208'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 22

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 10 Hd. Warramboo — Co. Le Hunte — Bore Serial No. DD 522/62

Collar coords 64400N, 43000E — R.L. 526.0' — Grid Warramboo

Vertical — Depth 162' — Plan Ref.

Date Bore Commenced 4.8.61 — Completed 7.8.61 — Driller T. Jarvis & H. Mischlewitz

Bore Logged by G.R. Heath — On 4-7.8.61 — Hirer D. of M.

OBJECT: To test magnetic "peak" on gravity anomaly.

RESULT: Decomposed itabirite (?) (20-30% martite) intersected from 70' - 115'. Metasediments, generally low in iron oxides, overlie and underlie this sequence.

LOG Comprises Macro and Microscopic geological logs

From	To	Description SUMMARY LOG
0'	5'	Light brown fine grained rounded quartz sand.
5'	9'	Light yellow-brown kunker containing 20-30% 1/200" rounded quartz.
9'	12'	Nodular and impregnating limonite.
12'	50'	Decomposed quartz-felspar-epidote-martite metasediment, containing 10-25% iron oxides. Grain size about 1/150".
50'	70'	Decomposed quartz-felspar-mica ("granite") metasediment containing accessory (less than 1%) iron oxides. Grain size about 1/50". Structure obscure.
70'	115'	Decomposed quartz-felspar-martite metasediment (itabirite?). Contains 20-30% martite, 30-50% quartz. Grain size about 1/200". Bedding about 1/8" thick.
115'	162'	Decomposed, grading to fresh, quartz-felspar-biotite, with lesser garnet and magnetite-martite metasediment. Grain size 1/8" - 1/200". Average iron oxide content throughout the sequence, about 5%. Epidote is an irregularly distributed component. Attitude 25°-80° to core axis (most commonly near 80°).

ROTARY DRILLHOLE NO. MR 22 (Contd.) -2-

From	To	Description DETAILED LOG
		N.M. Cuttings caught on 12 mesh sieve.
0	10'	Fines over 95% of cuttings on sieve. Angular quartz 10%, limonite 10%, pale yellow-brown kunkar containing 20-30% 1/200" rounded quartz 80%. Fines: 10% kunkar, 5% limonite, 30% rounded quartz, 55% residue from MR 21 (garnet, biotite etc.).
10'	20'	Fines 85% of cuttings on sieve. Angular quartz 20%, kunkar 30%, limonite 40%, decomposed rock fragments (quartz-martite (10-30% averaging 20%) - clay, 1/20" - 1/50" grain size) 10%. Fines: 30% limonite, 15% martite, 15% kunkar, 10% rock fragments, 30% mainly angular quartz.
20'	21'	Percussion open tube sample. Purple, off-white and yellow-brown decomposed metasediment. Contains 20-25% martite, 50% quartz, 25-30% decomposed felspar and mica. Grain size about 1/200". Bedding well defined, 30°-35° to core axis.
20'	30'	Fines 75% of cuttings on sieve. Angular quartz 55%, rock fragments (similar to 20'-21') 45%. Fines: 15-20% limonite-martite, 50% quartz, 30-35% rock fragments.
30'	40'	Fines 75% of cuttings on sieve. Quartz 60%, limonite etc. 10%, rock fragments 30% (as 20'-21'). Fines: 70% quartz, 30% limonite-martite.
40'	41'	Percussion open tube sample. Off-white and brown decomposed metasediment. Contains 10% martite (and limonite), 10% decomposed epidote, 40% quartz and 40% decomposed felspar and mica. Grain size 1/50" - 1/150". Bedding well defined, up to 1/2" thick, 25° to core axis.
40'	50'	Fines 85% of cuttings on sieve, limonite-martite 5-10%, rock fragments 10%, quartz 80-85%. Fines: 10-15% martite-limonite, 85-90% quartz.
50'	60'	Fines 70% of cuttings on sieve. Limonite and minor martite 15%, rock fragments 15%, quartz 70%. Fines: 15% limonite-martite, 20% rock fragments, 65% quartz.
60'	61'	Percussion open tube sample. Off-white homegeneous looking decomposed metasediment. Contains 50%, 1/50" quartz, 50% clay (decomposed felspar and mica) and possibly 1% 1/500" - 1/1000" scattered iron oxides. Bedding obscure.
60'	70'	Fines 70% of cuttings on sieve. Quartz 70%, limonite and minor martite 10%, rock fragments 20%. Fines: 20% limonite-martite, 10% rock fragments, 70% quartz.
70'	80'	Fines 50% of cuttings on sieve. Quartz 80%, limonite and minor martite 10%, rock fragments 10%. Fines: 10-15% martite and minor limonite, 85-90% quartz.
80'	81'	Percussion open tube sample. Yellow-brown decomposed metasediment. Contains 20-25% martite, 30% quartz, 45-50% clay (decomposed felspar and mica). Grain size mainly 1/150" - 1/200". Bedding fairly well defined, 50-85° to core axis.

From	To	Description DETAILED LOG
80'	90'	Fines 50% of cuttings on sieve. Quartz 70%, limonite and impregnated material 20%, rock fragments 10%. Fines: 80% quartz, 10% martite-limonite, 5% decomposed felspar, 5% rock fragments.
90'	100'	Fines 40% of cuttings on sieve. Quartz 60%, limonite etc. 30%, rock fragments 10%. Fines: 30% martite and minor limonite, 10% rock fragments, 60% quartz, minor decomposed felspar.
100'	101'	Percussion open tube sample. Yellow-brown decomposed metasediment similar to 80'-81'. Contains 25-30% martite, 20% clay (decomposed felspar and mica), 50-55% quartz (almost an itabirite). Grain size mainly less than 1/200". Bedding fairly well defined, about 1/8" thick, 25°-30° to core axis.
100'	110'	Fines 90-95% of cuttings on sieve. Quartz 65%, limonite etc. 25%, rock fragments 10%. Fines: 25% martite, 5% limonite and rock fragments, 70% quartz.
110'	120'	Fines 70% of cuttings on sieve. Quartz 45%, limonite etc. 45%, rock fragments 10%. Fines: 50% quartz, 50% martite, minor rock fragments etc.
120'	121'	Percussion open tube sample. Yellow-brown flaky clay containing 10-20%, 1/250" quartz. Bedding obscure, possibly 70°-80° to core axis.
120'	130'	Negligible cuttings retained on sieve. Fines: 10% martite, 10% decomposed felspar and mica, 80% quartz (usually with minor included martite and biotite).
130'	140'	Negligible cuttings retained on sieve. Fines: 20% martite, 5% biotite, 5% decomposed felspar, 70% quartz (as 120' - 130').
At	140'	Too hard for percussion sample.
140'	150'	Fines 80% of cuttings on sieve. Quartz 60%, limonite etc. 40%, one or two fresh looking quartz-biotite-epidote fragments. Fines: 30% martite and minor magnetite, 15% white felspar, 15% garnet, 5-10% biotite, 30-35% quartz.
150'	160'	Fines 70% of cuttings on sieve. Rock fragments (mainly quartz-felspar-biotite, with lesser epidote, martite and garnet) 30%, felspar 5%, limonite etc. 15%, quartz 50%. Fines: 10% biotite, 10% garnet, 10% white felspar, 20% magnetite-martite, 50% quartz.
160'	162'	Diamond drill core. Recovery 1.0' (50%). Interbedded quartz (40%) - white felspar (50%) - biotite (10%) and quartz (50%) - magnetite, martite (20%) - garnet (20%) - biotite (10%) metasediment. Overall iron oxide content about 5%. Epidote is a rare accessory. Grain size 1/8" (quartz, felspar) to 1/200" (garnet, magnetite). Bedding somewhat irregular, fairly well defined, 1/8" to 2" thick. Attitude 70°-75° to core axis.
	162'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 23 & 23A

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 10 Hd. Warrambee Co. Le Hunte Bore Ser.No. DD 565/62

Collar Coords 53100N, 40000E R.L. 476.3' Grid Warrambee

Vertical Depth 147' Plan Ref.

Date Bore Commenced 8.8.61 Completed 12.8.61 Driller H. Mischlewitz

Bore Logged by G.H. Heath On 9-12.8.61 Hirer D. of M.

OBJECT: To test gravity and magnetic "highs".

RESULT: Metasediments containing less than 10% magnetite-martite intersected from 55' - 147'. This material may not be sufficient to explain the anomalies.

LOG Comprises Macro and Microscopic geological logs.

From	To	Description SUMMARY LOG
0	1'	Light brown sandy loam.
1'	15'	Very tough pale yellow-brown nodular and sheet kunkar containing 10-30% 1/100" - 1/200" rounded quartz.
15'	55'	Offwhite and various shades of brown interbedded 1/100" slightly rounded quartz sand and slightly to very sandy quartz clay. Bedding sub-horizontal. Limonite nodules occur near the top of the sequence.
55'	136'	Decomposed quartz-mica metasediment. Light grey sandy, slightly pyritic, bedded, flaky clay. Contains about 50% angular quartz (1/100" grain size), and 1 or 2% pyrite near the base.
136'	140'	Decomposed quartz (35-40%) - felspar (15%) - biotite (30%) - garnet (10%) - martite (5-10%) metasediment. Grain size 1/100" - 1/10".
140'	147'	"Granodiorite". Homogeneous looking quartz-plagioclase-biotite metasediment with 5% scattered garnet and accessory iron oxides. Attitude about 40° to core axis.

ROTARY DRILLHOLE NO. MR 23 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 80% of cuttings on sieve. Pale yellow-brown kunkar containing 10-30%, 1/100" - 1/200" rounded quartz, 100%. Fines: 80% kunkar, 15% rounded quartz, 5% residue from MR 22.
10'	20'	Fines more than 95% of cuttings on sieve. Kunkar 30%, limonite 20%, pale yellow-brown clay containing 80% rounded 1/100" - 1/200" quartz 20%, off-white siliceous, 1/100" - 1/200" rounded quartz sandstone 30%, a few well rounded quartz grains. Fines: 30% kunkar, 70% dominantly well rounded quartz.
20'	21'	Percussion open tube sample. Off-white and brown (limonite stained) clay containing 70%, 1/100" - 1/200" rounded quartz. Limonite nodules (up to 1" diameter) occur throughout the clay.
20'	30'	Fines 80% of cuttings on sieve. Sub-angular to rounded quartz 20%, white siliceous sandstone 30%, kunkar10%, limonite and limonitic quartz sandstone 40%. Fines: 70% quartz (1/2 angular) 10% limonite, 10% kunkar, 10% siliceous sandstone.
30'	40'	Fines 75% of cuttings on sieve. Quartz (1/2 angular) 30%, limonite 30%, siliceous sandstone (2/3 off-white, 1/3 yellow-brown) 30%, kunker 10%. Fines: 20% residues (garnet, magnetite etc.), 50% angular quartz, 15% sandstone and kunkar, 15% limonite.
40'	41'	Percussion open tube sample. Pale yellow-brown interbedded slightly rounded 1/100" quartz sand, and sandy clay containing 10% quartz as above, and 70% 1/500" quartz. Bedding sub-normal to core axis.
40'	50'	Fines 80 - 85% of cuttings on sieve. Quartz (75% angular) 70%, limonite etc. 15%, siliceous sandstone 15%. Fines: 90% quartz (mainly angular), 5% limonite, 5% sandstone and kunkar.
50'	60'	Fines 90-95% of cuttings on sieve. Quartz (9/10 angular) 70%, limonite etc. 10%, siliceous sandstone 10%, kunkar 10%. Fines: More than 95% angular quartz, minor limonite sandstone etc., a few martite grains, and one or two fragments of very finely crystalline (1/100") pyrite.
60'	61'	Percussion open tube sample. Light grey sandy flaky clay (decomposed quartz-mica metasediment). Contains 50% angular quartz, and rare pyrite. Grain size 1/100". Bedding obscure possibly 65° to core axis. This material closely resembles MR 19.

ROTARY DRILLHOLE NO. NR 23 (Contd.) -3-

From	To	Description DETAILED LOG
60'	70'	Fines 90-95% of cuttings on sieve. Limonite 5%, kunkar 10%, siliceous sandstone 5%, pyrite 5%, angular quartz 75%. Fines: 5% pyrite, 5% limonite, 5% kunkar, 85% angular quartz.
70'	80'	Fines 90-95% of cuttings on sieve. Quartz 90%, pyrite 5%, kunkar etc. 5%. Fines: 99% quartz, 1% pyrite.
80'	81'	Percussion open tube sample Light grey decomposed metasediment as 60' - 61'.
80'	90'	Negligible cuttings retained on sieve. Fines: More than 95% quartz, 1 or 2% pyrite, 1 or 2% kunkar etc.
90'	100'	Negligible cuttings retained on sieve. Fines: More than 95% quartz, 1 or 2% pyrite, 1 or 2% somewhat decomposed mica.
100'	101'	Percussion open tube sample Light grey pyritic decomposed metasediment as 60'-61'.
100'	120'	No water return.
120'	121'	Percussion open tube sample Light grey-brown decomposed metasediment, similar to 60' - 61', but more pyritic and containing 1 or 2% martite. Bedding (?) sub-parallel to core axis.
120'	130'	No water return.
130'	138'	Negligible fines retained on sieve. Fines: 50% quartz and minor felspar, 25% martite, 10% garnet, 10% pyrite, 5% biotite. Became harder at 136'.
138'	139'	Percussion open tube sample. Decomposed quartz (35-40%) felspar (15%) - martite (5-10%) - biotite (30%) - garnet 10% metasediment. Grain size 1/100" (martite, garnet) to 1/10" (quartz). Bedding obscure, possibly 40° to core axis.
138'	142'	Negligible cuttings retained on sieve. Fines: Quartz 45%, garnet 10%, biotite 20%, pyrite 5%, felspar 20%, minor martite.
142'	147'	Diamond drill core. Recovery 2.8' (56%). Quartz (35%) - white felspar (plagioclase - 50%) - biotite (10%) - garnet (5%) metasediment ("granodiorite"). Grain size 1/50" - 1/10". Bedding 1/8" - 1/4" thick. Iron oxides (accessory magnetite - martite) very rare. Pyrite occurs on some joint faces. Attitude 35° - 40° to core axis.
	147'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 24

Project: Warramboo Aeromagnetic Anomaly		D.M. 664/61
Sec. 29 Hd. Warramboo	Co. Le Hunte	Bore Ser. No. BD 529/62
Collar Coords 57900N, 69000E	R.L.	Grid Warramboo
Vertical	Depth 179'	Plan Ref.
Date Bore Commenced 14.8.61	Completed 14.8.61	Driller T. Jarvis
Bore Logged by G.R. Heath	On 14.8.61	Hirer D. of M.

OBJECT: To test "high" in magnetic anomaly

RESULT: Metasediment (Itabirite ?) containing about 25% magnetite - martite was intersected from 25' - 179'.

LOG Comprises Macro and Microscopic geological logs
Magnetic Log
Summary Log

From	To	Description SUMMARY LOG
0'	10'	Light brown, well rounded, 1/50" quartz (80%) - gypsum (20%) sand.
10'	20'	Light yellow-brown nodular and friable kunkar.
20'	25'	Multicoloured mottled clay containing abundant limonite nodules. Overburden.
25'	179'	Somewhat granitised quartz-martite-magnetite-felspar-biotite, metasediment with minor epidote (approaching an itabirite). Martite (and magnetite below 140') content 10-30% usually about 25%. Grain size mainly about 1/100". Attitude 20° - 65° to core axis, higher values more common.

MAGNETIC LOG

Deflection 90-° from 174' - 179'.

ROTARY DRILLHOLE NO. NR 24 (Contd.) -2-

N.B. Cuttings caught on 12 mesh Sieve.

From	To	Description DETAILED LOG
0	10'	Negligible cuttings retained on sieve. Well rounded, 1/50" quartz sand 80%, 1/50" gypsum fragments 20%, one or two limonite grains.
10'	20'	Fines more than 95% of cuttings on sieve. Rounded quartz 10%, limonite and limonitic sandstone 50%, pale yellow-brown kunker (containing 30-60% 1/100" rounded quartz) 40%. Hard drilling from 18 feet. Fines: 60% rounded quartz, 30% gypsum, 10% limonite, minor kunker.
20'	21'	Percussion open tube sample. Light grey, yellow-brown and red-brown clay containing abundant limonite nodules up to 2" diameter.
21'	30'	Fines 80% of cuttings on sieve. Kunker 5%, quartz (mainly angular) 15%, limonite etc. 80%. Fines: 60% angular quartz, 20% limonite and limonite impregnated rock fragments, 20% martite.
30'	40'	Fines 90-95% of cuttings on sieve. Limonite etc. 90%, angular quartz 10%. Fines: 70% limonite, 30% quartz, a few grains of martite and decomposed felspar.
40'	41' 1	Percussion open tube sample. Yellow-brown decomposed quartz (30%) - martite (30%) - felspar (40%) metasediment (decomposed granitised itabirite ?). Grain size 1/50" - 1/200". Bedding fairly well defined, 20° to core axis. Limonite nodules (up to 3/4" diameter) occur throughout the rock.
40'	50'	Fines 90% of cuttings on sieve. Quartz 50%, limonite etc. 30%, martite 20%. Fines: 25-30% martite, 10% limonite etc., 60-65% quartz.
50'	60'	Fines 90% of cuttings on sieve. Quartz 60%, martite 15%, limonite etc. 10% calcareous "micro-nodules" with included quartz and martite 15%. Fines: 30% martite, 10% "micro-nodules" and fragments, 5% limonite etc., 55% quartz.
60'	61'	Percussion open tube sample. Off-white and purple-brown decomposed quartz (40%) - martite (20-25%) - felspar (35-40%) metasediment (similar to, but less limonite stained than 40'-41'). Martite content of individual beds up to 50%. Grain size 1/100" (in martite rich beds) to 1/10" in purer quartz areas). Bedding irregular (due to granitisation?), possibly 65° to core axis.
60'	70'	Fines 85% of cuttings on sieve. Quartz 70%, "micro-nodules" 10%, limonite etc. 10%, martite 10%. Fines: 10% "micro-nodules", 30% martite, 60% quartz, minor limonite etc.
70'	80'	Fines 90-95% of cuttings on sieve. Quartz 70%, "micro-nodules" 20%, martite 5%, limonite 5%. Fines: 30% martite, 10% "micro-nodules", 60% quartz.

LOG OF ROTARY DRILLHOLE NO. MR 24 (Contd.) -3-

From	To	Description DETAILED LOG
80'	81'	Percussion open tube sample. Decomposed metasediment consisting of interbedded quartz (20%) - clay (decomposed felspar - 80%) and quartz (45%) - martite (25%) - clay (30%). Probably granitised itabirite. Similar to 60'-61', but more regularly bedded. Overall martite content probably 15%. Grain size about 1/150". Bedding about 25° to core axis, well defined.
80'	90'	Fines 90-95% of cuttings on sieve. Quartz 60%, "micro-nodules" 30%, martite 5-10%, limonite etc. less than 5%. Fines: 25% martite, 10% "micro-nodules", 65% quartz.
90'	100'	Fines more than 95% of cuttings on sieve. Quartz 50%, "micro-nodules" 40%, martite 5%, limonite etc. 5%. Fines: 30% martite, 25% "micro-nodules", 45% quartz.
100'	101'	Percussion open tube sample. Yellow-brown and purple-brown decomposed metasediment, intermediate in appearance between 40'-41' and 80'-81'. Consists of about 10% martite, 5% decomposed biotite, 15% decomposed felspar and 70% quartz. Martite occurs in less than 1/4" beds. Grain size mainly about 1/100". Bedding well defined, somewhat contorted changing from 5° to 50° to core axis.
100'	110'	Fines more than 95% of cuttings on sieve. Quartz 50%, martite 5%, limonite etc. 5%, "micro-nodules" 40%. Fines: 20% martite, 30% "micro-nodules", 50% quartz, minor limonite and decomposed felspar.
110'	120'	Fines more than 95% of cuttings on sieve. Quartz 70%, "micro-nodules" 20%, limonite 5%, martite 5%. Fines: 15% martite, 5% decomposed felspar, 10% "micro-nodules", 70% quartz, a few decomposed mica flakes.
120'	121'	Percussion open tube sample. Yellow-brown and purple-brown decomposed quartz (50%) - martite (20%) - biotite (10%) - felspar (20%) metasediment, similar to 100'-101', but bedding less well defined. Grain size about 1/100". Attitude 35°-40° to core axis.
120'	130'	Fines more than 95% of cuttings on sieve. Quartz 55%, martite 10%, limonite etc. 5%, "micro-nodules" 30%. Fines: 20% martite, 10% "micro-nodules", 5% decomposed felspar, 65% quartz, a few biotite flakes.
130'	140'	Fines 90-95% of cuttings on sieve. Quartz 55%, felspar (mostly pink and grey) 30%, biotite 5%, martite 10%. Fines: 55% quartz, 20% martite, 5% biotite, 20% felspar, minor "micro-nodules" etc.
140'	141'	Percussion open tube sample. Decomposed yellow-brown and black quartz (45%) - felspar (15%) - martite (30%) - biotite (10%) metasediment as 120'-121'. Grain size about 1/50". Bedding obscure, possibly 65° to core axis. Minor garnet.

LOG OF ROTARY DRILLHOLE NO. KR 24 (Contd.) -4-

From	To	Description DETAILED LOG
140'	150'	Fines 90% of cuttings on sieve. Quartz 55%, grey and pink felspar 20%, martite 10%, "micro-nodules" 10%, limonite etc. 5%. Fines: 20% martite-magnetite (1/2 magnetite), 15% felspar, 5% "micro-nodules", 5% biotite.
150'	160'	Fines more than 95% of cuttings on sieve. Quartz 40%, felspar 40%, martite 5%, "micro-nodules" 5%, biotite 5%, limonite etc.5%. Fines: 10% martite-magnetite, 10% biotite, 10% "micro-nodules", 15% felspar, 55% quartz.
160'	170'	Fines 90% of cuttings on sieve. Quartz 40%, felspar 20%, limonite and martite 5%, quartz-felspar-magnetite-martite rock fragments, with variable biotite and epidote (grain size about 1/100") 35%, minor biotite. Fines: 20% magnetite-martite (2/3 magnetite), 20% felspar, 5% biotite, 10% rock fragments, 45% quartz.
174'	179'	Diamond drill core. Recovery 0.5' ((10%). Slightly decomposed quartz (40%) - orthoclase (10%) - magnetite, martite (30%) - epidote (10%) - biotite (10%) metasediment. Orthoclase is restricted to irregular lenses and augens less than 1" diameter. Grain size 1/100" (magnetite-martite) to 1/10" (orthoclase). Bedding well defined, fairly regular, generally less than 1/4" thick. Attitude 55°-60° to core axis.
170'	179'	Sludge. Quartz 35%, felspar 15%, magnetite-martite 15%, biotite 5%, epidote 5%, "micro-nodules" 5%, composites (as 174'-179') 20%.
179'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. NR 25

Project: Narrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 24 Hd. Narrambee Co. Le Hunte Bore Ser. No. DD 530/62

Collar Coords 57900N, 68000E R.L. Grid Narrambee

Vertical Depth 178' Plan Ref.

Date Bore Commenced 15.8.61 Completed 17.8.61 Driller T. Jarvis

Bore Logged by G.R. Heath On 16-17.8.61 Hirer D. of M.

OBJECT: To test "high " in magnetic anomaly.

RESULT: Metasediment containing 10-30% (averaging 20%) martite-magnetite was intersected from 50'-85' and 110'-178'.

LOG Comprises Macro and microscopic geological log
Magnetic Log
Summary Log

From	To	Description SUMMARY LOG
0'	3'	Light yellow-brown well rounded quartz sand.
3'	25'	Very finely (amorphous) ? to coarsely (1/4") crystalline yellow-brown and red-brown stained gypsum, containing variable (10%) ? quartz sand.
25'	50'	Yellow-brown and red-brown limonitic decomposed metasediment containing accessory martite.
50'	85'	Decomposed, granitised quartz-felspar-martite metasediment. Martite content 10-25% averaging about 15%. Grain size 1/150" - 1/200".
85'	110'	Decomposed mica schist (quartz 5%, felspar, 20%,mica 75%). Very homogeneous. Negligible martite.
110'	130'	Decomposed quartz (50%) martite (10-15%) felspar (35-40%) metasediment similar to 50'-85'.
130'	155'	Decomposed quartz-felspar-magnetite, martite (20%) - garnet metasediment. Grain size about 1/200".
155'	165'	Decomposed martite-magnetite (25-30%) itabirite. Grain size 1/50" - 1/250".
165'	178'	Granitised quartz-felspar-magnetite, martite (20-25%) - garnet - biotite epidote metasediment, similar to 130' - 155'. Grain size 1/10" - 1/250".
		Attitude mainly 45°-65° to core axis, but contorted in part.

MAGNETIC LOG

Deflection 90-° at 140'
90-° " 160'
90-° " 175'
90-° " 177'

LOG OF ROTARY DRILLHOLE NO. NR 25 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 90-95% of cuttings on sieve. Quartz (mainly angular) 30%, white gypsum (not visibly crystalline) 60%, residue from NR 24 10%. Fines: 20% gypsum, 30% quartz, 50% residue from NR 24.
10'	20'	Fines 70% of cuttings on sieve. 1/4" fragments of crystalline gypsum 95%, quartz etc. 5%. Fines: 40% gypsum, 40% mainly angular quartz, 20% residue (magnetite etc.).
20'	21'	Percussion open tube sample Red-brown and yellow-brown 1/200" - 1/50" crystalline gypsum containing scattered (5%?) quartz grains.
20'	30'	Fines 90% of cuttings on sieve. Quartz 5%, gypsum (as 10'-20') 10%, limonite and limonite impregnated metasediment 85%. Fines: 15% quartz, 5% gypsum, 30% martite (and very rare magnetite), 50% limonite.
30'	40'	Fines 70% of cuttings on sieve. Limonite etc. (as 20'-30') 95%, quartz, gypsum etc. 5%. Fines: 15% quartz, 15% martite, 70% limonite.
40'	41'½	Percussion open tube sample Yellow-brown and dark red-brown decomposed and limonite stained and impregnated quartz-felspar metasediment. Some granular limonite possibly after martite. However, less stained rock contains less than 1% martite. Bedding fairly well defined, 1/8"-1/4" thick, 45° to core axis.
40'	50'	Fines 95% of cuttings on sieve. Quartz 15%, gypsum 5%, limonite etc. 80%. Fines: 20% quartz, 10% martite, 70% limonite etc.
50'	60'	Fines 75% of cuttings on sieve. Quartz 15%, limonite and minor martite 85%. Fines: 35%, quartz, 15% martite, 50% limonite etc.
60'	61'	Percussion open tube sample Red-brown and dirty yellow-brown quartz (25%) - martite and limonite after martite (20-25%) - decomposed mica and lesser felspar metasediment. Limonite staining is common. Grain size about 1/150". Bedding fairly well defined; about 1/8" thick, 50°-55° to core axis.
60'	70'	Fines 90-95% of cuttings on sieve. Quartz 50%, limonite etc. 40%, gypsum 5%, martite 5%, a few quartz-martite rock fragments. Fines: 15% quartz, 10% limonite etc., 75% martite.
70'	80'	Fines 95% of cuttings on sieve. Quartz 30%, martite 30%, calcareous "micro-nodules" 20%, limonite 15%, gypsum 5%. Fines: 10% quartz, 5% "micro-nodules", 5% limonite etc. 80% martite.
80'	81'	Percussion open tube sample Multicoloured mottled and bedded, granitised and contorted, somewhat decomposed quartz-felspar-martite (5-10%) metasediment. Minor limonite staining. Grain size 1/200" (unaltered metasediment) to 1/5" (quartz-felspar). Bedding 1/16" - 1/8" thick, shows ptygmatic folding.

LOG OF ROTARY DRILL HOLE NO. MR 25 (Contd.) -3-

From	To	Description DETAILED LOG
80'	90'	Fines 85% of cuttings on sieve. Quartz 35%, martite 25%, limonite etc. 15%, "micro-nodules" 20%, gypsum 5%. Fines: 15% quartz, 10" "micro-nodules", 5% limonite etc., 70% martite.
90'	100'	Fines 90-95% of cuttings on sieve. Quartz 30%, "micro-nodules" 30%, martite 30%, limonite etc. 10%. Fines: 15% quartz, 15% "micro-nodules", 5% limonite, 65% martite.
100'	101'	Percussion open tube sample Yellow-brown faintly mottled decomposed quartz (5%) - felspar (20%) - mica (75%) metasediment. Rock contains about 5% scattered 1/20" "micro-nodules". Grain size about 1/100". No visible structure.
100'	110'	Fines 90% of cuttings on sieve. Quartz 40%, "micro-nodules" 30%, 20% martite, 10% limonite, minor gypsum etc. Fines: 25% "micro-nodules", 30% quartz, 10% limonite etc., 35% martite.
110'	120'	Fines 80% of cuttings on sieve. "Micro-nodules" 20%, quartz-martite-felspar composites 20%, limonite etc. 10%, martite 5%, quartz 40%. Fines: 30% martite, 10% limonite etc., 40% quartz, 10% "micro-nodules", 10% rock fragments (including some mica and epidote).
120'	121'	Percussion open tube sample. Off-white laminated decomposed quartz (50%) - martite (10-15%) - felspar (35-40%) metasediment. Grain size 1/100" - 1/200". Bedding fairly well defined, about 1/16" thick, 60° to core axis.
120'	130'	Fines 90-95% of cuttings on sieve. Quartz 30% "micro-nodules" 30%, limonite and minor martite 20, rock fragments 20% (mainly quartz-martite). Fines: 20% martite (minor magnetite) 10% limonite etc., 10% "micro-nodules", 20% rock fragments, 40% quartz.
130'	140'	Fines 90-95% of cuttings on sieve. Quartz 45%, limonite with minor martite 10%, 5% gypsum, 10% "micro-nodules", 30% rock fragments (3/4 as before, 1/4 martite-magnetite-epidote). Fines: 15% martite-magnetite, 5% "micro-nodules", 20% composites, 60% quartz.
140'	141'	Percussion open tube sample Yellow-brown, off-white and black bedded decomposed quartz (45%) - felspar (20%) - martite-magnetite (20%) - garnet (10%) - epidote (5%) metasediment. Grain size about 1/200". Bedding well defined, 1/16" - 1/4" thick, somewhat contorted sub-parallel to core axis.
140'	150'	Fines 85-90% of cuttings on sieve. Quartz 50%, limonite and minor martite 10%, rock fragments (as 140'-141') 20%, "micro-nodules" 20%. Fines: 15-20% martite-magnetite, 5% garnet, 10% limonite etc., 10% "micro-nodules", 55-60% quartz-felspar.
150'	160'	Fines 95% of cuttings on sieve. Quartz 55%, limonite etc. 5% magnetite and lesser martite 15%, "micro-nodules" 25%, minor epidote and felspar. Fines: 30% "micro-nodules", 10% magnetite-martite, 15% rock fragments, 45% quartz. Minor epidote and garnet.

LOG OF ROTARY DRILL HOLE NO. NR 25 (Contd.) -4-

From	To	Description DETAILED LOG
160'	161'	Percussion open tube sample Decomposed magnetite-martite itabirite. Contains 25-30% magnetite-martite, 15% felspar, 55-60% quartz. Grain size 1/50" - 1/250". Bedding fairly well defined, about 1/2" - 2" thick, 40° to core axis.
160'	170'	Fines 70% of cuttings on sieve. Quartz 45%, limonite and minor martite-magnetite 5%, quartz-epidote-garnet-magnetite fragments, 50%. Fines: 50% quartz, 30% rock fragments (as coarse fraction), 10% limonite etc., 10% "micro-nodules".
174'	178'	Diamond Drill core. Recovery 2.5' (60%). Fairly severely granitised metasediment. Contains 20-25% magnetite-martite, 5% garnet, 5% biotite, 5% epidote, 60-65% quartz-orthoclase (metasomatic ?) with minor serpentine in joint planes. Grain size 1/250" (garnet and iron oxides) to 1/10" (orthoclase). Bedding well defined and fairly regular (although distorted by lenses and blebs of quartz-orthoclase). Beds generally less than 1/2" thick. Attitude about 65° to core axis.
170'	178'	Sludge. Fines 70% of cuttings on sieve. Rock fragments 95% (1/2 quartz and quartz-orthoclase, 1/2 metasediment as 174'-178'), limonite 5%. Fines: 20% quartz, 20% "micro-nodules", 5% limonite, 5% rock fragments (as 174' - 178'), 50% magnetite-martite.
178'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 26

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 25 Hd. Warramboo Co. Le Hunte Bore Ser.No. DD 531/62

Collar Coords 57000N, 62000E R.L. 489.7' Grid Warramboo

Vertical Depth 100' Plan Ref.

Date Bore Commenced 17.8.61 Completed 19.8.61 Driller T. Jarvis

Bore Logged by G.R. Heath On 18-19.8.61 Hirer D. of M.

OBJECT: To test magnetic "peak" associated with gravity "high".

RESULT: Metasediment containing 10-20% primary iron oxides intersected from 50'-100'. Manganese oxides are also present.

LOG Comprises Macro and Microscopic geological log.
Summary Log
Magnetic Log.

From	To	Description SUMMARY LOG
0'	1'	Light yellow-brown sandy loam.
1'	30'	Pale yellow-brown and grey cherty somewhat manganiferous sheet and nodular kunkar, in a matrix of calcareous clayey quartz sand.
30'	50'	No sample.
50'	60'	Decomposed limonite impregnated metasediment containing about 15-20% martite, and 10% manganiferous oxides.
60'	100'	Quartz (40%) - felspar (25%) - magnetite, martite (10-20%) - garnet (10%) - biotite (10%) somewhat granitised metasediment. Grain size about 1/100". Beds well defined, about 1/8" - 1/4" thick. Attitude 25°-55° to core axis.

MAGNETIC LOG

Deflection 90-° to 90° from 96'-100'.

ROTARY DRILL HOLE NO. MR 26 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on12 mesh sieve.
0	10'	Fines 85-90% of cuttings on sieve. Angular quartz fragments 5%, residue from MR 25 (mainly quartz-magnetite) 5%, kunkar (very compact sheet material, contains 40-50% 1/200" rounded quartz. Colour grey and pale yellow-brown banded, giving a cherty appearance. Grey bands are acid insoluble, and appear to be manganiferous) 90%. Fines: 30% well rounded quartz, 10% kunkar, 60% residue from MR 25 (magnetite, garnet, biotite, angular felsics).
10'	20'	Fines 85% of cuttings on sieve. Angular quartz 5%, limonitic material 5%, kunkar 90%. Fines: 80% well rounded quartz, 5% kunkar, 5% limonite, 10% residue from MR 25.
20'	21'	Percussion open tube sample. Kunkar nodules and fragments in a matrix of well rounded 1/200" quartz sand containing 20% clay. Difficult to determine whether this core is representative, or a compressed mass of cuttings.
20'	30'	Fines 75% of cuttings on sieve. Quartz 5%, kunkar 65%, limonite (containing 10%, 1/200" rounded quartz and rare martite grains) 30%. Fines: 20% quartz (1/2 angular), 40% kunkar, 40% limonite, minor residual material from MR 25.
30'	50'	No samples. No sludge return, and too hard for percussion sample.
50'	60'	Fines more than 95% of cuttings on sieve. Iron stained angular quartz 50%, small nodules of manganiferous looking material 20%, limonite and limonite impregnated decomposed metasediment. 30%. Fines: 45% quartz, 20% decomposed felspar and quartz-felspar, 35% opaque oxides (about 2/3 martite, 1/3 manganiferous).
60'	61'	Percussion open tube sample. Mainly yellow-brown decomposed quartz (40%) - felspar (25-30%) - martite (10-15%) - biotite (15%) - garnet (5%) metasediment. Grain size about 1/100". Bedding fairly well defined, up to 1/4" thick, about 25° to core axis. Some limonite impregnation.
60'	70'	Fines 95% of cuttings on sieve. Quartz with minor felspar and mica 55%, kunkar 5%, manganiferous oxides 15%, limonite etc. 25%. Fines: 20-25% magnetite-martite, 5% manganiferous oxides, 70-75% quartz-felspar with minor micas and garnet.
70'	80'	Fines 90-95% of cuttings on sieve. Quartz-felspar and minor biotite 80%, manganese oxides 5%, limonite etc. 15%. Fines: 30%.martite-magnetite, 5% garnet, 5% limonite, 60% quartz-felspar with minor biotite.

ROTARY DRILL HOLE NO. MR 26 (Contd.) -3-

From	To	Description DETAILED LOG
80'	81'	Percussion open tube sample. Limonite stained decomposed metasediment similar to 60'-61', but containing 10% martite (and minor magnetite) and 5-10% epidote as well. Attitude 25°? to core axis.
80'	90'	Fines 99% of cuttings on sieve. Martite-magnetite 5%, limonite 20%, quartz (80%) - martite (20%) fragments 10%, quartz-felspar-mica fragments 10%, kunkar 5%, quartz 50%. Fines: 20% magnetite-martite, 10% garnet, 5% biotite, 10% rock fragments (1/200" quartz-biotite-magnetite-martite-garnet), 55% quartz.
90'	96'	Fines 85% of cuttings on sieve. Rock fragments (as 96'-100') 40%, magnetite-martite 10%, limonite 10%, quartz 40%. Fines: 25% magnetite-martite, 10% garnet, 5% biotite, 60% quartz-felspar.
96'	100'	Diamond drill core. Recovery 2.8' (70%). Somewhat granitised quartz (40%) - felspar (1/2 pink, 1/2 white, 20%) - garnet (10%) magnetite (10-30%, usually 20%) - biotite (10%) metasediment. Grain size 1/200" (garnet, magnetite) to 1/10" (felspar). Bedding well defined, usually about 55° to core axis, but shows drag folding (west limb anticline) near the centre of the sample. Beds 1/16" - 1/2" thick, due to mineral segregation.
	100'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. HR 27

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. Adj. 7 Hd. Warrambee Co. Le Hunte Bore Ser.No. DD 534/62

Collar Coords 65800N, 37000E R.L. 454.4' Grid Warrambee

Vertical Depth 66' Plan Ref.

Date Bore Commenced 21.8.61 Completed 22.8.61 Driller H. Mischlewitz

Bore Logged by G.R. Heath On 22.8.61 Hirer D. of M.

OBJECT: To test magnetic "peak" associated with gravity "high".

RESULT: Quartz and quartz-felspar-biotite metasediment intersected from 30' - 66'. Hole possibly too shallow to reach anomalous material.

LOG Comprises Macro and microscopic geological log

From	To	Description SUMMARY LOG
0	2'	Light brown sandy clay loam.
3'	5'	Pale yellow-brown nodular rather dispersed kunkar, in a sandy matrix.
5'	20'	Light yellow-brown sand. Consists of virtually pure, well rounded 1/100" - 1/200" quartz sand, but some limonite and silica impregnation has occurred near the surface.
20'	30'	No sample.
30'	66'	Quartz-felspar-biotite metasediment interbedded with resistant metaquartzite. Iron Oxides absent or rare accessories. Grain size about 1/100". Bedding (where distinguishable) 1/8" - 1/16" thick. Attitude 10^{0} - 35^{0} to core axis.

ROTARY DRILLHOLE NO. MR 27 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 70% of cuttings on sieve. Limonite and limonitic quartz sandstone (grain size 1/100" - 1/200") 80%, siliceous quartz sandstone (rounded 1/100" - 1/200") 20%, rare kunkar. Fines: 20% rounded quartz, 10% siliceous sandstone, 5-10% kunkar, 60-65% limonite etc.
10'	20'	Fines 95% of cuttings on sieve. Kunkar 5%, siliceous quartz sandstone 50%, quartz 5%, limonite etc. 40%. Fines: 5% kunkar, 25% quartz, 25% limonite etc., 45% siliceous quartz sandstone.
20'	21'	Percussion open tube sample Light yellow-brown well rounded 1/150" pure quartz sand, with very rare martite grains.
20'	30'	No mud return.
30'	40'	Fines 95% of cuttings on sieve. Angular quartz 30%, white somewhat decomposed felspar 25%, quartz-martite fragments (1/250" grain size) 5%, pyrite 5%, limonite 15%, siliceous sandstone 20%. Fines similar to coarse fraction.
40'	41'	Percussion open tube sample Light grey pyritic clay containing 5% pyrite, 30% 1/50" - 1/100" angular quartz, with decomposed felspar and mica 70%. No visible structure. Limonite and siliceous nodules fairly common.
40'	50'	Fines 99% of cuttings on sieve. Quartz 50%, felspar 20%, siliceous fragments 20%, limonite 10%, minor martite and pyrite. Fines: 75% quartz, 10% felspar, 10% siliceous fragments, limonite, pyrite, martite all less than 5%.
50'	60'	Fines more than 95% of cuttings on sieve. Quartz 25%, felspar 25%, siliceous fragments 25%, limonite 25%. Fines: 80% quartz, 10% felspar, 5% pyrite, 5% siliceous fragments etc.
61'	66'	Diamond drill core Recovery 3.9' (78%). Light grey slightly weathered metaquartzite grading down (boundary about 62') into quartz-felspar-biotite metasediment. Upper material consists of over 99%, 1/150" quartz, with rare biotite, martite and felspar. Lower rock type contains 30% biotite, 20% felspar, 50% quartz with accessory martite. Grain size about 1/100". Bedding 1/8" - 1/16" thick, somewhat contorted, 10°-35° to core axis.
	66'	END OF HOLE.

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IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. NR 28

Project: Warrambee Aeromagnetic Anomaly D.M. 664/61

Sec. 12 Hd. Warrambee Co. Le Hunte Bore Ser.No. 535/62

Collar Coords 56000N, 45000E R.L. 588.9' Grid Warrambee

Vertical Depth 76.4' Plan Ref.

Date Bore Commenced 23.8.61 Completed 24.8.61 Driller H. Mischlewitz

Bore Logged by G.R. Heath On 23-24.8.61 Hirer D. of M.

OBJECT: To test gravity "high" associated with magnetic "low".

RESULT: Partially and totally granitised metasediment (no iron oxides) intersected from 12' - 76.4'.
Coarse grained - Hole possibly too shallow to intersect anomalous material.

LOG Comprises Detailed Macro and microscopic geological log

From	To	Description SUMMARY LOG
0'	2'	Pale yellow-brown sandy loam.
2'	12'	Pale yellow-brown nodular and rather friable kunkar, somewhat limonitic near the base.
12'	76.4'	Quartz-felspar-biotite "granite" (grain size about 1/4"), containing a few areas of less altered metasediment (quartz-felspar-biotite-garnet). Bedding still present is strongly contorted.

ROTARY DRILL HOLE NO. MR 28 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 80% of cuttings on sieve. Pale yellow-brown kunkar containing 20%, 1/200" rounded quartz, and one or two limonite grains. Fines: 60% well rounded quartz, 35% kunkar, 5% limonite.
10'	20'	Fines 70% of cuttings on sieve. Lightly stained decomposed quartz-biotite-felspar fragments 1/50" - 1/100" grain size, red-brown 40%, yellow-brown 50%, kunkar 10%. Fines similar to coarse fraction, but 1 or 2% martite, and 10% well rounded quartz.
	20'	Too hard for percussion tube sample.
20'	30'	Fines 70% of cuttings on sieve. "Granite" fragments, as 10'-20', 75%, yellow-brown and dark grey kunkar 20%, limonite 5%. Fines: 90% "granite", 10% kunkar.
30'	40'	Fines 70% of cuttings on sieve. Fine and coarse fractions 99% "granite" (as 10'-20', but fresher mica and rare accessory martite). Rare kunkar.
40'	41'	Percussion open tube sample. Decomposed apparently structureless "granite", containing 30% quartz, 15% biotite, 55% felspar. Grain size about 1/15".
40'	50'	Negligible cuttings retained on sieve. Fines: 50% quartz, 30% felspar, 20% biotite.
50'	60'	Negligible cuttings retained on sieve. Fines: 40% quartz, 30% composites (quartz-felspar-biotite), 20% felspar, 10% biotite.
60'	70'	Fines 75% of cuttings on sieve. Angular quartz 30%, biotite flakes 5%, "granite" 65%. Fines: 10-15% biotite, 40% quartz, 45-50% "granite" fragments.
75'	76.4'	Diamond drill core. Recovery 1.35' (95%). Very coarse grained "granite" (1/20" - 1½" avereging 1/4" - 1/2" crystals) containing a small area of partially made over metasediment. "Granite" consists of 20% quartz, 5-10% biotite, 65-70% coarsely perthitic felspar, with a few 1/10" garnet crystals. Less altered metasediment (grain size about 1/20") consists of 5% garnet, 15-20% biotite, 60% rather opalescent quartz and 15-20% grey-white felspar. Remaining bedding about ¼" thick, strongly contorted.
76.4'		END OF HOLE

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILLHOLE NO. WR 29

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 12 Hd. Warramboo Co. Le Hunte Bore Ser. No. 538/62

Collar Coords: 57000N 45000E R.L. 577.1' Grid Warramboo

Vertical Depth 196' Plan Ref.

Date Bore commenced 24/8/61 Completed 29/8/61 Driller T. Jarvis

Bore Logged by G. R. Heath On 25-29/8/61 Hirer D. of M.

OBJECT: To test "peaks" in gravity and magnetic anomalies.

RESULT: Metasediment containing about 10% martite - magnetite intersected from 25'-196'.

LOG Comprises: Macro and microscopic geological logs.

From	To	Description SUMMARY LOG
0'	25'	Light yellow-brown well rounded 1/150" quartz sand containing nodular kunkar near the surface and up to 10% limonite - martite grains throughout.
25'	160'	Decomposed quartz - felspar - mica metasediment containing about 10% martite. Grain size about 1/100".
160'	196'	Granitised quartz - orthoclase - epidote - garnet magnetite, martite (5-10%) metasediment. Grain size 1/250" - ¼".
		Bedding obscure or contorted in all samples taken.

ROTARY DRILL HOLE NO. NR 29 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 90% of cuttings on sieve. Pale yellow-brown kunkar 99%, a few grains of quartz and limonite. Fines: 45% well rounded quartz, 45% kunkar, 10% limonite nodules.
10'	20'	Fines 99% of cuttings on sieve. Kunkar 50%, clusters of 1/200" well rounded quartz grains lightly cemented with clay 50%. Fines: 10% kunkar, 5-10% limonite - martite (1/2 of each), 80-85% well rounded quartz.
20'	21'	Percussion open tube sample. Red-brown to yellow-brown mottled and irregularly banded well rounded 1/150" quartz sand containing 5% martite and 10-15% clay. Banding mainly sub-horizontal.
20'	30'	Fines 95% of cuttings on sieve. Angular quartz 20%, limonite nodules 5%, kunkar 50%, limonitic rock fragments 25%. Fines: 20% quartz (1/2 rounded), 10% kunkar, 10% martite, 60% limonitic fragments.
30'	40'	Fines 80% of cuttings on sieve. Rock fragments (as 40' - 50'), limonitic 75%, off-white 25%. Fines: 5-10% martite, 25% angular quartz, 20% off-white fragments, 45-50% limonitic fragments.
40'	41'	Percussion open tube sample. Red-brown with lesser off-white and yellow-brown mottled and irregularly laminated decomposed quartz (35%) - martite (10%) - clay (decomposed felspar and mica, 55%) metasediment. Grain size about 1/200". Bedding indistinct, about 65° to core axis.
40'	50'	Fines 50% of cuttings on sieve. Limonite, and limonite stained and impregnated decomposed metasediment (clay + 30% angular quartz + 5% martite) 65%, off-white decomposed metasediment (quartz and flaky clay) 35%. Fines: 15% off-white fragments, 5-10% martite, 10% quartz, 65-70% limonite etc.
50'	60'	Fines 85-90% of cuttings on sieve. Off-white to pale yellow-brown fragments 55%, limonitic fragments 45%. Fines: 2% martite, 5-10% quartz, 50% limonitic fragments, 40% off-white to yellow-brown fragments.
At	60'	Too hard for percussion tube sample.
60'	70'	No water return.
70'	80'	Negligible cuttings retained on sieve. Fines: 5% martite, 40% quartz, 20% limonitic metasediment, 35% off-white and yellow-brown decomposed metasediment.
80'	90'	Negligible cuttings retained on sieve. Fines 85% well rounded lightly stained quartz sand, 5-10% martite, 5-10% rock fragments as above.
90'	100'	Negligible cuttings retained on sieve. Fines: 95% well rounded quartz, 5% martite, minor decomposed metasediment.
100'	110'	Negligible cuttings retained on sieve. Fines as 90'-100'.
110'	120'	Fines 99% of cuttings on sieve. Kunkar 20%, limonite etc. 10%, quartz - martite (as 90' - 100') lightly cemented with clay, 70%. Fines as 90'-100'.

ROTARY DRILL HOLE NO. MR 29 (Contd.) -3-

From	To	Description DETAILED LOG
120'	130'	Negligible cuttings retained on sieve. Fines as 90'-100'.
		N.B. Severe slumping from the 25' level occurred when the drill had reached 85'. The inflowing sand held down subsequent cuttings.
120'	130'	Sample collected during flushing of the hole with thick mud. Fines 85% of cuttings on sieve. Quartz 20%, limonite etc. 20%, somewhat weathered quartz (35%) - martite (15-20%) felspar - mica metasediment (grain size 1/200") 60%. Fines similar to coarse fraction.
130'	135'	Diamond drill core. Recovery 2' (40%). Light yellow-brown homogeneous looking decomposed quartz-felspar-mica metasediment containing 5% martite. Grain size 1/200" - 1/400". No visible structure.
130'	140'	Fines 95% of cuttings on sieve. Kunkar 5%, limonite 30%, quartz 15%, rock fragments (as 130' - 135' and 120' - 130') 50%. Fines: 50% quartz, 20% limonite (1/10 magnetic), 20% rock fragments, 10% martite.
140'	150'	Fines 95% of cuttings on sieve. Coarse fraction as 130'-140'. Fines: 15% martite, 10% limonite, 30% quartz, 45% rock fragments as 130'-140'.
150'	160'	Fines 90-95% of cuttings on sieve. Quartz (containing up to 5% martite) 90%, kunkar 5%, limonite 5%. Fines: 10% martite, 5% limonite, 85% quartz - martite (as coarse fraction).
160'	170'	Fines 90-95% of cuttings on sieve. Limonite 5%, quartz - decomposed orthoclase 25%, quartz-martite (as 150'-160') 70%. Fines: 10% martite, 30% quartz - orthoclase, 60% quartz - martite.
170'	180'	Fines 95% of cuttings on sieve. Coarse fraction as 160' - 170'. Fines: 20% martite, 30% quartz, 50% composites as 160' - 170'.
180'	190'	Fines more than 95% of cuttings on sieve. Decomposed rock fragments (as 160' - 170') 40%. Epidote and quartz - epidote fragments (some manganiferous looking) 60%. Fines: 40% quartz - epidote, 60% quartz - martite - felspar.
194'	196'	Diamond drill core. Recovery 1.8' (90%). Moderately to severely discordantly and concordantly granitised quartz (25-30%) - orthoclase (35%) - magnetite martite (5-10%) - epidote (25-30%) - garnet (5%) metasediment. Grain size 1/250" (garnet and magnetite) to 1/4" (orthoclase). Bedding indistinct and strongly contorted.
	196'	END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 30

Project: Warramboo Aeromagnetic Anomaly D.M. 664/61

Sec. 14 Hd. Warramboo Co. Le Hunte Bore Ser.No. DD 544/62

Collar Coords 54200N, 49000E R.L. 610.2' Grid Warramboo

Vertical Depth 69' Plan Ref.

Date Bore Commenced 29.8.61 Completed 31.8.61 Driller T. Jarvis

Bore Logged by G. R. Heath On 30-31.8.61 Hirer D. of M.

OBJECT: To test gravity and magnetic "peaks".

RESULT: Metasediment containing up to 10% martite intersected from 15' - 25'; underlain by metasedimentary "granite".

LOG Comprises Macro and microscopic geological log

From	To	Description SUMMARY LOG
0	3'	Pale yellow-brown quartz sand.
3'	15'	Pale yellow-brown kunker nodules in a matrix of somewhat limey and clayey quartz sand.
15'	25'	Decomposed quartz - felspar- mica metasediment containing 5-10% martite. Grain size 1/100".
25'	69'	Quartz - felspar (plagioclase and orthoclase) - biotite "granodiorite" or "granite", with up to 5% leached garnet porphyroblasts and accessory martite. Grain size usually about 1/8". No visible structure.

ROTARY DRILL HOLE NO. WR 30 (Contd.) -2-

From	To	Description DETAILED LOG
		N.B. Cuttings caught on 12 mesh sieve.
0	10'	Fines 85% of cuttings on sieve. Pale yellow-brown kunkar containing 40%, 1/150" - 1/200" rounded quartz 95%, remanié from WR 29, 5%. Fines: 30% rounded quartz, 15% remanié from WR 29, 55% kunkar.
10'	20'	Fines 85% of cuttings on sieve. Kunkar 35%, red-brown and off-white limonite stained and impregnated decomposed metasediment fragments 60%, quartz etc. 5%. Fines: 20% martite, 30% quartz, 15% limonitic metasediment, 35% kunkar.
At	20'	Too hard for percussion tube sample.
20'	30'	Fines 35% of cuttings on sieve. Decomposed quartz-felspar - mica fragments (containing less than 5% martite) 90%, quartz 5%, kunkar 5%. Fines similar to coarse fraction, with a few martite grains.
30'	68'	No mud return.
40'	41'	Percussion open tube sample. Decomposed "granite" consisting of 30% quartz, 20-25% biotite, 45-50% felspar (orthoclase) with accessory martite. Grain size 1/100" - 1/8". No visible structure.
60'	61'	1-1/2" rock fragments picked up while attempting percussion open tube sampling. Somewhat decomposed and stained "granite" consisting of 5% biotite, 35% quartz and 60% orthoclase. Grain size about 1/20". No visible structure.
68'	69'	Diamond drill core. Recovery 0.5' (50%) . Very slightly decomposed "granite" or "granodiorite". Consists of quartz (30%), garnet (1/8" - 1/4" porphyroblasts, somewhat leached looking, reddish-brown, 5%), pink orthoclase (30%), yellowish-brown plagioclase (multiple twinned, 35%). Grain size 1/10" - 1/5" no visible structure.
69'		END OF HOLE.

Department of Mines, South Australia

IRON EXPLORATION SECTION

LOG OF ROTARY DRILL HOLE NO. WR 31

Project: Warramboo Aeromagnetic Anomaly — D.M. 664/61

Sec. 25 Hd. Warramboo — Co. Le Hunte — Bore Ser.No. 545/62

Collar Coords 58400N, 62000E — R.L. 480.7' — Grid Warramboo

Vertical — Depth 117' — Plan Ref.

Date Bore Commenced 1.9.61 — Completed 4.9.61 — Driller T. Jarvis

Bore Logged by G.R. Heath — On 2-5.9.61 — Hirer D. of M.

OBJECT: To test gravity "peak" associated with "low" in magnetic anomaly

RESULT: Metasediment containing quartz, grey felspar, epidote and biotite with rare garnet and tourmaline intersected from 25' - 117'.

LOG Comprises Macro and microscopic geological log.
Summary Log.

From	To	Description SUMMARY LOG
0	3'	Light yellow-brown quartz sand.
3'	12'	Mainly nodular kunker, associated with minor siliceous limonite near the base.
12'	25'	Yellow-brown very sandy clay (contains 60-70% 1/150" - 1/200" rounded quartz sand).
25'	92'	Decomposed metasediment (bedded quartz-clay rock). Somewhat pyritic from 60'-90'. Contains minor very fine grained (1/500") martite.
92'	117'	Slightly decomposed, grading to fresh quartz - felspar - biotite metasediment with variable epidote and minor tourmaline and garnet. Grain size 1/150" (garnet) to 1" (tourmaline). Granitisation slight to severe (increasing from top to base of sequence.) Attitude 30^{0} - 45^{0} to core axis.

ROTARY DRILL HOLE NO. MR 31 (Contd.) -2-

From	To	Description DETAILED LOG
0'	10'	Fines 90% of cuttings on sieve. Pale yellow-brown kunkar 80%, subangular quartz 10%, remanié from MR 30, 10%. Fines: 40% kunkar, 10% remanié, 50% quartz (1/2 well rounded), minor limonite.
10'	20'	Fines 85% of cuttings on sieve. Kunkar 95%, quartz (rounded) 5%, one or two limonite fragments. Fines: 60% limonite, 40% quartz (3/4 angular).
20'	21'	Percussion open tube sample. Yellow-brown, faintly mottled clay, containing 60-70% well rounded 1/150" - 1/200" quartz sand.
20'	30'	Fines 90-95% of cuttings on sieve. Angular quartz 25%, off-white clay containing 5% angular quartz (decomposed metasediment?) 25%, limonite, and limonite impregnated clay (as above) 50%. Fines: 50% angular quartz, 30% white clay, 20% limonitic clay.
30'	40'	Fines more than 95% of cuttings on sieve. Kunkar 5%, limonitic clay 25%, white clay 30%, quartz 40%. Fines: 80% angular quartz, 20% white clay, 20% limonitic clay.
40'	41'	Percussion open tube sample. Pale purple, yellow-brown and off-white mottled and irregularly banded clay containing 25% angular 1/50" quartz. Probably decomposed metasediment. One banding trend (bedding ?), 30° to core axis at 40.5'.
40'	50'	Fines 90-95% of cuttings on sieve. Angular quartz 80%, limonitic clay 15%, white clay 5%. Fines: 90% angular quartz, 5-10% limonitic clay, 1 or 2% white clay.
50'	60'	Fines 80% of cuttings on sieve. Angular quartz 99%, minor limonitic and white clay, and kunkar. Fines: similar to coarse fraction.
60'	61'	Percussion open tube sample. Light grey very faintly mottled clay containing 30% angular 1/50" - 1/100" quartz, and 5%, 1/250" - 1/500" dispersed martite (and possibly pyrite).
60'	70'	Fines 85% of cuttings on sieve. Angular quartz (up to 1/4" diameter) 99%, a few grains of pyrite, kunkar and limonitic and white clay. Fines similar to coarse fraction.
70'	80'	Fines 85% of cuttings on sieve. Angular quartz 95%, very finely crystalline pyrite (1/1000") 5%, minor clay etc. Fines similar to coarse fraction, and including a few garnet and felspar fragments.
80'	81'	Percussion open tube sample. Decomposed, heavily pyrite impregnated metasediment. Contains 20% biotite, 5% garnet, 30% pyrite and 45% quartz - felspar. Grain size about 1/100". Bedding fairly well defined, less than 1/8" thick, about 45° to core axis.

ROTARY DRILL HOLE NO. NR 31 (Contd.) -3-

From	To	Description DETAILED LOG
80'	90'	Fines 95% of cuttings on sieve. Quartz 70%, grey felspar 25%, pyrite 5%, a few garnet fragments. Fines: 10-15% felspar, 5-10% pink garnet, 5% pyrite, 75% quartz.
90'	100'	Fines 80% of cuttings on sieve. Felspar and quartz - felspar - biotite composites 50%, quartz 45%, limonite 5%, a few grains of pyrite and garnet, and one or two epidote fragments. Fines: 5% garnet, 40% felspar, 55% quartz, minor pyrite, biotite, limonite.
92'	97'	Diamond drill core. Recovery 1.1' (20%). Grey somewhat decomposed quartz (35%) - grey felspar (60%) - biotite (5%) metasediment, with accessory garnet. Grain size 1/150" (garnet) to 3/8" (felspar). Bedding rather indistinct, somewhat contorted, 40° to core axis.
100'	110'	Fines 90-95% of cuttings on 12 mesh sieve. Quartz 60%, biotite 5%, limonite 5%, epidote 10% (contains some biotite), grey felspar 20%, minor garnet. Fines: 65% quartz, 10% epidote, 5% biotite, 5% garnet, 5% pyrite, 10% grey felspar.
110'	112'	Fines 75% of cuttings on 12 mesh sieve. Quartz 65%, fresh looking quartz - felspar - epidote - biotite 30%, garnet (5%) with minor limonite and pyrite. Fines (110'-117'): similar to coarse fraction, but containing rare tourmaline fragments.
112'	117'	Diamond drill core. Recovery 4.4' (90%). Light grey to grey-green moderately severely concordantly and discordantly granitised quartz - grey white felspar (70%) - epidote (20%) - biotite (10%) metasediment, containing tourmaline crystals up to 3/4" diameter in the most dislocated portions. Grain size 1/50" (least altered) to 1/4" (granitised areas). Bedding fairly well defined over most of the core, about 35° to core axis.
	117'	END OF HOLE.

APPENDIX C

AUSTRALIAN MINERAL DEVELOPMENT LABORATORY

ASSAY RESULTS

Locality: Hd. Narrambee. Secs. 10, 12, 24, 25.

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
MR1					
21'	22'	A2755/61	29.7%	0.125%	49.1%
44'	45.5'	A2756/61	21.8	0.13	55.3
60'	61'	A2757/61	22.6	0.12	54.1
80'	80.8'	A2758/61	13.9	0.175	68.5
80.8'	81.5'	A2759/61	17.9	1.13	60.5
101'	102'	A2760/61	23.0	1.58	53.7
128'	133.2'	A2761/61	8.85	3.12	59.1
144.3'	149'	A2762/61	8.45	1.90	82.9
MR2					
7'	11'	A2763/61	47.3	0.06	20.8
20'	22'	A2764/61	21.7	0.05	60.1
40'	41.5'	A2765/61	36.8	0.115	38.1
54'	58'	A2766/61	21.6	0.30	61.5
58'	61'	A2767/61	26.2	0.15	57.7
61'	66'	A2768/61	21.0	0.60	61.1
MR3					
60'	62'	A2769/61	15.5	0.10	65.4
80'	82'	A2770/61	10.8	1.03	68.8
100'	101.5'	A2771/61	16.2	3.25	51.5
120'	122'	A2772/61	20.2	1.80	54.6
140'	142'	A2773/61	12.7	5.50	53.0
162'	164'	A2774/61	20.8	4.90	46.9
180'	185'	A2775/61	7.0	1.25	82.0
200'	201.8'	A2776/61	6.1	0.75	82.3
MR4					
60'	62'	A2777/61	1.15	0.015	70.0
109.8'	114'	A2778/61	3.2	0.055	83.3

ASSAY RESULTS

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
DDH6					
20'	22'	A2779/61	22.8	0.07	54.9
40'	42'	A2780/61	19.4	0.13	60.9
60'	62'	A2781/61	5.75	0.06	77.5
80'	82'	A2782/61	18.7	1.51	57.9
100'	102'	A2783/61	17.8	1.21	60.1
120'	121'	A2784/61	27.8	0.66	46.6
135'	138.5'	A2785/61	12.0	1.25	77.3
138.5'	141.5'	A2786/61	7.25	0.19	81.3
DDH7					
80'	82'	A2787/61	7.55	0.12	67.2
100'	102'	A2788/61	2.85	0.03	77.8
140'	142'	A2789/61	5.30	0.03	74.6
160'	162'	A2790/61	2.35	1.33	79.6
181'	186'	A2791/61	9.60	0.04	79.0
DDH8					
20'	22'	A2792/61	15.8	0.075	63.6
40'	42'	A2793/61	6.45	0.65	76.3
60'	62'	A2794/61	4.55	1.75	79.6
80'	82'	A2795/61	7.15	1.94	73.2
100'	102'	A2796/61	6.25	0.615	74.0
120'	122'	A2797/61	4.90	1.12	82.0
126'	128.3'	A2798/61	13.9	1.10	71.5
DDH9					
20'	22'	A2799/61	11.0	0.069	68.2
40'	42'	A2800/61	22.6	0.175	54.1
60'	62'	A2801/61	20.3	0.175	55.6
80'	82'	A2802/61	32.4	0.545	41.4
100'	102'	A2803/61	16.6	0.41	58.6
120'	125'	A2804/61	4.4	0.17	84.4
153'	157'	A2805/61	7.5	1.48	79.5
157'	159'	A2806/61	4.0	0.245	85.5

ASSAY RESULTS

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
MR11					
120°	122°	A2807/61	1.35	0.01	83.3
MR12					
35°	40°	A2808/61	13.9	0.06	69.1
60°	65°	A2809/61	25.0	0.13	52.3
143°	146.7°	A2810/61	11.8	1.06	75.8
MR13					
60°	62°	A2811/61	21.8	0.04	52.1
80°	81°	A2812/61	23.4	0.09	53.0
100°	101°	A2813/61	15.9	0.095	66.5
120°	121°	A2814/61	15.6	0.13	66.4
140°	141°	A2815/61	19.0	0.075	61.4
160°	162°	A2816/61	27.0	0.218	54.3
180°	181°	A2817/61	5.45	0.081	70.2
193°	197°	A2818/61	1.15	0.094	93.2
MR14					
20°	21°	A2819/61	26.2	0.14	49.0
80°	81°	A2820/61	13.2	0.075	69.2
100°	101°	A2821/61	17.5	0.10	60.5
120°	121°	A2822/61	18.8	0.175	59.3
140°	141°	A2823/61	15.3	1.15	67.5
160°	165°	A2824/61	5.8	1.24	82.0
170°	171°	A2825/61	14.2	1.49	70.6
MR15					
20°	21°	A2826/61	2.75	0.015	74.0
80°	81°	A2827/61	8.90	0.01	71.3
112°	117°	A2828/61	1.15	0.01	95.9
MR16					
20°	21°	A2829/61	15.0	0.115	67.4
40°	41°	A2830/61	11.5	3.52	62.7
60°	61°	A2831/61	11.2	1.12	71.8
80°	81°	A2832/61	8.65	1.67	73.9
140°	144°	A2833/61	0.35	0.86	80.5
154°	158°	A2834/61	11.2	1.02	74.4

ASSAY RESULTS

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
MR17					
60'	61'	A2835/61	10.3	0.035	70.3
80'	81'	A2836/61	18.4	0.175	57.1
100'	101'	A2837/61	17.6	0.22	58.3
120'	121'	A2838/61	24.5	0.34	45.9
140'	141'	A2839/61	15.9	0.185	64.7
160'	161'	A2840/61	14.8	0.155	60.8
184'	187'	A2841/61	13.1	0.155	72.9
MR18					
20'	21'	A2842/61	4.1	0.01	83.2
40'	41'	A2843/61	34.1	0.105	42.8
80'	81'	A2845/61	28.2	0.125	51.7
100'	101'	A2846/61	22.0	0.075	57.2
119'	120'	A2847/61	24.8	0.125	56.7
130'	133'	A2848/61	22.1	0.135	60.2
140'	141'	A2849/61	13.3	0.055	72.3
147'	148'	A2850/61	9.5	0.53	76.7
160'	161'	A2851/61	18.1	0.405	65.4
169'	170'	A2852/61	21.7	0.93	60.1
184'	185'	A2853/61	20.3	0.11	58.2
200'	201'	A2854/61	17.7	0.06	60.2
214'	215'	A2855/61	26.0	0.315	52.2
226'	227'	A2856/61	20.5	0.165	58.5
237'	238'	A2857/61	5.65	0.04	70.6
258'	260.5'	A2858/61	7.5	1.43	66.0
MR19					
80'	81'	A2859/61	1.5	0.03	79.2
120'	121'	A2860/61	1.5	1.08	81.5
140'	141'	A2861/61	1.5	1.66	82.2
240'	245'	A2862/61	15.2	0.69	64.0
MR20					
40'	41'	A2863/61	18.1	0.02	56.1
60'	61'	A2864/61	30.4	0.06	43.0
100'	101'	A2865/61	13.4	0.435	61.8
120'	121'	A2866/61	11.1	0.10	79.8
140'	141'	A2867/61	25.0	0.20	56.7
160'	161'	A2868/61	25.5	0.20	52.0
180'	181'	A2869/61	4.6	0.065	77.1
193'	196'	A2870/61	4.7	0.07	77.8

ASSAY RESULTS

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
NR21					
60'	61'	A2871/61	5.8	0.02	70.6
80'	81'	A2872/61	11.0	0.06	66.9
100'	101'	A2873/61	20.1	0.38	46.9
120'	121'	A2874/61	21.2	0.38	48.4
140'	141'	A2875/61	20.6	0.82	50.7
204'	208'	A2876/61	6.9	1.05	80.9
NR22					
20'	21'	A2877/61	17.5	0.025	59.1
40'	41'	A2878/61	13.1	0.015	69.5
80'	81'	A2879/61	16.3	0.16	56.4
100'	101'	A2880/61	21.6	0.05	55.9
120'	121'	A2881/61	17.7	0.055	48.4
160'	162'	A2882/61	5.9	0.255	82.8
NR23					
120'	121'	A2883/61	7.1	0.105	50.6
138'	139'	A2884/61	4.6	0.015	77.5
142'	147'	A2885/61	1.3	0.02	94.0
NR24					
40'	41'	A2886/61	25.3	0.16	51.0
60'	61'	A2887/61	18.1	0.065	60.4
80'	81'	A2888/61	16.7	0.05	61.8
100'	101'	A2889/61	14.1	0.055	66.6
120'	121'	A2890/61	14.8	0.105	61.6
140'	141'	A2891/61	33.7	0.19	34.7
174'	179'	A2892/61	18.6	0.185	62.1
NR25					
60'	61'	A2893/61	23.6	0.135	46.9
80'	81'	A2894/61	15.1	0.055	64.6
100'	101'	A2895/61	12.0	0.04	59.6
120'	121'	A2896/61	7.9	0.065	73.6
140'	141'	A2897/61	16.5	0.635	64.3
160'	161'	A2898/61	20.0	0.675	58.0
174'	178'	A2899/61	10.2	1.91	66.7

APPENDIX C (Contd.) -6-

ASSAY RESULTS

From	To	Sample No.	Acid sol. Fe	Mn	Insoluble Matter
DR26					
60'	61'	A2900/61	16.3	0.89	62.2
80'	81'	A2901/61	12.9	0.50	68.0
96'	100'	A2902/61	14.1	1.58	73.6
DR27					
64'	66'	A2903/61	2.60	0.05	84.7
DR29					
40'	41'	A2904/61	21.2	0.08	55.9
130'	135'	A2905/61	7.65	0.075	73.6
194'	196'	A2906/61	13.1	1.20	70.9
DR30					
68'	69'	A2907/61	1.20	0.035	96.5
DR31					
60'	61'	A2908/61	0.82	0.005	87.1
112'	117'	A2909/61	3.90	0.075	81.1

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