

DEPT. NAT. RES & ENV



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A.P.M. DEVELOPMENT PTY. LTD.

ROSEDALE NO. 1 W462

WELL COMPLETION REPORT

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ROSEDALE NO. 1 WELL

GIPPSLAND, VIC.

WELL COMPLETION REPORT

By: J.E. Smith,
Geologist,
A.P.M. Development Pty. Ltd.,

* * *

I - SUMMARY

Drilling commenced in Post Kalimnan sands and clays. At a depth of 170 ft. Tertiary beds were encountered, these consisted of Latrobe Valley coal measures and persisted to a depth of 2,345 ft. The Latrobe Valley coal measures comprise thick seams of brown coal with interbedded sands and clays. Five major seams of coal occur in the Snake Ridge area. A tentative correlation of these seams with known seams which occur to the south and west of Rosedale, has been made. Underlying the Tertiary coal beds are Jurassic sandstones and shales with thin bands of black coal. The Jurassic beds are fairly uniform throughout and were still being penetrated at 5836 ft. (T.D.) Some seismic reflection work was carried out by the Bureau of Mineral Resources in the vicinity of Rosedale No. 1 Borehole. Results of these tests indicate the base of the Jurassic is below 6,000 ft, possibly between 7500-8500 ft.

II - INTRODUCTION

On 15th September 1959, the Minister for National Development granted A.P.M. Development Pty. Ltd., a subsidy under the Petroleum Search Subsidy Act 1957/58 to drill a stratigraphical borehole near Rosedale, Victoria. The target depth of the hole was 5,000 ft. and the amount of subsidy to be granted was not to exceed £48,000.

The reasons for drilling a stratigraphical borehole in this area were fourfold :-

(i) To attempt to locate the buried edge of the Jurassic unconformity beneath the Tertiaries which is thought may be the seepage plane for oil

(ii) To establish the presence of a structure in the Rosedale-Kilmany area which was indicated in geophysical survey data and by field observations

(iii) To locate the marine-fresh water junction of the Tertiary deposits which occurs somewhere between Sale and Traralgon

(iv) To obtain general geological data to make for a better appraisal of the geology of the Latrobe Valley.

It had been intended to drill a conventional borehole, coring for approximately 10% of the hole. At the request of the State Electricity Commission of Victoria, extra coring was carried out in the Tertiary coal measures to assist that body in their investigations into brown coal deposits in the Latrobe Valley.

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Drilling commenced on 27th February 1960, and was completed on 10th May 1960, at a depth of 5836 ft., approval to drill beyond the target depth being obtained from the Director of the Bureau of Mineral Resources.

III - WELL HISTORY

1. GENERAL DATA:

- (a) Well Name and Number - Rosedale No.1
- (b) Location - Latitude - 38° 8' S
Longitude - 146° 47' E
- (c) Tenement Holder - A.P.M. Development Pty. Ltd.,
Southgate,
South Melbourne.
- (d) Petroleum Tenement - Petroleum Prospecting
Licence No. 192.
- (e) District - Gippsland, Victoria.
- (f) Total Depth - 5836 feet.
- (g) Drilling Commenced - 27th February, 1960.
- (h) Drilling Completed - 10th May, 1960.
- (i) Well Suspended - 10th May, 1960.
- (j) Rig Released - 17th May, 1960.
- (k) Drilling Time - 74 days.
- (l) Elevation - Ground - 176.22 ft.
Rotary Table - 186.05 ft.
- (m) Status - Suspended. Cement plugs set
at 9⁵/₈" casing shoe and at surface.
- (n) Cost. £87,082

2. DRILLING DATA:

- (a) Drilling Contractor - Oil Drilling & Exploration Ltd.
82 Elizabeth Street,
Sydney, N.S.W.

(b) Drilling Plant -

Make	-	Brewster
Type	-	N 4
Rated Capacity	-	8,000 ft.
2 $\frac{7}{8}$ " Drill Pipe	-	

Motors:-

Make	-	General Motors
Type	-	Diesel Model 12107

(c) Derrick

Make	-	Lee C. Moore
Type	-	126' Cantilever
Rated Capacity	-	325,000 lbs.

(d) Pumps

Make	-	Oilwell
Type	-	214 P
Size	-	7 $\frac{1}{2}$ " x 14"

Pump Motors:-

Make	-	General Motors
Type	-	Diesel Model 12107

(e) Blow-out Preventer Equipment

Make	-	Cameron
Size	-	10" and 12"
Series	-	900

(f) Hole sizes and depths

12 $\frac{1}{4}$ " hole drilled to 310 ft. then reamed to 17 $\frac{1}{2}$ " and cased with 13 $\frac{3}{8}$ " casing.

8 $\frac{3}{4}$ " hole drilled to 310 ft. - 2483 ft. then reamed to 12 $\frac{1}{4}$ " and cased with 9 $\frac{5}{8}$ " casing

8 $\frac{3}{4}$ " hole drilled to 5836 ft. (T.D.)

(g) Casing & Liner Details

(1) Surface String

Size	-	13 $\frac{3}{8}$ "
Weight	-	48 lbs
Grade	-	H 40
Setting Depth	-	310 ft.

(2) Intermediate String

Size	-	9 $\frac{5}{8}$ "
Weight	-	36 lbs.
Grade	-	J 55
Setting Depth	-	2483 ft.

(h) Casing & Liner Cementing Details

(1) Surface String

Size	-	13 $\frac{3}{8}$ "
Setting Depth	-	310 ft.
Qty. of cement used	-	270 sacks
Cemented to	-	Surface
Method used	-	Plug

(2) Intermediate String

Size	-	9 $\frac{5}{8}$ "
Setting Depth	-	2483 ft.
Qty. of cement used	-	860 sacks
Method used	-	Plug
Cemented to	-	1050 ft. (approx.)

(i) Drilling Fluid

A bentonite base mud was used throughout the drilling operation. Normal additives, myrtan, caustic soda, starch barytes and C.M.C. were used when required.

To a depth of 310 ft. Euclin "B", a ligneous salt bi-product of wood pulping was used in place of myrtan and appeared to behave favourably. Average weight of the mud was 73 lbs/gallon.

Average weekly analyses of mud are set out below:-

Week Ending	5/3	12/3	19/3	26/3	2/4	9/4	16/4	23/4	30/4	7/5
Weight (lbs/gl)	71	70	71	69	75	76	76	76	75	73
Visc. Sec.	56	48	57	54	51	50	47	47	47	49
Water Loss c.c.	9	8	7	7	6.5	6.5	6	6	6	6.5
Filter cake (ins)	3/32	2/32	2/32	2/32	2/32	2/32	2/32	2/32	2/32	2/32
pH	9	9	9	10	9	10	9	9	9	9
Sand Content %	1.5	1	2.5	1	0.5	0.5	0.5	0.5	0.5	0.25

(j) Water Supply

Water supply was drawn by 4" pipe from the Latrobe River to the drilling site.

(k) Perforation and Shooting Record

Not applicable.

(l) Plugging back and squeeze jobs.

Cement plugs set at 9 5/8" casing shoe and at surface on completion of drilling.

(m) Fishing Operations

3418 ft. 4 Drill collars twisted off. Pin of 4th collar sheared off. Recovered at first run with overshot.

4259 ft. 3 Drill collars twisted off. Pin of collar sheared off. Recovered at first run with overshot.

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4476 ft. 5 Drill collars left in hole. Joint of drill pipe twisted off above collars. Recovered at first run with overshot.

4549 ft. 3 Drill collars twisted off. Pin of collar sheared off. Recovered at first run with overshot.

It was found that the twisting off of the drill collars occurred at identical positions, the position of failure being a point on the pin thread corresponding to the end of the thread in the mating socket. Consequently all drill collars on site were tested for the presence of cracks using the MAGNAFLUX Fluorescent Magnetic Method.

As a result of these tests, three drill collars were taken out of service due to severe cracking which occurred in the same position as the previous 'twist offs.' In an attempt to prevent further twisting off of drill collars they were regularly broken down and inspected for cracks and a constant torque gauge was used while reassembling them.

(n) Side tracked hole

Not applicable.

3. LOGGING AND TESTING

(a) Ditch Cuttings.

Representative cuttings were collected from the shaker screen for each five feet of hole drilled.

(b) Coring.

The original programme called for 10% conventional coring. This programme was adhered to throughout the Tertiary sequence, but owing to the uniform lithology of the Jurassic sediments, the interval between cores was extended. Wire line coring was carried out in Tertiary strata in conjunction with the State Electricity Commission of Victoria, to assist them in their brown coal investigations.

No. of conventional cores cut	-	29
Footage cored	-	531
Recovery	feet	- 388
	%	- 74

No. of wire line cores cut	-	19
Footage cored	-	190
Recovery	feet	- 75
	%	- 39

Details of all cores cut are set out below:-

<u>CONVENTIONAL CORES</u>		Footage Cored	Recovery	
Core No.	Depth		Feet	%
1	223-241 ft.	18	6	33
2	241-251 ft.	10	10	100
3	460-480 ft.	20	20	100
4	860-880 ft.	20	12	60
5	1056-1076 ft.	20	16	80
6	1260-1280 ft.	20	12	60
7	1460-1480 ft.	20	10	50
8	1660-1680 ft.	20	15	75
9	1870-1890 ft.	20	10	50
10	2080-2100 ft.	20	4	20
11	2100-2120 ft.	20	-	-
12	2260-2280 ft.	20	3	15
13	2280-2300 ft.	20	17	88
14	2370-2386 ft.	16	15	94
15	2469-2483 ft.	14	14	100
16	2705-2717 ft.	12	12	100

Core No.	Depth	Footage Cored	Recovery Feet	Recovery %
17	2710-2730 ft.	20	16	80
18	3208-3228 ft.	20	14	70
19	3447-3467 ft.	20	18	90
20	3615-3635 ft.	20	17	85
21	3926-3942 ft.	16	8	50
22	4230-4250 ft.	20	17	85
23	4476-4496 ft.	20	20	100
24	4747-4767 ft.	20	20	100
25	5045-5065 ft.	20	18	90
26	5243-5261 ft.	18	18	100
27	5495-5508 ft.	13	13	100
28	5742-5758 ft.	16	16	100
29	5818-5836 ft.	18	17	95
		531	388	74

WIRE LINE CORES

Core No.	Depth	Footage Cored	Recovery Feet	Recovery %
1	560- 570 ft.	10	7½	75
2	965- 975 ft.	10	5	50
3	975- 985 ft.	10	10	100
4	1115-1125 ft.	10	4	40
5	1185-1195 ft.	10	½	5
6	1300-1310 ft.	10	3	30
7	1350-1360 ft.	10	2	20
8	1390-1400 ft.	10	5	50
9	1505-1515 ft.	10	¾	8
10	1515-1525 ft.	10	½	5
11	1615-1625 ft.	10	¾	7
12	1800-1810 ft.	10	-	-
13	1850-1860 ft.	10	5½	55
14	1890-1900 ft.	10	7	70
15	1950-1960 ft.	10	1	10
16	1960-1970 ft.	10	1	10
17	1985-1895 ft.	10	10	100
18	2050-2060 ft.	10	1½	15
19	2191-2201 ft.	10	10	100
		190	75	39

(c) Side wall sampling.
Not applicable.

(d) Electric and other logging.

Electric logs were run at
310 ft.
2254 ft.
2483 ft.
4253 ft.
5036 ft.

(e) Drilling time and gas log.

See composite well log.

(f) Formation testing.

Not applicable.

(g) Deviation surveys.

Total deviations were run at regular intervals.

A brief summary of results is set out below:-

<u>Depth</u>	<u>Deviation</u>
150 ft.	10
1850 ft.	20
2665 ft.	10
3190 ft.	20
3440 ft.	30
3783 ft.	40
4295 ft.	20
4448 ft.	30
4950 ft.	20
5132 ft.	30
5360 ft.	40

(h) A temperature survey was run at 2433 ft., after intermediate casing string had been set in order to determine the height to which the cement had risen.

(i) Other well surveys.

Caliper log was run at 2483 ft.

Electric Dip log surveys were taken at
2480-2498 ft.
2918-2940 ft.
3220-3251 ft.
3900-3950 ft.
4450-4500 ft.

Electric Dip log
surveys were taken at 4750-4800 ft.
(Cont'd)

Directional survey was
taken from 2480-4750 ft.

(IV) GEOLOGY(1) SUMMARY OF PREVIOUS WORKGeological

Petroleum Prospecting Licences 192 and 193 cover parts of three structural and physiographic regions :-

- (a) Central Highlands
- (b) Gippsland Plains and Latrobe Valley
- (c) South Gippsland Highlands.

With the exception of some Mesozoic sediments, Palaeozoic Rocks and Tertiary basalt occurring in the Central Highlands to the northwest of Rosedale, practically no surface outcrops are to be found, the whole area being covered by recent sands and gravels. Some work has been carried out on the Mesozoic outcrops in the Central Highlands and they are found to comprise 2000 ft. + of Jurassic conglomerates and sandstones (Philip 1957).^K

Geophysical

Regional gravity and magnetometric surveys have been carried out over the area by Bureau of Mineral Resources (1948). These show remarkable correspondence between the gravity contours and the surface contours of the country and indicate the presence of some type of structure in the Rosedale-Kilmany area.

Drilling

Subsurface geological information is scarce within the licence areas, due to the lack of any deep drilling. A.P.M's hot water bores at Maryvale and the Boola Boola oil bore, about 15 miles to the west of Rosedale, were drilled to depths less than 2,000 ft. and did not penetrate the Tertiary brown coal measures.

To the east of Rosedale near Sale, the Warruk Warruk bore reached a depth of 3214 ft. passed through entirely Marine Tertiary beds with some suspect Mesozoic sandstone near the bottom of the hole.

(2) STRATIGRAPHY

(a) Palaeozoic Rocks These outcrop in the Central Highlands, where they strike generally north-south. Basement rocks under P.P.L's 192 and 193 could be the southerly continuation of Silurian and Lower Devonian sandstones, slates, mudstones and limestones, which outcrop about Tyers River, Toongabbie and Thompson River areas.

(b) Mesozoic Rocks Outcrop on the southern borders of the Eastern Highlands. They consist of thick basal conglomerates, felspathic sandstones and mudstones with some thin black coal seams.

(c) Tertiary Rocks The Tertiary succession is very complex stratigraphically. It includes volcanic, fresh water and marine deposits.

(i) Marine Tertiary Rocks consist of Post Kalimnan sands, silts and gravels up to 500 ft. thick in places. These are underlain by the Jemmy's Point formation of friable shelly sandstones and the Mitchell River formation of marls and clays with foraminifera, bryozoa and shells. These in turn are underlain by the Gippsland Limestone formation, which are widespread in Gippsland and are up to 1800 ft. thick. At the base of the Marine Tertiaries is the Lakes Entrance formation, consisting of brown to greenish grey marls up to 77 + ft. in thickness with the oil bearing glauconitic bed at the base.

(ii) Fresh Water Tertiary Rocks Passing to the west in the Latrobe Valley, marine Tertiaries give way to non marine deposits consisting of recent alluvium underlain by Upper Pliocene sands, gravels and clays which are in turn underlain by the Latrobe Valley Coal measures. The maximum thickness of non marine rocks is of the order of 2,000 ft. in the Morwell area. The Tertiary succession thickens eastwards, marine beds become interbedded with non marine deposits.

Formations Encountered in Rosedale No.1 Borehole

(a) Post Kalminan These sediments consist of 170 ft. of fine to coarse quartz sands/[&]interbedded puggy grey clays.

(b) Tertiary The whole of the Tertiary sequence (2175 ft.) penetrated in the borehole consisted of fresh water beds comprising the Latrobe Valley coal measures. Brown coal was struck at 170 ft. and the top of the Jurassic has been placed at 2345 ft. The Latrobe Valley coal measures consist of thick beds of brown coal with interbedded sands and clays. Five major coal seams appear to occur here, thickness of these seams are set out below :-

<u>DEPTH</u>	<u>THICKNESS</u>	<u>NAME</u>
(i) 170-475 ft.	305 ft.	Yallourn
(ii) 525-755 ft.	230 ft.	Morwell IA
(iii) 855-1205 ft.	350 ft.	Morwell IB
(iv) 1260-1705 ft.	435 ft.	Morwell II
(v) 1820-2060 ft.	240 ft.	Traralgon.

Due to the relatively large number of minor coal seams and clay and sand bands within these major divisions, correlation with the known coal seams in the Latrobe Valley given above, can only be regarded as tentative.

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(e) Mesozoic Jurassic sediments persisted from 2345 ft. to the total depth of the hole (5836 ft.) This sequence consists of compact fine to medium grained grey sandstones, felspathic near the top and becoming calcareous towards the base, with interbedded shales, siltstones, mudstones and black coal seams. The beds are strongly current bedded and extensively fractured, fracture zones being usually calcite filled, sometimes with associated pyrite. Some evidence of faulting is also seen in slickensides and fault breccias which occur in some of the cores taken. Plant remains and leaf impressions, carbonaceous stringers and black coal seams (some up to 3 ft. thick) are common throughout. The Jurassic rocks are fairly uniform lithologically and their total thickness is unknown. Some seismic work was carried out towards the end of the drilling operation but final analyses of this information was not available until drilling had ceased and the rig was being dismantled. The results of the seismic work indicated that the base of the Jurassic sediments could be at 6,000 ft. or more likely as deep as 7,600 ft. or even 8,500 ft.

(3) STRUCTURE

The area covered by the prospecting licences is quite extensively faulted. Major faults, which in part are also monoclinical folds, form the boundaries of the Gippeland Plains against the Central Highlands and the South Gippeland Highlands. There appears to be a remarkable correspondence between gravity contours and the surface contours of the country.

Examination of the gravity survey over the area indicates some type of structure in the Rosedale area. Electric Dip Log Surveys and dip measurements on cores from the borehole show dips from 20-30° to the south west. This confirms the presence of some type of structure - possibly anticlinal with a north west - south east axis.

X (4) RELEVANCE TO OCCURRENCE OF PETROLEUM

Results obtained from drilling have shown that although some type of structure occurs on Snake Ridge, the Tertiary rocks penetrated are entirely fresh water sediments and would be unlikely to contain oil, the Jurassic sediments are compact, non porous sandstones and shales, and although extensively fractured, the fracture zones have been filled by calcite and thus permeability is low and would not form a petroleum reservoir under these conditions. The Jurassic rocks would, however, form an excellent cap rock for any petroleum which is present in the underlying Middle or Lower Devonian limestone which may occur here under the Jurassic and could be a source rock for petroleum.

(5) POROSITY AND PERMEABILITY OF SEDIMENTS PENETRATED

Porosity and Permeability determinations have been carried out by the Bureau of Mineral Resources. Generally the porosity of Tertiary sediments is fairly high varying from 10-43%, permeability of the brown coals in this sequence is also good, varying from 16-74 millidarcies. In the Jurassic sediments the porosity is only fair 3-5% while the permeability is nil. Tabulated results of the determinations made by the Bureau of Mineral Resources, are included as an appendix to this report.

(6) CONTRIBUTION TO GEOLOGICAL CONCEPTS RESULTING FROM DRILLING

(a) Stratigraphy

(i) Tertiary The Tertiary sequence is of the expected order of thickness in this area and is comprised of completely fresh water sediments. It had been thought that brown coal beds would be thinning out and they would be, in part, be intercalated with marine Tertiary beds which occur around the Sale area. The marine-

fresh water Tertiary junction can now be placed somewhere between Rosedale and Sale.

(ii) The Mesozoic sequence comprises a uniform series of sandstones and shales with thin black coal seams. Considerable thicknesses of Jurassic sediments occur in South Gippsland but only 2020 ft. occur to the northwest of Rosedale (Philip 1957). It was expected that this sequence would thin near the borehole but drilling and seismic observations indicate there may be up to 5,000 ft. of Jurassic here and that the buried edge of the Jurassic unconformity will occur some distance to the north of Rosedale. The compactness of these sediments is not favourable for oil accumulation but they could form a cap rock for oil which may occur in the underlying Palaeozoic rocks.

(b) Structure Surface observations and geophysical data indicate the presence of some type of structure in the Rosedale-Kilmany area. Drilling has confirmed the presence of this structure. Electric dip log surveys and dip measurements from cores show that the beds dip from 20-30° to the southwest. The exact nature of this structure is still unknown but it is possibly anticlinal with a northeast-southwest axis.

(VI) ENCLOSURES

(1) Geological sketchmap of P.P.L's 192 and 193 showing location of Rosedale No.1 Borehole.

(2) Diagramatic cross sections through Rosedale No.1 Borehole before and after drilling.

(3) Composite Well Log.

(4) Copies of :-

(a)	Electric Well Logs at	-	310 ft. 2254 ft. 2483 ft. 4253 ft. 5836 ft.
(b)	Temperature Log at	-	2433 ft.
(c)	Caliper Log at	-	2483 ft.
(d)	Electric Dip Log Survey at	-	5836 ft.
(e)	Directional Survey at	-	5836 ft.

(5) ~~Sketchmap of Rosedale No. 1.~~

APPENDICES

- (1) Rosedale No.1 - Lithological Log.
by J.E. Smith,
A.P.M. Development Pty. Ltd.

 - (2) Palynological Examination of Rosedale Bore Samples
by J. Douglas,
State Mines Department - Vic.

 - (3) Micro and Macrofloral Examination of bore core samples
from A.P.M. Rosedale No.1 Bore.
by J. Douglas,
State Mines Department - Vic.

 - (4) Spore Analyses - A.P.M. Development, Rosedale No. 1.
by P.R. Evans,
Bureau of Mineral Resources.

 - (5) Porosity and Permeability Determinations, Rosedale No.1.
by Bureau of Mineral Resources.
 - (6) Bit Record - Rosedale No.1.
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APPENDIX 1

ROSEDALE NO. 1

LITHOLOGICAL LOG

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ROSEDALE NO. 1 - LITHOLOGICAL LOG

Rosedale-1

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<u>DEPTH</u>	<u>LITHOLOGY</u>
15-20 ft.	Yellow brown friable porous sandstone with some bands of compact grey-brown and soft purple siltstone.
20-25 ft.	Puggy cream clay with some yellow iron staining and occasional inclusions of brownish sandstone.
25-30 ft.	Do.
30-35 ft.	Do. with common yellow streaks and some pink staining.
35-40 ft.	Do. with some fine grained sub-angular quartz grains.
40-45 ft.	Light yellow puggy clay with thin bands of white clay and some quartz grains.
45-50 ft.	Puggy cream clay with some yellow staining.
50-55 ft.	Puggy white clay with some yellow staining.
55-60 ft.	Fairly coarse clean quartz sand and light brown fine sand.
60-65 ft.	Puggy white clay.
65-70 ft.	Puggy white clay, greasy, some yellow streaks and occasional brownish red sandstone inclusions.
70-75 ft.	Cream-white clay, slightly silty, with some yellow streaks.
75-80 ft.	Cream silty clay with some yellow streaks
80-85 ft.	Fairly coarse sand with some clay and silt.
85-90 ft.	Loose quartz sand with common yellow to red staining, angular to sub-angular, some silt and clay.
90-95 ft.	No sample taken.
95-100 ft.	Light grey silty clay with some quartz grains and some yellow streaks.
100-105 ft.	Grey silty clay with common yellow streaks.

- 105-110 ft. Light grey silt with some yellow staining.
- 110-115 ft. Light yellow brown fine silty sand.
- 115-120 ft. Do. with coarse quartz fragments.
- 120-125 ft. Coarse, loose, angular quartz sand with some iron staining.
- 125-130 ft. Light yellow brown (some dark grey) fine silty sand with coarse quartz grains and yellow staining.
- 130-135 ft. Coarse, angular to rounded free quartz sand with some iron staining.
- 135-140 ft. Do. Locally pyritic. Occasional partly decomposed wood fragments.
- 140-145 ft. Coarse, angular to rounded free quartz sand with some iron staining, locally pyritic.
- 145-150 ft. Do. commonly pyritic.
- 150-155 ft. Do. locally pyritic.
- 155-160 ft. Grey silty clay with some coarse quartz grains, as above.
- 160-165 ft. Light grey silt, clayey in places some quartz grains as above.
- 165-170 ft. Do.
- 170-175 ft. Brown coal with some partly decomposed wood fragments.
- 175-180 ft. Grey-brown ligneous clay.
- 180-185 ft. Brown coal.
- 185-190 ft. Brown coal.
- 190-195 ft. Puggy grey brown clay with some brown coal fragments.
- 195-200 ft. Brown coal with some well preserved wood fragments.
- 200-205 ft. Brown coal.
- 205-210 ft. Puggy grey brown clay with some brown coal fragments.

- 210-215 ft. Sandy grey brown clay with some brown coal fragments.
- 215-220 ft. Sandy grey brown clay with some large quartz grains and thin bands of white clay.
- 223-228 ft. Grey silty clay with some brown coal fragments and white clay bands.
- 228-233 ft. Grey silty clay and inferior brown coal.
- 233-238 ft. Inferior brown coal.
- 238-241 ft. Grey brown silty clay with some inferior brown coal.

Core No. 1 223-241 ft. Recovery 6 ft.

- 235-241 ft. Fairly tight brown coal with some thin stringers of grey fine grained sand and a few thin bands of grey clay.
- 241-246 ft. Inferior brown coal and grey silty clay.
- 246-251 ft. Brown grey ligneous clay.

Core No. 2 241-251 ft. Recovery 10 ft.

- 241-244 ft. Very compact white to grey puggy clay.
- 244-248 ft. Friable brown coal in which the original woody structure is fairly well-preserved. Some thin stringers of white calcareous material.
- 248-251 ft. Clayey brown coal with some plant remains.
- 251-255 ft. Puggy grey clay, some brown coal and white clay fragments.
- 255-260 ft. Grey brown silty clay with some brown coal fragments.
- 260-265 ft. Puggy light grey clay with some brown coal fragments and angular quartz pebbles.
- 265-270 ft. Puggy light grey silty clay with some brown coal fragments.
- 270-275 ft. Puggy white and grey clay, locally silty.

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- 275-280 ft. Brown silty clay with white clay bands and some brown coal fragments.
- 280-285 ft. Puggy grey clay with white clay bands and some brown coal fragments.
- 285-290 ft. Light grey silty clay.
- 290-295 ft. Do.
- 295-300 ft. Do.
- 300-305 ft. Do.
- 305-310 ft. Greyish-brown silty clay.
- 310-315 ft. Greyish brown silty clay with some white clay streaks.
- 315-320 ft. Do. and brown coal.
- 320-325 ft. Partly decomposed wood fragments and brown coal. Some white clay.
- 325-330 ft. Do.
- 330-335 ft. Brown coal commonly showing wood structure.
- 335-340 ft. Puggy grey clay with some white clay streaks.
- 340-345 ft. Puggy light grey clay with some brown coal
- 345-350 ft. Partly decomposed wood with reddish brown leaf remains.
- 350-355 ft. Do. with brown leaf remains.
- 355-360 ft. Do. with some white clay.
- 360-365 ft. Brown coal with some plant remains and grey white clay.
- 360-370 ft. Ligneous clay.
- 370-375 ft. Ligneous clay with a few clear quartz grains.
- 375-380 ft. Brown coal with some ligneous clay and a few soft white calcareous nodules.
- 380-385 ft. Brown coal with a few soft white calcareous nodules.
- 385-390 ft. Soft brown coal.

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- 390-395 ft. Soft brown coal.
- 395-400 ft. Brown coal with some decomposed wood fragments.
- 400-405 ft. Soft brown coal with some decomposed wood fragments.
- 405-410 ft. Do.
- 410-415 ft. Brown coal.
- 415-420 ft. Brown coal with decomposed wood fragments.
- 420-425 ft. Soft brown coal with decomposed wood fragments.
- 425-430 ft. Do. with some white calcareous nodules.
- 430-435 ft. Do. with some grey silty clay and white calcareous nodules.
- 435-440 ft. Do. with some calcareous nodules.
- 440-445 ft. Do. with some decomposed wood fragments and calcareous nodules.
- 445-450 ft. Brown coal and ligneous clay with some white calcareous nodules.
- 450-455 ft. Ligneous clay and some brown coal and calcareous nodules.
- 455-460 ft. Brown coal and some ligneous clay, few white calcareous nodules.
- 460-465 ft. Soft brown coal with some white calcareous nodules.
- 465-470 ft. Clayey brown coal and some grey clay.
- 470-475 ft. Clayey brown coal.
- 475-480 ft. Puggy grey-brown clay.

Core No. 3 460-480 ft. Recovery 20 ft.

460-474 ft. Friable brown coal with some zones of compact coal with plant remains and some white calcareous nodules.

474-477 ft. Compact brown coal.

477-480 ft. Compact greasy, light grey clay with some brown coal inclusions.

- 480-485 ft. Ligneous clay with some brown coal.
- 485-490 ft. Do.
- 490-495 ft. Dark grey puggy clay.
- 495-500 ft. Do.
- 500-505 ft. Do.
- 505-510 ft. Do.
- 510-515 ft. Do. with some brown coal.
- 515-520 ft. Do. with some brown coal.
- 520-525 ft. Do. with some brown coal and decomposed wood fragments.
- 525-530 ft. Inferior brown coal - clayey.
- 530-535 ft. Soft friable brown coal.
- 535-540 ft. Brown coal and ligneous clay.
- 540-545 ft. Ligneous clay and brown coal with some grey clay.
- 545-550 ft. Ligneous clay with some brown coal.
- 550-555 ft. No sample taken.
- 555-560 ft. Soft friable brown coal with some white calcareous nodules.
- 560-565 ft. Brown coal.
- 565-570 ft. Brown coal.

Wire-Line Core No. 1 560-570 ft. - Recovery 7½ ft.

- 562½-566 ft. Friable brown coal
- 566-568 ft. Compact brown coal
- 568-570 ft. Compact brown coal with some friable zones.
- 570-575 ft. Brown coal with some plant remains.
- 575-580 ft. Brown coal - slightly clayey in parts.
- 580-585 ft. Hard brown coal.
- 585-590 ft. Inferior brown coal and ligneous clay.

- 590-595 ft. Inferior brown coal and ligneous clay.
- 595-600 ft. Do.
- 600-605 ft. Soft friable brown coal.
- 605-610 ft. Ligneous clay and some brown coal with a few white calcareous nodules.
- 610-615 ft. Ligneous clay.
- 615-620 ft. Ligneous clay.
- 620-625 ft. Inferior brown coal - clayey.
- 625-630 ft. Ligneous clay and inferior brown coal.
- 630-635 ft. Ligneous clay and inferior brown coal.
- 635-640 ft. Ligneous clay and inferior brown coal.
- 640-645 ft. Brown coal with partly decomposed wood fragments.
- 645-650 ft. Brown coal with some partly decomposed wood fragments.
- 650-655 ft. Inferior brown coal - locally clayey.
- 655-660 ft. Puggy dark grey-brown ligneous clay.
- 660-665 ft. Do. with streaks of light grey silty clay.
- 665-670 ft. Do. with streaks of light grey silty clay.
- 670-675 ft. Silty dark grey ligneous clay with streaks of light grey silty clay.
- 675-680 ft. Do.
- 680-685 ft. Ligneous clay and inferior brown coal with some white calcareous nodules.
- 685-690 ft. Ligneous clay and inferior brown coal.
- 690-695 ft. No sample taken.
- 695-700 ft. Brown coal.
- 700-705 ft. Inferior brown coal and ligneous clay.

- 705-710 ft. Dark grey-brown ligneous clay, some inferior brown coal and some light grey silt.
- 710-715 ft. Dark grey-brown ligneous clay, locally silty with some light grey clay streaks.
- 715-720 ft. Inferior brown coal - clayey in places.
- 720-725 ft. Do.
- 725-730 ft. Do.
- 730-735 ft. Brown coal.
- 735-740 ft. Inferior brown coal with some light grey silty clay.
- 740-745 ft. Brown coal slightly clayey in places.
- 745-750 ft. Friable brown coal.
- 750-755 ft. Friable brown coal with some decomposed wood fragments.
- 755-760 ft. Dark grey puggy clay with some brown coal and some light grey silty clay streaks.
- 760-765 ft. Do.
- 765-770 ft. Dark grey puggy clay with some silty clay streaks.
- 770-775 ft. Ligneous clay and some clayey brown coal.
- 775-780 ft. Do. with some grey silty streaks.
- 780-785 ft. Do. with light grey silty clay streaks.
- 785-790 ft. Dark grey puggy clay with some brown coal, a few quartz grains and silty streaks.
- 790-795 ft. Do. with coarse rounded quartz grains.
- 795-800 ft. Loose sand of even grained rounded fairly coarse, colourless to opaque quartz grains showing some brown staining.
- 800-805 ft. Do. finer grained and more rounded
- 805-810 ft. Do. Do.
- 810-815 ft. Do. coarse and more rounded.

815-820 ft. Loose sand as above with some angular grains.
820-825 ft. Do. some fine rounded grains.
825-830 ft. Do.
830-835 ft. Do.
835-840 ft. Do. slightly coarse.
840-845 ft. Do.
845-850 ft. Do.
850-855 ft. Do.
855-860 ft. Clayey brown coal with some quartz grains.
860-865 ft. Medium grained quartz sand with some clayey brown coal.
865-870 ft. Clayey brown coal with some quartz grains
870-875 ft. Medium grained quartz sand and some clayey brown coal.
875-880 ft. Ligneous clay and medium grained quartz sand.

Core No.4 860-880 ft. Recovery 12 ft.

868-880 ft. Compact brown ligneous clay showing some slickensides.
880-885 ft. Grey puggy clay.
885-890 ft. Inferior brown coal.
890-895 ft. Do.
895-900 ft. Friable brown coal.
900-905 ft. Do.
905-910 ft. Clayey brown coal.
910-915 ft. Brown coal.
915-920 ft. Ligneous clay and brown coal.
920-925 ft. Do.
925-930 ft. Brown coal.

930-935 ft. Ligneous clay and brown coal.
 935-940 ft. Do.
 940-945 ft. Do.
 945-950 ft. Do.
 950-955 ft. Brown coal with some rounded quartz grains.
 955-960 ft. Do. quartz grains more abundant.
 960-965 ft. Brown coal and ligneous clay with some quartz grains.
 965-970 ft. Do. and fine grained unconsolidated grey silt.
 970-975 ft. Friable brown coal and ligneous clay.

Wire Line Core No. 2 965-975 ft. Recovery 5 ft.

969-971 ft. Unconsolidated grey silt.
 971-973 ft. Ligneous clay.
 973-975 ft. Friable brown coal.

975-980 ft. Friable brown coal.
 980-985 ft. Do.

Wire Line Core No. 3 975-985 ft. Recovery 10 ft.

975-985 ft. Friable brown coal.

985-990 ft. Friable brown coal.
 990-995 ft. Do.
 995-1000 ft. Do.
 1000-1005 ft. Do.
 1005-1010 ft. Do.
 1010-1015 ft. Do. with decomposed wood fragments.
 1015-1020 ft. Do. Do.

- 1020-1025 ft. Friable brown coal, more brittle, locally clayey.
- 1025-1030 ft. Friable brown coal, more brittle, locally clayey.
- 1030-1035 ft. Friable brown coal, more brittle, locally clayey.
- 1035-1040 ft. Friable brown coal with ligneous clay.
- 1040-1045 ft. Brittle brown coal locally clayey.
- 1045-1050 ft. Ligneous clay.
- 1050-1055 ft. Puggy ligneous clay.
- 1055-1060 ft. Brittle brown coal.
- 1060-1065 ft. Brown coal.
- 1065-1070 ft. Brown coal, locally clayey.
- 1070-1075 ft. Brown coal.
- 1075-1080 ft. Friable brown coal and some light grey silty clay.

Core No. 5 1056-1076 ft. Recovery 16 ft.

- 1060-1064 ft. Unconsolidated friable fine grained grey sandstone.
- 1064-1068 ft. Ligneous clay with some fine grained grey sandy stringers.
- 1068-1076 ft. Friable brown coal with some fine grey sandy stringers, locally clayey, inclusions of fossil resin up to $\frac{1}{2}$ " in dia.
- 1080-1085 ft. Friable brown coal with some light grey silty clay.
- 1085-1090 ft. Friable brown coal.
- 1090-1095 ft. Do. with some quartz grains and fine sand.
- 1095-1100 ft. Brittle brown coal with abundant quartz grains and some fine sand.
- 1100-1105 ft. No sample taken.

- 1105-1110 ft. Loose rounded medium grained quartz sand, locally pyritic and some fine sand.
- 1110-1115 ft. Do.
- 1115-1120 ft. No sample taken.
- 1120-1125 ft. Free clean coarse grained rounded quartz sand locally pyritic.

Wire Line Core No. 4 115-1125 ft. Recovery 4 ft.

- 1121-1125 ft. Dark grey silty sand with some brown coal inclusions.
- 1125-1130 ft. Free clean rounded coarse quartz sand, locally pyritic.
- 1130-1135 ft. Do. quartz more angular, and brown coal 50/50.
- 1135-1140 ft. Do.
- 1140-1145 ft. Do.
- 1145-1150 ft. Do.
- 1150-1155 ft. Do. with some brown coal
- 1155-1160 ft. Do.
- 1160-1165 ft. Do. and brown coal 50/50.
- 1165-1170 ft. Friable brown coal.
- 1170-1175 ft. Brown coal with decomposed wood fragments.
- 1175-1180 ft. Brown coal
- 1180-1185 ft. Brown coal with some silt.
- 1185-1190 ft. Brown coal with white soft powdery calcareous nodules and some decomposed wood.
- 1190-1195 ft. Do.

Wire Line Core No. 5 1185-1195. Recovery 6 ins.

- 1194-1195 ft. Sandy brown coal
- 1195-1200 ft. Brown coal with white soft powdery calcareous nodules and some decomposed wood, some rounded quartz grains.
- 1200-1205 ft. Do.

- 1205-1210 ft. Medium grained rounded quartz sand.
- 1210-1215 ft. Do.
- 1215-1220 ft. Do.
- 1220-1225 ft. Do. locally pyritic.
- 1225-1230 ft. Clear medium grained loose quartz sand.
- 1230-1235 ft. Brown coal with white calcareous nodules and medium grained rounded quartz sand, locally pyritic.
- 1235-1240 ft. Medium grained rounded quartz sand and some brown coal.
- 1240-1245 ft. Medium grained rounded to angular quartz sand - many sand grains are opaque grey.
- 1245-1250 ft. Clear medium grained loose quartz sand, locally pyritic
- 1250-1255 ft. Do. many quartz grains opaque grey.
- 1255-1260 ft. Do. quartz grains stained brown.
- 1260-1265 ft. Compact brown coal.
- 1265-1270 ft. Do.
- 1270-1275 ft. Friable brown coal.
- 1275-1280 ft. Do.
- Core No. 6 1260-1280 ft. Recovery 12 ft.
- 1268-1270 ft. Friable brown coal.
- 1270-1271 ft. Grey silt.
- 1271-1275 ft. Friable brown coal.
- 1275-1277 ft. Compact brown coal - clayey.
- 1277-1278 ft. Grey silt.
- 1278-1280 ft. Compact brown coal
- 1280-1285 ft. Brown coal with white powdery calcareous nodules, some quartz grains and grey silt.
- 1285-1290 ft. Soft friable brown coal, locally pyritic.
- 1290-1295 ft. Brown coal with some thin white calcareous streaks.
- 1295-1300 ft. Do.

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- 1300-1305 ft. Brown coal.
- 1305-1310 ft. Brown coal.
- 1310-1315 ft. Brown coal with some decomposed wood fragments.

Wire line Core No. 6 1300-1310 ft. Recovery 3 ft.
1307-1310 ft. Friable Brown Coal.

- 1315-1320 ft. Brown coal.
- 1320-1325 ft. Inferior brown coal with abundant white powdery calcareous nodules.
- 1325-1330 ft. Inferior brown coal with some white powdery nodules.
- 1330-1335 ft. Do.
- 1335-1340 ft. Brown coal with a few white calcareous nodules.
- 1340-1345 ft. Do. with some quartz grains.
- 1345-1350 ft. Brown coal and ligneous clay with some quartz grains.
- 1350-1355 ft. Brown coal with a few quartz grains.
- 1355-1360 ft. Brown coal and white powdery calcareous nodules 50/50.

Wire Line Core No. 7 1350-1360 ft. Recovery 2 ft.

- 1358-1360 ft. Ligneous clay with thin bands of grey silt.
- 1360-1365 ft. Brown coal with white calcareous nodules, some plant remains and quartz grains.
- 1365-1370 ft. Medium grained rounded quartz sand with some brown coal and calcareous nodules.
- 1370-1375 ft. Brown coal with some calcareous nodules and quartz grains.
- 1375-1380 ft. Soft brown coal.
- 1380-1385 ft. Soft brown coal.
- 1385-1390 ft. Brittle brown coal - clayey.
- 1390-1395 ft. Do.

1395-1400 ft. Brittle Brown coal - clayey.

Wire Line Core No.8 1390-1400 ft. Recovery 5 ft.

1395-1400 ft. Ligneous clay with thin bands of grey silt.

1400-1405 ft. Brittle brown coal, clayey, with some quartz grains.

1405-1410 ft. Do.

1410-1415 ft. Brown coal with some quartz grains.

1415-1420 ft. Medium grained sub-rounded to angular, brown stained quartz sand with some brown coal, locally pyritic.

1420-1425 ft. Do.

1425-1430 ft. Ligneous clay with some brown coal and quartz sand.

1430-1435 ft. Do.

1435-1440 ft. Brown coal, locally pyritic and some medium grained quartz sand.

1440-1445 ft. Loose rounded to angular medium grained quartz sand.

1445-1450 ft. Do. some opaque grey grains.

1450-1455 ft. Do. some very fine sand.

1455-1460 ft. Do. some brown coal with calcareous nodules.

1460-1465 ft. Brown coal.

1465-1470 ft. Brown coal.

1470-1475 ft. Brown coal.

1475-1480 ft. Brown coal.

Core No.7 1460-1480 ft. Recovery 10 ft.

1470-1472 ft. Black silty sand.

1472-1480 ft. Friable brown coal.

1480-1485 ft. Brown coal, clayey in parts with some calcareous nodules.

1485-1490 ft. Do.

1490-1495 ft. Do.

- 1495-1500 ft. Brown coal, clayey in parts with some calcareous nodules.
- 1500-1505 ft. Do.
- 1505-1510 ft. Brown coal with some calcareous nodules, some rounded quartz sand and silt.
- 1510-1515 ft. Silty brown coal with some calcareous nodules and quartz grains.
- Wire Line Core No.9 1510-1515 ft. Recovery 8 ins.
1514-1515 ft. Silty brown coal.
- 1515-1520 ft. Silty brown coal with some calcareous nodules.
- Wire Line Core No.10 1515-1525 ft. Recovery 6 ins.
1524-1525 ft. Fine sand.
- 1520-1525 ft. Brown coal with some silt, calcareous nodules and quartz grains.
- 1525-1530 ft. Loose rounded medium grained quartz sand and some silt.
- 1530-1535 ft. No sample taken.
- 1535-1540 ft. Medium grained loose rounded quartz sand and some silt.
- 1540-1545 ft. Do. some coarse quartz grains.
- 1545-1550 ft. Do. some coarse quartz grains.
- 1550-1555 ft. Do. some coarse quartz grains - pyritic.
- 1555-1560 ft. Do. and coarse quartz grains.
- 1560-1565 ft. Do. and coarse quartz grains.
- 1565-1570 ft. Do. some coarse quartz grains.
- 1570-1575 ft. Do. some coarse quartz grains.
- 1575-1580 ft. Do. and some silty brown coal.
- 1580-1585 ft. Brown coal with some white calcareous nodules.
- 1585-1590 ft. Brown coal.
- 1590-1595 ft. Loose medium grained rounded quartz sand.

- 1595-1600 ft. Brown coal and medium grained quartz sand.
- 1600-1605 ft. Medium grained quartz sand and some inferior brown coal, some pyritic.
- 1605-1610 ft. Do.
- 1610-1615 ft. Do.
- 1615-1620 ft. Do.
- 1620-1625 ft. Loose rounded medium grained quartz sand, locally pyritic.

Wire Line Core No. 11. 1615-1625 ft. Recovery 9 ins.

- 1624-1625 ft. Dark grey fine sand.
- 1625-1630 ft. Loose rounded medium grained quartz sand, locally pyritic.
- 1630-1635 ft. Do. pyrite common.
- 1635-1640 ft. Do. pyrite abundant - well formed crystals.
- 1640-1645 ft. Do. some opaque grey grains.
- 1645-1650 ft. Do. some opaque grey grains.
- 1650-1655 ft. Do. some brown coal.
- 1655-1660 ft. Brown coal and loose medium grained quartz sand.
- 1660-1665 ft. Inferior brown coal with some calcareous nodules.
- 1665-1670 ft. Brown coal.
- 1670-1675 ft. Brown coal.
- 1675-1680 ft. Brown coal.

Core No. 8 1660-1680 Recovery 16 ft.

- 1665-1667 ft. Brown coal with many mica rich silty stringers.
- 1667-1670 ft. Crumbly brown coal with a few silty stringers.
- 1670-1674 ft. Greasy ligneous clay showing slickensides near the bottom. Top portion is sandy and contains stringers of rich brown coal (? Fusain)
- 1674-1680 ft. Crumbly high quality brown coal.

1680-1685 ft.	Brown coal.
1685-1690 ft.	Brown coal.
1690-1695 ft.	Brown coal.
1695-1700 ft.	Brown coal - pyritic, with some decomposed wood fragments.
1700-1705 ft.	Brown coal and loose rounded medium grained quartz sand.
1705-1710 ft.	Loose medium grained rounded quartz sand.
1710-1715 ft.	Do.
1715-1720 ft.	Do.
1720-1725 ft.	Do.
1725-1730 ft.	Do.
1730-1735 ft.	Do.
1735-1740 ft.	Do.
1740-1745 ft.	Loose medium grained rounded quartz sand.
1745-1750 ft.	Do. locally pyritic.
1750-1755 ft.	Do.
1755-1760 ft.	Silty brown coal and medium grained rounded quartz sand.
1760-1765 ft.	Do.
1765-1770 ft.	Dark brown puggy ligneous clay.
1770-1775 ft.	Do.
1775-1780 ft.	Do.
1780-1785 ft.	Do. and brown coal.
1785-1790 ft.	Clayey brown coal - puggy.
1790-1795 ft.	Grey puggy clay and brown ligneous clay.
1795-1800 ft.	Do.
1800-1805 ft.	Brown coal and ligneous clay, some quartz sand.

1805-1810 ft. Brown coal and ligneous clay, some quartz sand.

Wire Line Core No. 12 1800-1810 ft. Recovery Nil

1810-1815 ft. Brown puggy clay.

1818-1820 ft. Do.

1820-1825 ft. Brown coal.

1825-1830 ft. Brown coal.

1830-1835 ft. Clayey brown coal.

1835-1840 ft. Do.

1840-1845 ft. Do.

1845-1850 ft. Do.

1850-1855 ft. Inferior brown coal - clayey.

1855-1860 ft. Inferior brown coal and puggy clay.

Wire Line Core No. 13. 1850-1860 ft. Recovery 5ft. 6 ins.

1854-1860 ft. grey silt.

1860-1865 ft. Inferior brown coal.

1865-1870 ft. Do.

1870-1875 ft. Brittle shaley brown coal with some quartz grains.

1875-1880 ft. Do.

1880-1885 ft. Do.

1885-1890 ft. Do.

Core No. 9 1870-1890 ft. Recovery 10 ft.

1880-1886 ft. Fine brown sandy silt with stringers of brown coal.

1886-1890 ft. Brown coal.

1890-1895 ft. High quality brown coal, slickensided.

1895-1900 ft. Do.

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Wire Line Core No. 14 1890-1900 ft. Recovery 7 ft.

1893-1900 ft. High quality brown coal,
locally slickensided,

- 1900-1905 ft. High quality brown coal, slickensided.
- 1905-1910 ft. Do.
- 1910-1915 ft. Soft high quality brown coal.
- 1915-1920 ft. Do.
- 1920-1925 ft. Brittle brown coal.
- 1925-1930 ft. Brown coal.
- 1930-1935 ft. High quality brown coal, locally slickensided.
- 1935-1940 ft. Do. softer.
- 1940-1945 ft. Do.
- 1945-1950 ft. Do.
- 1950-1955 ft. Do.
- 1955-1960 ft. Do.

Wire Line Core No. 15 1950-1960 ft. Recovery 1 ft.

1959-1960 ft. High quality brown coal.

- 1960-1965 ft. Brown coal with powdery white calcareous nodules.
- 1965-1970 ft. High quality brown coal, locally slickensided.

Wire Line Core No. 16 1960-1970 ft. Recovery 1 ft.

1969-1970 ft. High quality brown coal.

- 1970-1975 ft. Brown coal with white powdery calcareous nodules.
- 1975-1980 ft. Brown coal.
- 1980-1985 ft. Brown coal, locally pyritic.
- 1985-1990 ft. Brown coal, locally slickensided.
- 1990-1995 ft. Do.

Wire Line Core No. 17 1985-1995 ft. Recovery 10ft.

1985-1995 ft. High quality brown coal,
locally slickensided.

- 1995-2000 ft. Brown coal and fine grey silt.
- 2000-2005 ft. Do. abundant silt.
- 2005-2010 ft. Do.
- 2010-2015 ft. Brown coal.
- 2015-2020 ft. Inferior brown coal - slickensided.
- 2020-2025 ft. Inferior brown coal, clayey in places, some fine grey silt and quartz grains.
- 2025-2030 ft. Do.
- 2030-2035 ft. Do. some calcareous nodules.
- 2035-2040 ft. Brown coal, locally slickensided.
- 2040-2045 ft. Do.
- 2045-2050 ft. Do.
- 2050-2055 ft. Do.
- 2055-2060 ft. Do.

Wire Line Core No. 18 2050-2060 ft. Recovery 1 ft. 6 ins

- 2058-2060 ft. grey brown clay.
- 2060-2065 ft. Inferior brown coal, clayey and silty in parts.
- 2065-2070 ft. Do. with some medium grained quartz grains.
- 2070-2075 ft. Do. with some medium grained quartz grains.
- 2075-2080 ft. Do. with some medium grained quartz grains.
- 2080-2085 ft. Brown coal.
- 2085-2090 ft. Brown coal with some quartz grains and some pyrite.
- 2090-2095 ft. Brown coal with quartz grains and light grey micaceous sandstone.
- 2095-2100 ft. Loose medium grained angular to sub-angular quartz sand with some muscovite flakes.

Core No.10 2080-2100 ft. Recovery 4 ft.

2096-2100 ft. Friable light grey fine grained sandstone.

- 2100-2105 ft. Angular quartz grains and brown coal cavings.
- 2105-2110 ft. Do.
- 2110-2115 ft. Loose medium grained sub-angular quartz sand.
- 2115-2120 ft. Do. some muscovite flakes.

Core No.11 2100-2120 ft. Recovery Nil.

- 2120-2125 ft. No sample taken.
- 2125-2130 ft. Loose medium grained sub-angular quartz sand, some milky and light grey silt.
- 2130-2135 ft. Do. locally pyritic.
- 2135-2140 ft. Do.
- 2140-2145 ft. Do.
- 2145-2150 ft. Loose medium grained sub-angular quartz sand, some milky and light grey silt.
- 2150-2155 ft. Clean medium grained angular quartz sand, locally pyritic and some grey silt.
- 2155-2160 ft. Do.
- 2160-2165 ft. Do.
- 2165-2170 ft. Do.
- 2170-2175 ft. Do.
- 2175-2180 ft. Do. with some flakes of muscovite.
- 2180-2185 ft. Do.
- 2185-2190 ft. Brown coal - ? cavings.
- 2190-2195 ft. Brown coal - ? cavings
- 2195-2200 ft. Brown coal - ? cavings and some medium grained quartz sand.
- 2200-2205 ft. Brown coal - ?cavings and some medium grained quartz sand locally pyritic and some grey silt.

Wire Line Core No. 19 2191-2201 ft. Recovery 10ft.

- 2191-2195 ft. Hard compact light grey siltstone
- 2195-2197 ft. Siltstone as above passing into flaky greasy mudstone with slickensides.
- 2197-2199 ft. Mudstone as above passing into hard grey siltstone with some thin bands of brown coal.
- 2199-2201 ft. Friable medium grained grey sandstone.

- 2205-2210 ft. Brown coal - ? cavings and medium grained quartz sand.
- 2210-2215 ft. Brown coal and grey silt with some quartz sand.
- 2215-2220 ft. Brown coal and medium grained pyritic quartz sand. 50/50.
- 2220-2225 ft. Medium grained angular quartz sand and light grey silt some pyrite and brown coal.
- 2225-2230 ft. Light grey silt and some brown coal.
- 2230-2235 ft. Grey silt and hard almost black coal.
- 2235-2240 ft. Medium grained quartz sand, locally pyritic some grey silt and brown coal.
- 2240-2245 ft. Medium to coarse grained angular to sub-angular quartz sand.
- 2245-2250 ft. Medium grained quartz sand.
- 2250-2255 ft. Hard brown (almost black) coal with some quartz sand and silt.
- 2255-2260 ft. Do.
- 2260-2265 ft. Do.
- 2265-2270 ft. Hard brown coal - almost black.
- 2270-2275 ft. Do. with some quartz sand.
- 2275-2280 ft. Clean medium grained angular quartz sand, locally pyritic mainly milky with some clear grains.

Core No. 12 2260-2280 ft. Recovery 3 ft.

- 2277-2277½ ft. Fine grained soft light grey sandstone.
- 2277½-2279 ft. Ligneous clay - slickensided with brown coal stringers.

- 2279-2280 ft. Brown coal - lustrous.
- 2280-2285 ft. Brown coal with some quartz sand.
- 2285-2290 ft. Medium grained angular to sub-angular quartz sand and some brown coal.
- 2290-2295 ft. Brown coal and quartz sand.
- 2295-2300 ft. Do.

Core No. 13 2280-2300 ft. Recovery 17 ft.

- 2283-2289 ft. Brown grey clay passing into fine sand then coarse sand near the base. Stringers and inclusions of lustrous brown (almost black) coal occur throughout.
- 2289-2300 ft. Greyish white compact plastic clay with some small brown coal inclusions
- 2300-2305 ft. Brown coal and quartz sand.
- 2305 -2310 ft. Do. (sample contaminated)
- 2310-2315 ft. Do. large quartz grains and some pyrite.
- 2315-2320 ft. Do. some pyrite.
- 2320-2325 ft. Coarse angular to sub-angular quartz gravel with some pyrite.
- 2325-2330 ft. Coarse angular to sub-angular quartz gravel with some pyrite.
- 2330-2335 ft. Do.
- 2335-2340 ft. Do.
- 2340-2345 ft. Do.

BASE OF TERTIARY PLACED AT 2345 ft.

- 2345-2350 ft. Greenish grey medium grained felspathic sandstone.
- 2350-2355 ft. Do.
- 2355-2360 ft. Do.
- 2360-2365 ft. Do.

2365-2370 ft.	Greenish grey medium grained feldspathic sandstone.
2370-2375 ft.	Do.
2375-2380 ft.	Do.
2380-2385 ft.	Do.

Core No. 14 2370-2386 ft. Recovery 15 ft.

2371-2386 ft. Greenish grey medium grained feldspathic sandstone, strongly cross bedded. Conglomeratic near the base with fairly large mudstone fragments. Carbonaceous stringers are common, particularly near the top. Frequent zones of finely disseminated pyrite (? marcasite) crystals, usually associated with secondary white, powdery deposits (? gypsum).

2385-2390 ft.	Greenish grey medium grained feldspathic sandstone.
2390-2395 ft.	Do.
2395-2400 ft.	Do.
2400-2405 ft.	Do.
2405-2410 ft.	Do.
2410-2415 ft.	Do.
2415-2420 ft.	Do.
2420-2425 ft.	Do.
2425-2430 ft.	Do.
2430-2435 ft.	Do.
2435-2440 ft.	Do.
2440-2445 ft.	Do.
2445-2450 ft.	Do.
2450-2455 ft.	Do.
2455-2460 ft.	Do.
2460-2465 ft.	Do.
2465-2470 ft.	Do.
2470-2475 ft.	Greenish grey medium grained feldspathic sandstone with some black coal fragments.
2475-2480 ft.	Do.
2480-2485 ft.	No sample taken.

Core No.15 - 2469-2483 ft. Recovery 14 ft.

- 2469-2483 ft. Hard compact grey fine grained siltstone slickensided, frequent carbonaceous stringers. Locally black (carbonaceous) and containing fossilised wood fragments. Some fine grained sandstone showing cross bedding, a 4" seam of earthy black coal occurs at about 2480 ft.
- 2485-2490 ft. No sample taken.
- 2490-2495 ft. No sample taken.
- 2495-2500 ft. Grey siltstone with some rounded quartz pebbles.
- 2500-2505 ft. Do.
- 2505-2510 ft. Do. abundant angular to rounded quartz pebbles.
- 2510-2515 ft. Do. abundant angular to rounded quartz pebbles.
- 2515-2520 ft. Grey siltstone and medium grained grey sandstone with some calcite veins.
- 2520-2525 ft. Do.
- 2525-2530 ft. Do.
- 2530-2535 ft. Do.
- 2535-2540 ft. Do.
- 2540-2545 ft. Do.
- 2545-2550 ft. Fine grained grey silty sandstone.
- 2550-2555 ft. Fine to medium grained silty sandstone with carbonaceous stringers.
- 2555-2560 ft. Do.
- 2560-2565 ft. Greenish grey medium grained feldspathic sandstone.
- 2565-2570 ft. Do.
- 2570-2575 ft. Do.
- 2575-2580 ft. Do. with some calcite veins.
- 2580-2585 ft. Do.
- 2585-2590 ft. Do.
- 2590-2595 ft. Do.
- 2595-2600 ft. Do. with some carbonaceous stringers.
- 2600-2605 ft. Do.
- 2605-2610 ft. Do. with black coal stringers. and calcite veins.

- 2610-2615 ft. Medium grained greenish grey felspathic sandstone with black coal stringers and calcite veins.
- 2615-2620 ft. Do. with black coal stringers and calcite veins.
- 2620-2625 ft. Do. with black coal stringers and calcite veins.
- 2625-2630 ft. Do. with black coal stringers.
- 2630-2635 ft. Do.
- 2635-2640 ft. Do. with black coal stringers and calcite veins.
- 2640-2645 ft. Do. with black coal stringers.
- 2645-2650 ft. Do. with some fine grained sandstone.
- 2650-2655 ft. Do. with some black coal stringers
- 2655-2660 ft. Do.
- 2660-2665 ft. Do. with a small amount of lustrous black coal.
- 2665-2670 ft. Do. some fine grained sandstone.
- 2670-2675 ft. Do.
- 2675-2680 ft. Do. ~~2680~~
- 2680-2685 ft. Do. with abundant lustrous black coal.
- 2685-2690 ft. Do. with some fine grained sandstone.
- 2690-2695 ft. Do. with some calcite veins
- 2695-2700 ft. Do. with black coal stringers and calcite veins.
- 2700-2705 ft. Do. with some fine grained dark grey sandstone.
- 2705-2710 ft. Do. with some black coal stringers.
- 2710-2715 ft. Do. with some black coal stringers.
- 2715-2720 ft. Medium grained grey felspathic sandstone and grey shale 50/50 with thin calcite lathes and dull black coal.

Core No. 16 2705-2717 ft. Recovery 12 ft.

- 2705-2717 ft. Light greenish grey medium grained felspathic sandstone with black coal stringers, common irregular calcite veins, locally pyritic.

- 2720-2725 ft. Medium grained grey felspathic sandstone with some grey shale, calcite veins and dull black coal, few clear medium grained quartz pebbles.
- 2725-2730 ft. Light grey medium grained felspathic sandstone, locally pyritic.
- 2730-2735 ft. Do.
- 2735-2740 ft. Do.
- 2740-2745 ft. Do. with some calcite veins and black coal stringers.
- 2745-2750 ft. Do. with some calcite veins and black coal stringers.
- 2750-2755 ft. Do. with black coal fragments.
- 2755-2760 ft. Do. with abundant calcite veins.
- 2760-2765 ft. Do. with some grey shale, calcite veins and frequent dull black coal fragments.
- 2765-2770 ft. Do. with some grey shale, calcite veins and dull black coal.
- 2770-2775 ft. Do. with some grey shale, calcite veins and abundant dull black coal fragments.
- 2775-2780 ft. Medium grained grey felspathic sandstone.
- 2780-2785 ft. Do. with some limonite staining.
- 2785-2790 ft. Do. with some limonite staining.
- 2790-2795 ft. Do. with some limonite staining.
- 2795-2800 ft. Do. with some limonite staining.
- 2800-2805 ft. Do. with some limonite staining.
- 2805-2810 ft. Do. with some limonite staining.
- 2810-2815 ft. Medium to fine grained grey felspathic sandstone, some grey shale, black coal and calcite veins, locally pyritic.
- 2815-2820 ft. Do.
- 2820-2825 ft. Medium to fine grained felspathic sandstone, limonite stained with frequent calcite veins.
- 2825-2830 ft. Do.
- 2830-2835 ft. Do.
- 2835-2840 ft. Do.

- 2840-2845 ft. Grey medium grained fclspathic sandstone, some calcite veins
 - 2845-2850 ft. Grey medium grained fclspathic sandstone.
 - 2850-2855 ft. Fine to medium grained grey fclspathic sandstone.
 - 2855-2860 ft. Do.
 - 2860-2865 ft. Do.
 - 2865-2870 ft. Grey medium grained fclspathic sandstone, some limonite staining and frequent black coal fragments.
 - 2870-2875 ft. Do.
 - 2875-2880 ft. Do.
 - 2880-2885 ft. Do. with some grey shale
 - 2885-2890 ft. Fine grained grey fclspathic sandstone with some black coal.
 - 2890-2895 ft. Do.
 - 2895-2900 ft. Medium grained grey fclspathic sandstone.
 - 2900-2905 ft. Do.
 - 2905-2910 ft. Do. with some fine grained sandstone.
 - 2910-2915 ft. Do. with calcite veins.
 - 2915-2920 ft. Do. with calcite veins.
 - 2920-2925 ft. Do. with calcite veins, black coal and pyrite.
 - 2925-2930 ft. Do. with calcite veins, black coal and pyrite.
- Core No. 17 2910-2930 ft. Recovery 16 ft.
- 2914-2930 ft. Grey medium grained current bedded fclspathic sandstone, frequent black coal stringers and inclusions, some irregular calcite veins.
 - 2930-2935 ft. Medium grained grey fclspathic sandstone with calcite veins and black coal fragments.
 - 2935-2940 ft. Do.
 - 2940-2945 ft. Do.
 - 2945-2950 ft. Do.
 - 2950-2955 ft. Do.

- 2955-2960 ft. Medium grained grey feldspathic sandstone with calcite veins and black coal fragments.
- 2960-2965 ft. Do.
- 2965-2970 ft. Grey medium grained feldspathic sandstone, some calcite veins.
- 2970-2975 ft. Do. with some black coal fragments.
- 2975-2980 ft. Do.
- 2980-2985 ft. Do. with frequent black coal.
- 2985-2990 ft. Do. with frequent black coal.
- 2990-2995 ft. Do. with frequent black coal.
- 2995-3000 ft. Do.
- 3000-3005 ft. Do.
- 3005-3010 ft. Grey medium grained feldspathic sandstone.
- 3010-3015 ft. Do. with some black coal.
- 3015-3020 ft. Do. with some black coal and calcite.
- 3020-3025 ft. Do. with some black coal and calcite and pyrite crystals.
- 3025-3030 ft. Do. and grey shale 50/50
- 3030-3035 ft. Grey shale with some medium grained grey feldspathic sandstone with calcite veins.
- 3035-3040 ft. Dark grey shale with some calcite.
- 3040-3045 ft. Do.
- 3045-3050 ft. Do. with some black coal.
- 3050-3055 ft. Do.
- 3055-3060 ft. Do.
- 3060-3065 ft. Do. with abundant black coal and some medium grained grey feldspathic sandstone with limonite staining.
- 3065-3070 ft. Grey medium grained feldspathic sandstone with some limonite staining, some dark grey shale, calcite and black coal.
- 3070-3075 ft. Do.
- 3075-3080 ft. Do.
- 3080-3085 ft. Do.
- 3085-3090 ft. Do.
- 3090-3095 ft. Grey fine to medium grained feldspathic sandstone with some black coal and calcite.

- 3095-3100 ft. Grey fine to medium grained felspathic sandstone with some black coal and calcite, with dark grey shale.
- 3100-3105 ft. Dark grey shale.
- 3105-3110 ft. Do.
- 3110-3115 ft. Dark grey shale.
- 3115-3120 ft. Do.
- 3120-3125 ft. Do.
- 3125-3130 ft. Do.
- 3130-3135 ft. Do.
- 3135-3140 ft. Do.
- 3140-3145 ft. Do.
- 3145-3150 ft. Do.
- 3150-3155 ft. Do.
- 3155-3160 ft. Do.
- 3160-3165 ft. Do. and medium grained grey felspathic sandstone 50/50.
- 3165-3170 ft. Do. and medium grained grey felspathic sandstone 50/50
- 3170-3175 ft. Do. and medium grained grey felspathic sandstone 50/50 with some calcite, pyrite, black coal and rounded quartz pebbles.
- 3175-3180 ft. Grey medium grained limonite stained felspathic sandstone with some black coal and calcite.
- 3180-3185 ft. Do.
- 3185-3190 ft. Grey medium grained sandstone, with some calcite and rounded quartz grains.
- 3190-3195 ft. Do. locally pyritic.
- 3195-3200 ft. Do.
- 3200-3205 ft. Do.
- 3208-3210 ft. Do. locally pyritic.
- 3210-3215 ft. Do. and dark grey shale.
- 3215-3220 ft. Dark grey shale and some sandstone and black coal.
- 3220-3225 ft. Do.
- 3225-3228 ft. Dark grey and black shale with some sandstone.

Core No. 18 3208-3228 ft. Recovery 14 ft.

3214-3217 ft. Fault breccia consisting of irregular fragments of grey fine grained sandstone in soft friable silty matrix.

3217-3228 ft. Compact dark grey shale with abundant sandstone and carbonaceous stringers and lenses and some calcite veins. Strongly current bedded. Fine vertical calcite filled fractures. Some pyrite. Locally slickensided.

- 3228-3230 ft. Dark grey shale, some sandstone, black coal and calcite.
- 3230-3235 ft. Do.
- 3235-3240 ft. Grey medium grained sandstone and dark grey shale, some calcite and frequent black coal fragments.
- 3240-3245 ft. Do.
- 3245-3250 ft. Dark grey shale.
- 3250-3255 ft. Do. and medium grained grey sandstone.
- 3255-3260 ft. Grey medium grained sandstone and some dark grey shale.
- 3260-3265 ft. Do. with some calcite and black coal.
- 3265-3270 ft. Dark grey shale and some sandstone, some calcite and black coal.
- 3270-3275 ft. Do.
- 3275-3280 ft. Do. locally pyritic.
- 3280-3285 ft. Do. locally pyritic.
- 3285-3290 ft. Do.
- 3290-3295 ft. Dark grey shale with small amount of sandstone.
- 3295-3300 ft. Do.
- 3300-3305 ft. Do. with some black coal and calcite.
- 3305-3310 ft. Do. some black coal and calcite.
- 3310-3315 ft. Do. some black coal and calcite.
- 3315-3320 ft. Do. some black coal and calcite.
- 3320-3325 ft. Grey medium grained sandstone and some dark grey shale.
- 3325-3330 ft. Do.
- 3330-3335 ft. Do. some calcite.

3335-3340 ft.	Grey medium grained sandstone and some dark grey shale and some calcite.
3340-3345 ft.	Do. some calcite
3345-3350 ft.	Do. some calcite
3350-3355 ft.	Do. locally pyritic.
3355-3360 ft.	Do.
3360-3365 ft.	Grey medium grained sandstone.
3365-3370 ft.	Do.
3370-3375 ft.	Dark grey shale and some medium grained sandstone, some black coal and calcite.
3375-3380 ft.	Do.
3380-3385 ft.	Do.
3385-3390 ft.	Do.
3390-3395 ft.	Grey medium grained sandstone, some dark grey shale, black coal and calcite.
3395-3400 ft.	Do.
3400-3405 ft.	Do.
3405-3410 ft.	Do.
3410-3415 ft.	Do.
3415-3420 ft.	Sample contaminated.
3420-3425 ft.	Grey medium grained sandstone.
3425-3430 ft.	Do.
3430-3435 ft.	Grey medium grained sandstone and grey shale 50/50 some calcite and black coal
3435-3440 ft.	Do.
3440-3445 ft.	Do.
3445-3450 ft.	Do.
3450-3455 ft.	Do.
3455-3460 ft.	Dark grey shale, some medium grained grey sandstone, locally pyritic.
3460-3465 ft.	Do.
3465-3470 ft.	Do.

Core No. 19 3447-3467 ft. Recovery 18 ft.

3449-3460 ft. Dark grey compact shale with some carbonaceous stringers and calcite filled fractures. Sand stringers towards the base.

- 3460-3467 ft. Light grey medium grained sandstone with abundant carbonaceous stringers and calcite filled fractures. Prominent current bedding.
- 3470-3475 ft. Dark grey shale with some medium grained sandstone.
- 3475-3480 ft. Do. some black coal.
- 3480-3485 ft. Do. some black coal and calcite.
- 3485-3490 ft. Do. some black coal and calcite.
- 3490-3495 ft. Do. some black coal and calcite.
- 3495-3500 ft. Do. some black coal and calcite.
- 3500-3505 ft. Do. some black coal and calcite.
- 3505-3510 ft. Do. some black coal and calcite.
- 3510-3515 ft. Do. some black coal and calcite.
- 3515-3520 ft. Do. some black coal and calcite.
- 3520-3525 ft. Medium grained grey sandstone, some shale, calcite and black coal.
- 3525-3530 ft. Dark grey shale and grey sandstone, locally pyritic, some black coal.
- 3530-3535 ft. Do.
- 3535-3540 ft. Dark grey shale.
- 3540-3545 ft. Do.
- 3545-3550 ft. Do.
- 3550-3555 ft. Do.
- 3555-3560 ft. Do.
- 3560-3565 ft. Do. with some medium grained sandstone locally pyritic.
- 3565-3570 ft. Fine grained grey sandstone.
- 3570-3575 ft. Fine to medium grained grey sandstone, with some dark grey shale, calcite and black coal fragments.
- 3575-3580 ft. Do. locally pyritic.
- 3580-3585 ft. Do. locally pyritic.
- 3585-3590 ft. Do.
- 3590-3595 ft. Do. black coal abundant.
- 3595-3600 ft. Dark grey shale with some sandstone, black coal and calcite.
- 3600-3605 ft. Medium grained sandstone and dark grey shale, some black coal and calcite.

- 3605-3610 ft. Medium grained sandstone and dark grey shale, some black coal and calcite.
- 3610-3615 ft. Do.
- 3615-3620 ft. Do.
- 3620-3625 ft. Do. locally pyritic.
- 3625-3630 ft. Fine to medium grained grey sandstone and dark grey shale, some black coal stringers.
- 3630-3635 ft. Do. locally pyritic, some calcite

Core No.20 3615-3635 ft. Recovery 17 ft.

- 3618-3622 ft. Dark grey medium grained sandstone with carbonaceous streaks. shows current bedding.
- 3622-3627 ft. Lighter grey medium grained sandstone with calcite filled cracks.
- 3627-3632 ft. Fine grained carbonaceous sandstone, strongly current bedded.
- 3632-3635 ft. Medium grained grey sandstone with carbonaceous stringers and some calcite filled cracks.
- 3635-3640 ft. Fine to medium grained sandstone, some shale and black coal, locally pyritic.
- 3640-3645 ft. Dark grey shale and little medium grained grey sandstone.
- 3645-3650 ft. Do. some calcite.
- 3650-3655 ft. Do. some calcite.
- 3655-3660 ft. Do. some calcite.
- 3660-3665 ft. Do. some calcite.
- 3665-3670 ft. Fine grained light grey sandstone, some medium grained grey sandstone and some dark grey shale.
- 3670-3675 ft. Do. and black coal.
- 3675-3680 ft. Dark grey shale and some sandstone.
- 3680-3685 ft. Dark grey shale.
- 3685-3690 ft. Do.
- 3690-3695 ft. Do.
- 3695-3700 ft. Do. and some fine grained light grey sandstone.
- 3700-3705 ft. Do. and some fine grained light grey sandstone and black coal.

- 3705-3710 ft. Do. and some fine grained light grey sandstone and black coal.
- 3710-3715 ft. Do. and some medium grained sandstone and black coal.
- 3715-3720 ft. Do. and some sandstone, black coal and calcite.
- 3720-3725 ft. Do. and some sandstone, black coal and calcite.
- 3725-3730 ft. Do. and some sandstone, black coal and calcite.
- 3730-3735 ft. Dark grey shale and fine to medium grained sandstone and some black coal.
- 3735-3740 ft. Do.
- 3740-3745 ft. Do.
- 3745-3750 ft. Dark grey shale, some grey calcareous sandstone, some calcite
- 3750-3755 ft. Do.
- 3755-3760 ft. Do.
- 3760-3765 ft. Do.
- 3765-3770 ft. Do.
- 3770-3775 ft. Grey shale.
- 3775-3780 ft. Do.
- 3780-3785 ft. Do.
- 3785-3790 ft. Do. some sandstone, black coal and calcite, locally pyritic.
- 3790-3795 ft. Do. some grey sandstone and calcite
- 3795-3800 ft. Do. some sandstone, calcite and black coal.
- 3800-3805 ft. Dark grey shale, some sandstone, calcite veins and black coal.
- 3805-3810 ft. Do.
- 3810-3815 ft. Do.
- 3815-3820 ft. Do.
- 3820-3825 ft. Do.
- 3825-3830 ft. Do.
- 3830-3835 ft. Do.
- 3835-3840 ft. Fine to medium grained dark grey sandstone, some shale, calcite and black coal.
- 3840-3845 ft. Do.

- 3840-3845 ft. Fine to medium grained dark grey sandstone, some shale, calcite and black coal.
- 3845-3850 ft. Dark grey shale, some sandstone, calcite and black coal.
- 3850-3855 ft. No sample taken.
- 3855-3860 ft. Dark grey shale, some sandstone, calcite and black coal.
- 3860-3865 ft. Do.
- 3865-3870 ft. Dark grey shale.
- 3870-3875 ft. Do.
- 3875-3880 ft. Grey medium grained grey sandstone.
- 3880-3885 ft. Do.
- 3885-3890 ft. Grey medium grained grey sandstone, locally pyritic, some calcite.
- 3890-3895 ft. Do. some shale and black coal.
- 3895-3900 ft. Do. some shale and black coal.
- 3900-3905 ft. Medium grained grey sandstone and dark grey shale 50/50 some calcite and pyrite and frequent black coal.
- 3905-3910 ft. Do.
- 3910-3915 ft. Light grey medium grained sandstone, some calcite and black coal.
- 3915-3920 ft. Do.
- 3920-3925 ft. Do.
- 3925-3930 ft. Medium to fine grained grey sandstone and dark grey shale, some calcite and black coal.
- 3930-3935 ft. Dark grey silty shale, some sandstone, calcite and black coal.
- 3935-3940 ft. Do.
- 3940-3945 ft. Do.

Core No. 21 3926-3942 ft. Recovery 8 ft.

- 3934-3942 ft. Thin alternating bands of dark grey to black silty shale and grey fine grained sandstone. Strongly current bedded and showing miniature faulting near the top.
- 3945-3950 ft. No sample taken.
- 3950-3955 ft. Light grey medium grained sandstone and dark grey shale some calcite and black coal.

- 3955-3960 ft. Light grey medium grained sandstone and dark grey shale, some calcite and black coal, locally pyritic.
- 3960-3965 ft. Do.
- 3965-3970 ft. Do.
- 3970-3975 ft. Fine grained light grey sandstone, some calcite.
- 3975-3980 ft. Do.
- 3980-3985 ft. Light grey medium grained sandstone, some shale, black coal and calcite.
- 3985-3990 ft. Do. frequent black coal.
- 3990-3995 ft. Do. frequent black coal.
- 3995-4000 ft. Do.
- 4000-4005 ft. Do.
- 4005-4010 ft. Do.
- 4010-4015 ft. Do.
- 4015-4020 ft. Do.
- 4020-4025 ft. Do. locally pyritic.
- 4025-4030 ft. Do.
- 4030-4035 ft. Do.
- 4035-4040 ft. Do.
- 4040-4045 ft. Do. some limonitic fragments.
- 4045-4050 ft. Do.
- 4050-4055 ft. Do.
- 4055-4060 ft. Medium grained light grey sandstone, some calcite.
- 4060-4065 ft. Do. some fine grained sandstone.
- 4065-4070 ft. No sample taken.
- 4070-4075 ft. Medium to fine grained light grey sandstone, some shale calcite and black coal.
- 4075-4080 ft. Do.
- 4080-4085 ft. Do.
- 4085-4090 ft. Do.
- 4090-4095 ft. Do. sandstone medium grained.
- 4095-4100 ft. Do. sandstone medium grained.
- 4100-4105 ft. Do. sandstone medium grained.

- 4105-4110 ft. Medium to fine grained light grey sandstone, some shale calcite and black coal, sandstone medium grained.
- 4110-4115 ft. Do.
- 4115-4120 ft. Grey shale, some medium to fine grained sandstone some calcite and black coal.
- 4120-4125 ft. Do.
- 4125-4130 ft. Do. locally pyritic.
- 4130-4135 ft. Do.
- 4135-4140 ft. Do.
- 4140-4145 ft. Do.
- 4145-4150 ft. Grey medium grained sandstone, some dark grey shale, black coal and calcite.
- 4150-4155 ft. Dark grey shale and some grey medium grained sandstone.
- 4155-4160 ft. Dark grey shale and medium grained sandstone 50/50 some calcite and black coal.
- 4160-4165 ft. Do.
- 4165-4170 ft. Do.
- 4170-4175 ft. Do.
- 4175-4180 ft. Light grey medium grained sandstone.
- 4180-4185 ft. Do.
- 4185-4190 ft. Do.
- 4190-4195 ft. Do. with some black coal stringers.
- 4195-4200 ft. Light grey medium to fine grained sandstone, some shale, black coal and calcite.
- 4200-4205 ft. Do.
- 4205-4210 ft. Do.
- 4210-4215 ft. Do.
- 4215-4220 ft. Do.
- 4220-4225 ft. Do. locally pyritic.
- 4225-4230 ft. Do.
- 4230-4235 ft. Light grey medium grained sandstone, some calcite veins and black coal stringers.
- 4235-4240 ft. Do.
- 4240-4245 ft. Do.
- 4245-4250 ft. Do.

Core No.22 4230-4250 ft. Recovery 17 ft.

- 4233-4250 ft. Grey massive medium grained sandstone with abundant irregular carbonaceous stringers, and inclusions, particularly towards the base and some calcite veins.
- 4250-4255 ft. Light grey medium grained sandstone, locally pyritic, some calcite veins and black coal stringers and inclusions.
- 4255-4260 ft. Do.
- 4260-4265 ft. Do.
- 4265-4270 ft. Do.
- 4270-4275 ft. Do.
- 4275-4280 ft. Do.
- 4280-4285 ft. Do.
- 4285-4290 ft. Dark grey medium to fine grained sandstone
- 4290-4295 ft. Do. some shale, black coal and pyrite.
- 4295-4300 ft. Light grey medium grained sandstone, some fine grained, with some shale, black coal and calcite, locally pyritic.
- 4300-4305 ft. Light grey medium grained sandstone and some dark grey shale.
- 4305-4310 ft. Dark grey shale, some medium grained grey sandstone, black coal stringers.
- 4310-4315 ft. Do. some calcite.
- 4315-4320 ft. Fine grained grey sandstone, some calcite veins, locally slickensided.
- 4320-4325 ft. Do.
- 4325-4330 ft. Do. some black coal stringers.
- 4330-4335 ft. Do.
- 4335-4340 ft. Dark grey shale, some sandstone, calcite and black coal.
- 4340-4345 ft. Grey medium to fine grained sandstone, some shale, black coal and calcite.
- 4345-4350 ft. Dark grey shale.
- 4350-4355 ft. Do.
- 4355-4360 ft. Do. with some black coal.
- 4360-4365 ft. Do.
- 4365-4370 ft. Do.
- 4370-4375 ft. Do.
- 4375-4380 ft. Do.

- 4380-4385 ft. Dark grey shale with some black coal.
- 4385-4390 ft. Fine to medium grained grey sandstone, some dark grey shale, black coal and calcite.
- 4390-4395 ft. Do.
- 4395-4400 ft. Do.
- 4400-4405 ft. Medium to fine grained sandstone, some dark grey shale, black coal fragments and calcite.
- 4405-4410 ft. Do. locally pyritic.
- 4410-4415 ft. Do.
- 4415-4420 ft. Do.
- 4420-4425 ft. Do. locally pyritic.
- 4425-4430 ft. Do. abundant black coal.
- 4430-4435 ft. Do. abundant black coal.
- 4435-4440 ft. Do.
- 4440-4445 ft. Do. locally pyritic.
- 4445-4450 ft. Do.
- 4450-4455 ft. Medium grained light grey sandstone, some black coal.
- 4455-4460 ft. No sample taken.
- 4460-4465 ft. Medium to fine grained grey sandstone, some grey shale, calcite and black coal.
- 4465-4470 ft. Do.
- 4470-4475 ft. Do.
- 4475-4480 ft. Do.
- 4480-4485 ft. Fine to medium grained grey sandstone, some calcite and black coal.
- 4485-4490 ft. Do.
- 4490-4495 ft. Do.

Core No. 23 4476-4496 ft. Recovery 20 ft.

4476-4481 ft. Medium grained grey sandstone, conglomeratic with claystone fragments ($1\frac{1}{2}$ " x $\frac{3}{4}$ ") near the top. Contains black coal stringers and calcite filled, almost vertical, fracture zones.

4481-4485 ft. Dark grey to black siltstone, current bedded, vertical calcite filled fracture zones.

- 4485-4491 ft. Grey fine grained sandstone with carbonaceous stringers - more abundant towards the base. Locally shows current bedding. Frequent calcite filled vertical fracture zones.
- 4491-4496 ft. Finely interbedded grey fine grained sandstone and dark grey siltstone strongly cross bedded. Abundant irregular to vertical calcite veins.
- 4495-4500 ft. Medium grained grey sandstone and grey shale 50/50 locally pyritic, some calcite veins and black coal.
- 4500-4505 ft. Light grey medium grained sandstone locally calcareous some calcite and black coal, locally pyritic.
- 4505-4510 ft. Do.
- 4510-4515 ft. Do. some grey shale.
- 4515-4520 ft. Do.
- 4520-4525 ft. Do.
- 4525-4530 ft. Do.
- 4530-4535 ft. Do. frequent black coal.
- 4535-4540 ft. Do.
- 4540-4545 ft. Do.
- 4545-4550 ft. No sample taken.
- 4550-4555 ft. Grey fine to medium grained sandstone, some calcite veins, frequent black coal.
- 4555-4560 ft. Grey fine to medium grained sandstone, some calcite and black coal.
- 4560-4565 ft. Do. locally pyritic.
- 4565-4570 ft. Do.
- 4570-4575 ft. Do. some dark grey shale.
- 4575-4580 ft. Do. some dark grey shale.
- 4580-4585 ft. Do.
- 4585-4590 ft. Do.
- 4590-4595 ft. Do. some dark grey shale.
- 4595-4600 ft. Do.
- 4600-4605 ft. Do.
- 4605-4610 ft. Do.
- 4610-4615 ft. Do. locally pyritic.

4615-4620 ft.	Dark grey shale and fine to medium grained sandstone 50/50 calcite and black coal.
4620-4625 ft.	Do.
4625-4630 ft.	Dark grey shale, some calcite and black coal.
4630-4635 ft.	Do.
4635-4640 ft.	Do. and fine to medium grained sandstone.
4640-4645 ft.	Do.
4645-4650 ft.	Do.
4650-4655 ft.	Dark grey shale and black coal 50/50
4655-4660 ft.	Fine grained grey sandstone and black coal.
4660-4665 ft.	Dark grey shale and fine to medium grained sandstone, some black coal and calcite.
4665-4670 ft.	Do.
4670-4675 ft.	Do.
4675-4680 ft.	Do.
4680-4685 ft.	Dark grey shale.
4685-4690 ft.	Fine to medium grained grey sandstone, some shale, calcite.
4690-4695 ft.	Do.
4695-4700 ft.	Do.
4700-4705 ft.	Medium grained grey calcareous sandstone, some calcite.
4705-4710 ft.	Do.
4710-4715 ft.	No sample taken.
4715-4720 ft.	Medium grained grey calcareous sandstone, some calcite.
4720-4725 ft.	Do.
4725-4730 ft.	Do.
4730-4735 ft.	Do.
4735-4740 ft.	Do.
4740-4745 ft.	Dark grey shale.
4745-4747 ft.	Brownish black earthy coal.
4747-4750 ft.	Dark grey shale with some earthy coal.
4750-4755 ft.	Dark grey shale.
4755-4760 ft.	Do.

- 4760-4765 Dark grey shale.
- 4765-4770 ft. Fine to medium grained grey sandstone, some grey shale.

Core No. 21 4747-4767 ft. Recovery 20 ft.

- 4747-4763 ft. Dark grey to black silty shale with local zones of fine grained grey sandstone. Abundant irregular vertical calcite filled cracks, current bedded, some slickensides.
- 4763-4767 ft. Fine grained grey sandstone.
- 4770-4775 ft. Light grey fine to medium grained sandstone, locally calcareous, some carbonaceous stringers and white to pink calcite veins.
- 4775-4780 ft. Do.
- 4780-4785 ft. Do.
- 4785-4790 ft. Do.
- 4790-4795 ft. Do.
- 4795-4800 ft. Do.
- 4800-4805 ft. Light grey fine to medium grained sandstone, locally calcareous.
- 4805-4810 ft. Do.
- 4810-4815 ft. Do.
- 4815-4820 ft. Do.
- 4820-4825 ft. Do. with some dark grey shale.
- 4825-4830 ft. Do. some dark grey shale.
- 4830-4835 ft. Do. and dark grey shale.
- 4835-4840 ft. Do. and dark grey shale.
- 4840-4845 ft. Do. and dark grey shale.
- 4845-4850 ft. Dark grey shale, local calcite veins.
- 4850-4855 ft. Do.
- 4855-4860 ft. Do.
- 4860-4865 ft. Do.
- 4865-4870 ft. Do.
- 4870-4875 ft. Do. locally pyritic.
- 4875-4880 ft. Dark grey fine grained sandstone.
- 4880-4885 ft. Dark grey shale.
- 4885-4890 ft. Fine to medium grained sandstone, dark grey shale, some black coal and frequent calcite veins.

4890-4895 ft.	Fine to medium grained sandstone, dark grey shale, some black coal and frequent calcite veins.
4895-4900 ft.	Do.
4900-4905 ft.	Do.
4905-4910 ft.	Do.
4910-4915 ft.	Dark grey shale, abundant black coal.
4915-4920 ft.	Do.
4920-4925 ft.	Dark grey shale and black coal 70/30
4925-4930 ft.	Dark grey calcareous shale.
4930-4935 ft.	Do.
4935-4940 ft.	Do. rare pyrite.
4940-4945 ft.	Do. rare pyrite.
4945-4950 ft.	Do. some fine to medium grained sandstone.
4950-4955 ft.	Do.
4955-4960 ft.	Do.
4960-4965 ft.	Dark grey shale, locally calcareous, and grey medium grained calcareous sandstone.
4965-4970 ft.	Fine to medium grained grey calcareous sandstone.
4970-4975 ft.	Do. and grey calcareous shale 50/50
4975-4980 ft.	Grey medium grained calcareous sandstone with some calcite veins.
4980-4985 ft.	Do.
4985-4990 ft.	Do. and strongly pyritic stoney black coal 50/50
4990-4995 ft.	Dark grey shale, some calcite veins.
4995-5000 ft.	Do.
5000-5005 ft.	Dark grey to black shale.
5005-5010 ft.	Do. and black coal 80/20
5010-5015 ft.	Do. with some black coal.
5015-5020 ft.	Black shaley coal.
5020-5025 ft.	Dark grey to black shale.
5025-5030 ft.	Do.
5030-5035 ft.	Do. some fine to medium grained grey sandstone.

- 5035-5040 ft. Dark grey to black shale, some fine to medium grained grey sandstone.
- 5040-5045 ft. Do.
- 5045-5050 ft. Do. some fine grained grey sandstone
- 5050-5055 ft. Do. some sandstone and black coal
- 5055-5060 ft. Do. some sandstone
- 5060-5065 ft. Do. some sandstone

Core No. 25 5045-5065 ft. Recovery 18 ft.

- 5047-5050 ft. Fine grained grey sandstone.
- 5050-5065 ft. Dark grey to black silty shale with stringers of fine grained grey sandstone showing current bedding. Some calcite veins filling almost vertical fractures. Leaf and plant impressions abundant near the base.
- 5065-5070 ft. Dark grey to black shale.
- 5070-5075 ft. Do. some calcite veins.
- 5075-5080 ft. Fine grained grey sandstone, some shale and black coal.
- 5080-5085 ft. Fine to medium grained grey sandstone, locally calcareous.
- 5085-5090 ft. Do. and dark grey shale 50/50
- 5090-5095 ft. Dark grey shale.
- 5095-5100 ft. Do. some black coal.
- 5100-5105 ft. Fine grained grey calcareous sandstone, some shale and black coal.
- 5105-5110 ft. Do.
- 5110-5115 ft. Medium grained light grey calcareous sandstone.
- 5115-5120 ft. Do. some shale and black coal.
- 5120-5125 ft. Do. some shale and black coal.
- 5125-5130 ft. Black coal and some black shale.
- 5130-5135 ft. Fine to medium grained grey calcareous sandstone some shale and black coal.
- 5135-5140 ft. Dark grey shale.
- 5140-5145 ft. Do. some sandstone and black coal.
- 5145-5150 ft. Do. some sandstone and black coal.
- 5150-5155 ft. Fine grained grey sandstone, some medium grained calcareous, some shale and calcite.
- 5155-5160 ft. Do.

- 5160-5165 ft. Fine grained dark grey calcareous sandstone some dark grey shale and black coal.
- 5165-5170 ft. Do.
- 5170-5175 ft. Do.
- 5175-5180 ft. Medium grained light grey calcareous sandstone.
- 5180-5185 ft. Do.
- 5185-5190 ft. Do.
- 5190-5195 ft. Do. some calcite veins and black coal stringers
- 5195-5200 ft. Black coaly shale, pyrite.
- 5200-5205 ft. Do.
- 5205-5210 ft. Dark grey sandy shale.
- 5210-5215 ft. Dark grey fine grained sandstone, locally calcareous.
- 5215-5220 ft. Do. some dark grey shale.
- 5220-5225 ft. Do. some dark grey shale.
- 5225-5230 ft. Fine to medium grained grey calcareous sandstone and dark grey shale.
- 5230-5235 ft. Do.
- 5235-5240 ft. Do.
- 5240-5245 ft. Do.
- 5245-5250 ft. Do.
- 5250-5255 ft. Do.
- 5255-5260 ft. Dark grey shale, some fine to medium grained calcareous sandstone and black coal.
- 5260-5265 ft. Dark grey fine grained sandstone, locally calcareous, some dark grey shale.

Core No.26 5243-5261 ft. Recovery 18ft.

- 5243-5261 ft. Irregular interbedded bands of fine grained grey sandstone and dark grey to black siltstone. Frequent calcite, veins, sometimes with associated pyrite occur as fracture fillings. Plant and leaf impressions are common, particularly towards the base. Locally shows current bedding.
- 5265-5270 ft. Dark grey fine grained sandstone, locally calcareous some dark grey shale.

5270-5275 ft.	Dark grey fine grained sandstone, locally calcareous some dark grey shale.
5275-5280 ft.	Do.
5280-5285 ft.	Do.
5285-5290 ft.	Do.
5290-5295 ft.	Do. and some light grey calcareous sandstone.
5295-5300 ft.	Do. and some light grey calcareous sandstone.
5300-5305 ft.	Light grey medium grained calcareous sandstone, some black shale and black coal.
5305-5310 ft.	Do.
5310-5315 ft.	Do.
5315-5320 ft.	Do. abundant black coal.
5320-5325 ft.	Do. some calcite veins.
5325-5330 ft.	Do. and fine grained dark grey sandstone.
5330-5335 ft.	Light grey medium grained calcareous sandstone.
5335-5340 ft.	Do.
5340-5345 ft.	Do.
5345-5350 ft.	Do.
5350-5355 ft.	Do. and some dark grey shale.
5355-5360 ft.	Dark grey shale and some fine to medium grained calcareous sandstone.
5360-5365 ft.	Do.
5365-5370 ft.	Dark grey fine grained calcareous sandstone, some dark grey shale.
5370-5375 ft.	Dark grey calcareous shale.
5375-5380 ft.	Do.
5380-5385 ft.	Do. some black coal.
5385-5390 ft.	Dark grey calcareous shale and some fine to medium grained calcareous sandstone.
5390-5395 ft.	Do. some carbonaceous stringers.
5395-5400 ft.	Do.
5400-5405 ft.	Do.
5405-5410 ft.	Do.

- 5410-5415 ft. Dark grey calcareous shale and some fine to medium grained calcareous sandstone, some carbonaceous stringers.
- 5415-5420 ft. Do.
- 5420-5425 ft. Fine grained light grey calcareous sandstones and some shale
- 5425-5430 ft. Do.
- 5430-5435 ft. Do.
- 5435-5440 ft. Light grey medium grained calcareous sandstone.
- 5440-5445 ft. Do.
- 5445-5450 ft. Dark grey calcareous shale, locally pyritic, some sandstone.
- 5450-5455 ft. Dark grey calcareous shale.
- 5455-5460 ft. Do.
- 5460-5465 ft. Do. some fine grained calcareous sandstone.
- 5465-5470 ft. Fine to medium grained calcareous sandstone.
- 5470-5475 ft. Do.
- 5475-5480 ft. Dark grey calcareous shale and some grey calcareous sandstone.
- 5480-5485 ft. Do. some calcite veins.
- 5485-5490 ft. Do.
- 5490-5495 ft. Light grey fine grained calcareous sandstone and calcareous shale
- 5495-5500 ft. Do.
- 5500-5505 ft. Do.
- 5505-5510 ft. Do.

Core No.27 5495-5508 ft. Recovery 13 ft.

- 5495-5508 ft. Dark grey silty shale with plant and leaf impressions. Calcite veins common. Locally cross bedded with fine grained grey sandstone.
- 5510-5515 ft. Fine to medium grained calcareous sandstone and dark grey calcareous shale,
- 5515-5520 ft. Do.
- 5520-5525 ft. Do.
- 5525-5530 ft. Do.
- 5530-5535 ft. Dark grey shale locally calcareous and some calcareous sandstone.

5535-5540 ft.	Dark grey shale locally calcareous and some calcareous sandstone.
5540-5545 ft.	Fine to medium grained grey calcareous sandstone and grey shale, some calcite veins.
5545-5550 ft.	Do.
5550-5555 ft.	Do.
5555-5560 ft.	Do.
5560-5565 ft.	Do.
5565-5570 ft.	Medium grained grey calcareous sandstone.
5570-5575 ft.	Do.
5575-5580 ft.	Do. calcite veins and carbonaceous stringers.
5580-5585 ft.	Do. some dark grey shale.
5585-5590 ft.	Do. some shale and calcite veins.
5590-5595 ft.	Do. and grey shale, calcite veins.
5595-5600 ft.	Grey shale and some calcareous sandstone.
5600-5605 ft.	Do. some black coal.
5605-5610 ft.	Do. some black coal.
5610-5615 ft.	Do.
5615-5620 ft.	Do.
5620-5625 ft.	Do. some black shale.
5625-5630 ft.	Do. some black shale and abundant calcite.
5630-5635 ft.	Fine to medium grained grey calcareous sandstone with calcite veins. Some shale and black coal.
5635-5640 ft.	Grey medium grained calcareous sandstone, some fine grained, some calcite veins and carbonaceous stringers.
5640-5645 ft.	Do.
5645-5650 ft.	Do.
5650-5655 ft.	Do. some dark grey shale.
5655-5660 ft.	Do. some dark grey shale.
5660-5665 ft.	Grey medium to fine grained calcareous sandstone, some calcite veins and carbonaceous stringers, some dark grey shale.
5665-5670 ft.	Do.
5670-5675 ft.	Do.
5675-5680 ft.	Do.

- 5680-5685 ft. Grey medium to fine grained calcareous sandstone, some calcite veins and carbonaceous stringers, some dark grey shale, with abundant calcite veins.
 - 5685-5690 ft. Do.
 - 5690-5695 ft. Dark grey shale.
 - 5695-5700 ft. Do.
 - 5700-5705 ft. Dark grey fine grained sandstone.
 - 5705-5710 ft. Do.
 - 5710-5715 ft. Do.
 - 5715-5720 ft. Do.
 - 5720-5725 ft. Do. some calcite veins.
 - 5725-5730 ft. Grey medium grained calcareous sandstone, some black coal and calcite veins.
 - 5730-5735 ft. Do.
 - 5735-5740 ft. Do.
 - 5740-5745 ft. Grey fine to medium grained sandstone, locally calcareous, some carbonaceous stringers and calcite veins.
 - 5745-5750 ft. Do.
 - 5750-5755 ft. Do.
 - 5755-5760 ft. Do.
- Core No. 28 5742-5758 ft. Recovery 16 ft.
- 5742-5752 ft. Dark grey to black fine grained sandstone with some fine calcite veins.
 - 5752-5758 ft. Fine grained grey sandstone with some dark grey siltstone zones, locally strongly current bedded. abundant calcite veins and carbonaceous stringers and inclusions.
 - 5760-5765 ft. Grey fine to medium grained sandstone, locally calcareous, some carbonaceous stringers and calcite veins.
 - 5765-5770 ft. Do.
 - 5770-5775 ft. Fine to medium grained sandstone, locally calcareous, some calcite veins, carbonaceous stringers and black coal fragments.
 - 5775-5780 ft. Do.
 - 5780-5785 ft. Do.
 - 5785-5790 ft. Do.
 - 5790-5795 ft. Do.
 - 5795-5800 ft. Do.

5800-5805 ft.	Fine to medium grained sandstone, locally calcareous, some calcite veins, carbonaceous stringers and black coal fragments.
5805-5810 ft.	Do.
5810-5815 ft.	Do.
5815-5820 ft.	Do.
5820-5825 ft.	Do.
5825-5830 ft.	Do.
5830-5836 ft.	Do.

Core No.29 5818-5836 ft. Recovery 17 ft.

5819-5823 ft. Grey fine grained sandstone with siltstone streaks and frequent carbonaceous streaks and calcite veins. Locally very strongly current bedded.

5823-5836 ft. Light grey fine to medium grained sandstone with common irregular calcite veins and some carbonaceous inclusions and stringers.

TOTAL DEPTH 5836 ft.

APPENDIX 2

PALYNOLOGICAL EXAMINATION OF ROSEDALE BORE SAMPLES

The following bore core samples from A.P.M. Rosedale No.1 bore have been treated by the Hydro-fluoric acid - Schulze's Solution method and isolated microfloras examined under the microscope.

Depth	Slide Nos.	Sample No.	Microfloras
1991' - 3'	991-1001	1	Nothofagus
2195' - 7'	1002-9	2	Proteacidites
			Triorites
			} and other Lower Tertiary pollens
2197' - 9'	1013-6	3	
5243' -65'	1017-8	4	Barren, but core contains Mesozoic macrofossils Taeniopteris spatulata ♀ Oldham & Morris ♀ Elatecladus conferta ♀ Oldham & Morris ♀

The work was undertaken in conjunction with Western District Deep bore Palynological examination, and hence sampling was not as extensive as desirable.

Samples 1, 2 and 3 contain the typical Lower Tertiary Nothofagus microflora and probably originate from sediments of Oligocene age.

Sample 4 is rather barren, but macrofossils (leaf impression) are of the widespread Victorian Upper Mesozoic sequence.

Further sampling is proceeding.

Rosedale-1

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APPENDIX 3

MICRO- AND MACROFLORAL EXAMINATION OF BORE CORE SAMPLES
FROM A.P.M. ROSEDALE NO.1 BORE

(V) REFERENCES

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- Thomas, D.E. and Baragwanath, W. 1949 "Geology of the Brown Coals of Victoria"
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181-199.
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MICROFLORAL EXAMINATION OF ROSEDALE BORE CORE
SAMPLES

Rosedale-1
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A short report on four A.P.M. Rosedale No.1 bore core samples was submitted on 13.5.60. Further sampling has recently been completed, again using the Hydrofluoric acid - Schulze's Solution treatment method.

<u>Depth</u>	<u>Slide Nos.</u>	<u>Microfloras</u>
1180'-82'	1128-30	Nothofagus sp., Tricolpites sp., Proteacidites sp., Disaccate Gymnosperms Pilferous exined pollen; Fungal Conidia
1186'-88'	1127-7	Triorites harrisii, Nothofagus, Bisaccate Gymnosperm, Cyathidites sp.
1188'-90'	1072-5	(Triorites sp., Cyathidites sp., (Proteacidites sp. etc. Nothofagus sp.
*1991'-93'	999-1001	(" " " "
*2195'-97'	1002-9	(" " " "
*2197'-99'	1013-6	(" " " "
2277'-79'	1104-7	Nothofagus sp., T.harrisii, Fungal Conidia, Proteacidites, Echinete exined pollen undetermined, Trilete echinate spore, Proteacidites cf. crassus, Myrtaceidites. Cupaneidites orthoteichus, Proteacidites cf. obscurus
2279'-80'	1108-12	Rather depauperate.
2283'-85'	1121-2	(Coalified with few microfossils (
2287'-89'	1119-20	(
2473'-75'	1076-8	Lycopodiumsporites sustroclavatides, Bi-and Trisaccate Gymnosperms (Microcachryidites sp.) Cyathidites, Neoraistrickia sp., Pilferous exined spores undetermined, Granulatis- porites sp. Megaspores?
4247'-50'	1079-83	Cyathidites sp. Leptolepidites sp. Echinete exined spore undetermined.
4484'-86'	1084	Rather barren.

4492'-84'	1113A-1114A	Cyathidites sp.
5049'-51'	1085-8	Plant debris, Cyathidites sp., Piliferous, Leptolepidites verracatus etc.
*5243'-65'	1039-41	Neoraistrickia sp., Cyathidites sp.
5251'-53'	1089-91	Plant debris.
5500'-2'	1131-2	Gymnosperms, large Monolete spore.
5506'-8'	1133-4	Barren.
5752'-4'	1113-5	Leptolepidites verracatus etc.

* See Previous Report.

A very evident and most marked floral change occurs between 2289' and 2473'. Dicotyledenous pollen grains, with *Nothofagus* predominant, disappear and are replaced by an entirely different assemblage of spores from ferns, Lycopods, Gymnosperms etc. This marks the region of the Mesozoic-Tertiary boundary, and sampling to 5754' shows that this assemblage continues relatively unchanged.

Further sampling from the 2500'-4000' region, a more complete species determination and a quantitative study is planned. As no marine microplankton were found in the Tertiary sequence it is presumed that they are freshwater or swamp deposits, but it must be noted that samples are from a few restricted zones in the 1180', 1990', 2200' and 2280' levels, chosen particularly because of their likelihood to contain plant microfossils. In the Mesozoic sequence the samplings also indicate non marine sedimentation. A few undetermined organisms in the 2500' zone are possibly broken megaspores.

Using the work of Cookson and Dettmann as basis for age determination the Mesozoic sequence would fall into an Upper Stage of the Lower Cretaceous period, but her stage determinations are not unquestionable, and as in the writers opinion a Lower Cretaceous determination is debatable, a Middle-Upper Mesozoic age only is postulated.

References:

Cookson Isabel, C., & Dettmann, Mary, E., 1958 - Some Trilete Spores from Upper Mesozoic Deposits in the Eastern Australian Region.

Proc. Roy. Soc. Vic., Vol. 70, Pt.2, pp.95-128

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Proc. Roy. Soc. Vic., Vol.71, Pt.1, pp.31-38

Dettmann, Mary, E., 1959 - Upper Mesozoic Microfloras in Well Cores from Woodside and Hedley Victoria.

Proc. Roy. Soc. Vic., Vol.71, Pt.2, pp.99-105

MACROFOSSILS

Macroscopic plant remains have been examined from the following horizons.

At 2193' - 8' undetermined plant fragments include stem and leaf remains with two specimens of prime interest, namely a stem with bud, and small linear-hastate leaves up to 1 cm. long and 1 mm. broad, of dicotyledenous aspect. A specimen at 2195' also appears to be the remains of a dicotyledenous leaf, but no cuticle was isolated despite repeated attempts. Fern and Cycad-like remains are absent, and the flora indicates a Tertiary age.

At 2289' - 2300' vertical rootlets penetrate a soft white claystone. Similar rootlets are found in Victorian Mesozoic and Tertiary claystones and as maceration revealed nothing of the root anatomy these are of doubtful value for dating.

Undoubted Mesozoic macrofossils at 5243' -65' have been commented on in the Report of 13/5/60. Attempts at cuticle isolation have also here met with repeated failure, and as the specimens referred to are at present believed to have a long time range, no reliable determination to Stage status is possible.

Rosedale-1
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APPENDIX 4

SPORE ANALYSES - A.P.M. DEV. ROSEDALE NO.1

Three samples from Rosedale No.1 have been examined briefly to check the Mesozoic - Tertiary boundary on the basis of spores. The depths of the samples were:-

core 13	2283 - 2285 ft.
core 15	2469 - 2471 ft.
cuttings	4895 - 4900 ft.

The results confirm that the Tertiary - Mesozoic boundary was penetrated between 2285 and 2469 ft. The yield from core 13 was poor but a sufficient number of angiosperm pollens were present to indicate a Tertiary age for that sample. Core 15, in a compact grey shale, contained well preserved spores of Mesozoic age, including Cyathidites spp., Osmundacidites conaumensis, Granulatisporites dailyi, and bisaccate pollens. Cookson and Dettmann (1958) and Dettmann (1959) claim that G. dailyi is restricted to the Lower Cretaceous. The accuracy of that restriction is debateable but not relevant to the present problem.

The cuttings at 4895 - 4900 ft. yielded a similar abundance of Cyathidites spp. and bisaccate pollens with Lycopodiacidites austroclavitidites and Neoraistrickia sp. in addition. No diagnostic cretaceous or Jurassic spores were found in the samples.

Dettmann
(4-11-65)

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DETTMANN

PALYNOLOGICAL EXAMINATION OF ROSEDALE, DARRIMAN, AND
TARWIN MEADOWS WELLS

Samples of 19 cores were submitted for palynological examination by Haematite Explorations Pty. Ltd. from three wells sunk in eastern Victoria. The wells and the intervals examined include: Rosedale well between 2469 and 5836 feet, Darriman well between 4309 and 4475 feet, and Tarwin Meadows well between 304 and 2572 feet. The majority of the samples yielded identifiable spores and pollen grains, but the microfloras are generally poorly preserved. Moreover, the plant matter contained in samples from between 5243 and 5836 feet in Rosedale well has been carbonized such that identifiable spores and pollen grains appear to be lacking. As outlined below the productive samples contain microfloras that conform with the Lower Cretaceous assemblages described by Dettmann (1963) from south-eastern Australia. The presence of these microfloras enables correlation of the well sequences both with each other and with Lower Cretaceous sediments at other localities in Gippsland. Details of the microfloral sequence in each of the wells follows (see also Table 1).

Rosedale well

Samples from the lower part (5243 - 5836 feet) of the sequence failed to produce identifiable spores and pollen grains and thus no age assessment can be made on palynological grounds. Sediments between 4747 and 5065 feet yielded only a few poorly preserved spores and pollen grains that signify an Upper Mesozoic age, but possess little stratigraphical value within the Upper Mesozoic.

More diverse and better preserved microfloras were obtained from the remainder of the sequence (between 2469 and 4496 feet). Samples between 3447 and 4496 feet yielded Dictyotosporites speciosus Cookson & Dettmann in association

with Cyclosporites hughesi (Cookson & Dettmann). The combined occurrence of these species indicates the presence of the older category of the Valanginian-Aptian Speciosus Assemblage that was described by Dettmann (1963). Comparable microfloras were obtained in Wellington Park No.1 well between 6845 and 9019 feet (Dettmann 1965).

The two uppermost samples (2469-83 feet and 3208-28 feet) are also of Valanginian-Aptian age since Dictyotosporites speciosus occurs at 2469-83 feet. However, neither Cyclosporites hughesi nor Crybelosporites striatus (Cookson & Dettmann) was observed and there is thus insufficient evidence to determine whether the microflora belongs to the older or younger categories of the Speciosus Assemblage. Although no precise correlation can be achieved, the horizons between 2469 and 3228 feet in Rosedale well can be regarded as equivalents of at least part of the sequence between 3818 and 9019 feet in Wellington Park No.1 well.

Darriman well

Neither of the two samples examined provided abundant microfloras. That obtained from 4474-75 feet includes Crybelosporites striatus and Coptospora striata Dettmann which indicate the presence of either the younger (Aptian) category of the Speciosus Assemblage or the Aptian-Albian Paradoxa Assemblage. It should be noted that Coptospora striata possesses a restricted stratigraphical range in sediments of the Otway Basin where it extends from the uppermost horizons containing the Speciosus Assemblage to the lowermost beds that have yielded the Paradoxa Assemblage. This evidence indicates that the deposits at 4474-75 feet in Darriman well are similar in age or younger than those between 5818 and 4340 feet in Wellington Park No.1 well.

The sample from 4309-10 feet provided only a few spores and pollen grains

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that are of little stratigraphical significance within the Upper Mesozoic.

Tarwin Meadows well

Samples from between 600 and 2572 feet yielded restricted microfloras in which Dictyotosporites speciosus is a component. Thus, the Valanginian-Aptian Speciosus Assemblage is represented at these horizons. Beds at 2567-72 feet also yielded Cooksonites variabilis Pocock which indicates the presence of the older category of the Speciosus Assemblage and suggests correlation of the beds with those at 6845 feet in Wellington Park No.1 well and at 5977 feet in Bengworden South No.1 well (see Dettmann 1965).

The succeeding horizons (600-1610 feet) that contain Dictyotosporites speciosus are probable equivalents of at least part of the sequence between 3818 and 6845 feet in Wellington Park No.1 well, but the absence of Cyclo-
Tarwin Meadows
sporites hughesi and Crybelosporites striatus within the interval precludes precise correlation.

The uppermost horizon (304-14 feet) lacked diagnostic species of the Speciosus and Paradoxa Assemblages. However, the presence of Pilososporites notensis Cookson & Dettmann indicates an age no younger than Aptian.

References

- Dettmann, M.E. 1963. Upper Mesozoic microfloras from south-eastern Australia. Proc. Roy. Soc. Vict., 77, 1-148.
Dettmann, M.E. 1965. Palynological report on Woodside Wellington Park No.1 well. Unpublished report submitted to Haematite Explorations Pty. Ltd. 9/8/65.

4th November, 1965.

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Microspores

Pollen

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Cyclosporites hughesi
 Dictyosporites speciosus
 Aequitriradites spinulosus
 Cicatricosisporites australiensis
 Cooksonites variabilis
 Klukisporites scaberis
 Leptolepidites verrucatus
 Cyathidites spp.
 Lycopodiumsporites spp.
 Ceratosporites equalis
 Neoraistrickia truncata
 Pilosporites notensis
 Foraminisporis daillyi
 Foraminisporis wonthaggiensis
 Foraminisporis asymmetricus
 Crybelosporites striatus
 Coptospora striata
 Alisporites spp.
 Tsugapollenites dampieri

	Microspores	Pollen
Rosedale	c.15 2469-85'	+ +
	c.18 5208-28'	+ + + + + + + +
	c.19 5447-67'	+ + + + + + + +
	c.20 3615-35'	+ + + + + + + +
	c.21 5926-42'	+ + + + + + + +
	c.23 4476-96'	+ + + + + + + +
	c.24 4747-67'	+ + + + + + + +
	c.25 5045-65'	+ + + + + + + +
	c.26 5243-61'	+ + + + + + + +
	c.27 5495-5508'	+ + + + + + + +
c.28 5742-58'	+ + + + + + + +	
c.29 5818-36'	+ + + + + + + +	
Darriman	4309-10'	+ + + + + + + +
	4474-75'	+ + + + + + + +
Tarwin Meadows	304-514'	+ + + + + + + +
	600-610'	+ + + + + + + +
	1597-1607'	+ + + + + + + +
	1607-10'	+ + + + + + + +
	2587-72'	+ + + + + + + +
		Speciosus
		Indet. (U. Major)
		Indet.
		Indet.
		Speciosus

Table 1: Distribution of selected spore and pollen species from Rosedale, Darriman, and Tarwin Meadows wells.
 + - species present

POROSITY AND PERMEABILITY DETERMINATIONS
ROSEDALE NO. 1

Tabulated below are the results of porosity and permeability determinations on suitable core samples from the above well.

The tests were carried out using Ruska field porometer and Ruska permeameter with nitrogen as a flowing medium.

Depth (feet)	Porosity (%)	Permeability (ind)	
		Horizontal	Vertical
478-480	37.3	0	0
969-971	41.2	Not measured Too friable	Not measured Too friable
1,060-1,062	40.5	74	71
1,274-1,276	43.7	53	28
1,478-1,480	37	Not measured Too friable	Not measured Too friable
1,624-1,625	24	12	12
1,670-1,672	25	0	0
1,882-1,884	37.5	16	1
2,058-2,060	21.5	16	1
2,192-2,195	18.8	0	0
2,197-2,199	24	6.5	0
2,199-2,201	35	496	338
2,287-2,289	32	52	9
2,289-2,291	20	1.6	0
2,293-2,295	22.5	0	0
2,373-2,375	10.2	0	0
2,381-2,386	13.0	1	0

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Depth (feet)	Porosity (%)	Permeability Ind.	
		Horizontal	Vertical
2709-2,711	9.5	0	0
2,713-2,715	13	0	0
2,924-2,926	13	0	0
2,341-3,453	6	0	0
3,625-3,627	4	0	0
3,633-3,635	8	0	0
3,940-3,942	3	0	0
4,235-4,237	12.5	0	0
4,241-4,243	13.5	0	0
4,245-4,247	Varies from 3.0 to 14.5	0	0
4,486-4,488	Varies from 2 to 7.7	0	0
4,492-4,494	Varies from 5 to 13	0	0
5,825-5,827	8	0	0
5,833-5,836	7.5	0	0

BIT RECORD - ROXBOROUGH NO. 1

BIT NO.	SIZE & TYPE	DEPTH IN	DEPTH CUT	FOOTAGE DRILLED	HOURS RUN	REMARKS
1	12 1/4" SEC. NC	0	223 ft.	206 ft.	16 1/2	Depth from R.T.K.B. 17' above G.L.
		223 ft.	315 ft.	64 ft.	24 1/2	Reamed 223-251 ft.
		279 ft.	313 ft.	(35 ft.)	4	Reamed with 17 1/2" Reed 0.315 ft.
		310 ft.	2050 ft.	-	42 1/2	Drilled out cement plug. Reamed 310-2050 ft.
2	8 1/2" HTC Hard "J"	223 ft.	251 ft.	28 ft.	4 1/2	Cores No. 1 and 2.
3	8 1/2" SEC. S3	315 ft.	460 ft.	145 ft.	13	
		2370 ft.	2469 ft.	83 ft.	6 1/2	Reamed 2370-2386 ft.
4	7 1/8" HTC, Hard "J"	460 ft.	480 ft.	20 ft.	3 1/2	Core No. 3
		860 ft.	880 ft.	20 ft.	4 1/2	Core No. 4
		1058 ft.	1078 ft.	20 ft.	3 1/2	Core No. 5
		1260 ft.	1280 ft.	20 ft.	5 1/2	Core No. 6
		1460 ft.	1480 ft.	20 ft.	1 1/2	Core No. 7
		1665 ft.	1685 ft.	20 ft.	2 1/2	Core No. 8
		1870 ft.	1890 ft.	20 ft.	1 1/2	Core No. 9
		2080 ft.	2125 ft.	45 ft.	1 1/2	Cores 10 & 11 + 5 ft. Drilled.
WL.1	8 1/2" Reed PD 2	460 ft.	860 ft.	380 ft.	20 1/2	Reamed 460-480 ft.

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WELL NO.	SIZE & TYPE	DEPTH IN	DEPTH OUT	FOOTAGE DRILLED	HOURS RUN	REMARKS
WL.2	8 $\frac{1}{2}$ " Reed PD.2	860 ft.	1058 ft.	178 ft.	12	Reamed 860-880 ft.
		1058 ft.	1260 ft.	182 ft.	9	Reamed 1058-1078 ft.
WL.3	8 $\frac{1}{2}$ " Reed PD.2	1260 ft.	1460 ft.	180 ft.	20	Reamed 1260-1280 ft.
		1460 ft.	1665 ft.	185 ft.	11 $\frac{1}{2}$	Reamed 1460-1480 ft.
WL.4	8 $\frac{1}{2}$ " Reed PD.2	1665 ft.	1870 ft.	185 ft.	18 $\frac{1}{2}$	Reamed 1665-1685 ft.
WL.5	8 $\frac{1}{2}$ " Reed PD.2	1870 ft.	2080 ft.	190 ft.	19 $\frac{1}{2}$	Reamed 1870-1890 ft.
5	7 $\frac{1}{8}$ " HTC. Hard "J"	2260 ft.	2280 ft.	20 ft.	2 $\frac{1}{2}$	Core No.12
WL.6	8 $\frac{1}{2}$ " Reed PD.2	2080 ft.	2260 ft.	135 ft.	10	Reamed 2080-2125 ft.
		2260 ft.	2280 ft.	-	1 $\frac{1}{2}$	Reamed 2260-2280 ft.
6	7 $\frac{1}{8}$ " HTC Hard "J"	2280 ft.	2300 ft.	20 ft.	3 $\frac{1}{2}$	Core No.13
		2370 ft.	2386 ft.	16 ft.	7 $\frac{1}{2}$	Core No.14
WL.7	8 $\frac{1}{2}$ " Reed PD.2	2280 ft.	2370 ft.	70 ft.	8 $\frac{1}{2}$	Reamed 2280-2300 ft.
7	7 $\frac{1}{8}$ " HTC. Hard "J"	2469 ft.	2483 ft.	14 ft.	11	Core No.15
		2705 ft.	2717 ft.	12 ft.	5 $\frac{1}{2}$	Core No.16
8	12 $\frac{1}{2}$ " SEC. S6	2050 ft.	2483 ft.	-	28 $\frac{1}{2}$	Reamed 2050-2480 ft.
9	8 $\frac{1}{2}$ " SEC. S3	2440 ft.	2705 ft.	222 ft.	21 $\frac{1}{2}$	Drilled out cement plug 43 feet.
10	8 $\frac{1}{2}$ " SEC. S3	2705 ft.	2910 ft.	193 ft.	19 $\frac{1}{2}$	Reamed 2705-2717
11	7 $\frac{1}{8}$ " HTC. Hard "J"	2910 ft.	2930 ft.	20 ft.	5	Core No.17
12	8 $\frac{1}{2}$ " SEC. S3	2910 ft.	3208 ft.	278 ft.	23 $\frac{1}{2}$	Reamed 2910-2930 ft.
13	7 $\frac{1}{8}$ " HTC. Hard "J"	3208 ft.	3228 ft.	20 ft.	9 $\frac{1}{2}$	Core No.18

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BIT NO.	SIZE & TYPE	DEPTH IN	DEPTH OUT	FOOTAGE DRILLED	HOURS RUN	REMARKS
14	8½" SEC. S3	3208 ft.	3418 ft.	190 ft.	22½	Reamed 3208-3228 ft.
15	8½" Reed YT	3418 ft.	3447 ft.	29 ft.	4½	
16	7½" HTC. Hard "J"	3447 ft.	3467 ft.	20 ft.	11½	Core No.19
17	8½" HTC. Hard "J"	3447 ft.	3562 ft.	95 ft.	21½	Reamed 3447-3467 ft.
18	8½" HTC. OSQ2	3562 ft.	3615 ft.	53 ft.	7½	
		3615 ft.	3693 ft.	61 ft.	16½	Reamed 3615-3632 ft.
19	7½" HTC. Hard "J"	3615 ft.	3632 ft.	17 ft.	19½	Core No.20
20	8½" HTC. OW3	3693 ft.	3783 ft.	90 ft.	15	
21	8½" HTC. OW3	3783 ft.	3861 ft.	78 ft.	17½	
22	8½" HTC. OW3	3861 ft.	3926 ft.	65 ft.	19	
23	7½" HTC. Hard "J"	3926 ft.	3942 ft.	16 ft.	12½	Core No.21
24	8½" SEC. S6	3926 ft.	4045 ft.	103 ft.	13½	Reamed 3926-3942
25	8½" SEC. S4	4045 ft.	4187 ft.	142 ft.	26	
26	8½" SEC. S4	4187 ft.	4230 ft.	43 ft.	6½	
		4230 ft.	4259 ft.	9 ft.	4½	Reamed 4230-4250 ft.
27	7½" HTC. Hard "J"	4230 ft.	4250 ft.	20 ft.	7½	Core No.22
28	8½" HTC. S6	4259 ft.	4337 ft.	78 ft.	26½	
29	8½" Reed YT	4337 ft.	4458 ft.	121 ft.	27	
30	8½" HTC. OW3	4458 ft.	4476 ft.	918 ft.	5	
		4476 ft.	4549 ft.	93 ft.	17	Reamed 4476-4496 ft.
31	7½" HTC. Hard "J"	4476 ft.	4496 ft.	20 ft.	10½	Core No.23
32	8½" SEC. S4	4549 ft.	4594 ft.	45 ft.	19½	
33	8½" HTC. OW3	4594 ft.	4630 ft.	36 ft.	13½	

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BIT NO.	SIZE & TYPE	DEPTH IN	DEPTH OUT	FOOTAGE DRILLED	HOURS RUN	REMARK
34	8½" HTC. OWJ	4630 ft.	4695 ft.	65 ft.	27½	
35	8½" Reed YT	4695 ft.	4747 ft.	52 ft.	13	
36	7½" HTC. Hard "J"	4747 ft.	4767 ft.	20 ft.	10½	Core No. 24
37	8½" HTC. OSQ2	4747 ft.	4883 ft.	116 ft.	27½	Reamed 4747-4767 ft.
38	8½" HTC. OWS	4883 ft.	4971 ft.	88 ft.	27½	
39	8½" SEC. S6	4971 ft.	5045 ft.	74 ft.	20	
40	7½" HTC. Hard "J"	5045 ft.	5065 ft.	20 ft.	14½	Core No. 25
41	8½" SEC. S6	5045 ft.	5162 ft.	97 ft.	26	Reamed 5045-5065 ft.
42	8½" SEC. S4	5162 ft.	5243 ft.	81 ft.	28½	
43	7½" HTC. Hard "J"	5243 ft.	5261 ft.	18 ft.	13	Core No. 26
44	8½" SEC. S6	5243 ft.	5360 ft.	99 ft.	30½	Reamed 5243-5261 ft.
45	8½" SEC. S4	5360 ft.	5495 ft.	135 ft.	28½	
46	7½" HTC. Hard "J"	5495 ft.	5508 ft.	13 ft.	13½	Core No. 27
47	8½" SEC. S6	5495 ft.	5572 ft.	64 ft.	18½	Reamed 5495-5508
48	8½" HTC. OSQ2	5572 ft.	5659 ft.	87 ft.	29	
49	8½" HTC. OSQ2	5659 ft.	5742 ft.	83 ft.	28½	
50	7½" HTC. Hard "J"	5742 ft.	5758 ft.	16 ft.	11½	Core No. 28
51	8½" HTC. OSQ2	5742 ft.	5818 ft.	60 ft.	28½	Reamed 5742-5758 ft.
52	7½" HTC. Hard "J"	5818 ft.	5836 ft.	18 ft.	7½	Core No. 29

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PE906280

This is an enclosure indicator page.
The enclosure PE906280 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE906280 has the following characteristics:

- ITEM_BARCODE = PE906280
- CONTAINER_BARCODE = PE904030
- NAME = Geology Sketch Map
- BASIN = GIPPSLAND
- PERMIT = PPL192
- TYPE = GENERAL
- SUBTYPE = GEOL_MAP
- DESCRIPTION = Geological Sketch Map of PPL's 192 and
193 showing position of Rosedale-1
- REMARKS =
- DATE_CREATED =
- DATE_RECEIVED =
- W_NO = W462
- WELL_NAME = ROSEDALE-1
- CONTRACTOR =
- CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906281

This is an enclosure indicator page.
The enclosure PE906281 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE906281 has the following characteristics:

- ITEM_BARCODE = PE906281
- CONTAINER_BARCODE = PE904030
- NAME = General Diagrammatic Section
- BASIN = GIPPSLAND
- PERMIT = PPL192
- TYPE = WELL
- SUBTYPE = CROSS_SECTION
- DESCRIPTION = General Diagrammatic Sections through
Rosedale-1 Borehole (pre and post
drilling)
- REMARKS =
- DATE_CREATED =
- DATE_RECEIVED =
- W_NO = W462
- WELL_NAME = ROSEDALE-1
- CONTRACTOR =
- CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906282

This is an enclosure indicator page.
The enclosure PE906282 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE906282 has the following characteristics:

ITEM_BARCODE = PE906282
CONTAINER_BARCODE = PE904030
NAME = Detailed Diagrammatic Section
BASIN = GIPPSLAND
PERMIT = PPL192
TYPE = WELL
SUBTYPE = CROSS_SECTION
DESCRIPTION = Detailed Diagrammatic Sections through
Rosedale-1 Borehole (pre and post
drilling)
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W462
WELL_NAME = ROSEDALE-1
CONTRACTOR =
CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE603621

This is an enclosure indicator page.
The enclosure PE603621 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE603621 has the following characteristics:

ITEM_BARCODE = PE603621
CONTAINER_BARCODE = PE904030
NAME = Composite Log
BASIN = GIPPSLAND
PERMIT = PPL192
TYPE = WELL
SUBTYPE = COMPOSITE_LOG
DESCRIPTION = Composite Log (enclosure from WCR) for
Rosedale-1
REMARKS =
DATE_CREATED = 10/05/60
DATE_RECEIVED =
W_NO = W462
WELL_NAME = ROSEDALE-1
CONTRACTOR =
CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE602066

This is an enclosure indicator page.
The enclosure PE602066 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE602066 has the following characteristics:

ITEM_BARCODE = PE602066
CONTAINER_BARCODE = PE904030
NAME = Electric Well Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Electric Well Log, 310', for Rosedale 1
REMARKS =
DATE_CREATED = 19/03/60
DATE_RECEIVED =
W_NO = W462
WELL_NAME = Rosedale-1
CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
CLIENT_OP_CO = AMP DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE602067

This is an enclosure indicator page.
The enclosure PE602067 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE602067 has the following characteristics:

ITEM_BARCODE = PE602067
CONTAINER_BARCODE = PE904030
NAME = Electric Well Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Electric Well Log, 2483', for Rosedale
1
REMARKS =
DATE_CREATED = 19/03/60
DATE_RECEIVED =
W_NO = W462
WELL_NAME = Rosedale-1
CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
CLIENT_OP_CO = AMP DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE602068

This is an enclosure indicator page.
The enclosure PE602068 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE602068 has the following characteristics:

ITEM_BARCODE = PE602068
CONTAINER_BARCODE = PE904030
NAME = Electric Well Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Electric Well Log, 4253', for Rosedale
1
REMARKS =
DATE_CREATED = 9/04/60
DATE_RECEIVED =
W_NO = W462
WELL_NAME = Rosedale-1
CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
CLIENT_OP_CO = AMP DEVELOPMENT PTY LTD

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PE602069

This is an enclosure indicator page.
The enclosure PE602069 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE602069 has the following characteristics:

ITEM_BARCODE = PE602069
CONTAINER_BARCODE = PE904030
NAME = Electric Well Log
BASIN = GIPPSLAND
PERMIT =
TYPE = WELL
SUBTYPE = WELL_LOG
DESCRIPTION = Electric Well Log, 5836', for Rosedale
1
REMARKS =
DATE_CREATED =
DATE_RECEIVED =
W_NO = W462
WELL_NAME = Rosedale-1
CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
CLIENT_OP_CO = AMP DEVELOPMENT PTY LTD

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PE603622

This is an enclosure indicator page.
The enclosure PE603622 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE603622 has the following characteristics:

ITEM_BARCODE = PE603622
CONTAINER_BARCODE = PE904030
 NAME = Electrical Log to 2254'
 BASIN = GIPPSLAND
 PERMIT = PPL192
 TYPE = WELL
 SUBTYPE = WELL_LOG
DESCRIPTION = Electrical Log to 2254' for Rosedale-1,
 including natural potential and
 resistivity logs
REMARKS =
DATE_CREATED = 12/03/60
DATE_RECEIVED =
 W_NO = W462
 WELL_NAME = ROSEDALE-1
CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

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PE603623

This is an enclosure indicator page.
The enclosure PE603623 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE603623 has the following characteristics:

- ITEM_BARCODE = PE603623
- CONTAINER_BARCODE = PE904030
- NAME = Temperature and Caliper Log
- BASIN = GIPPSLAND
- PERMIT = PPL192
- TYPE = WELL
- SUBTYPE = WELL_LOG
- DESCRIPTION = Temperature and Caliper Logs for
Rosedale-1
- REMARKS =
- DATE_CREATED = 21/03/60
- DATE_RECEIVED =
- W_NO = W462
- WELL_NAME = ROSEDALE-1
- CONTRACTOR = OIL DRILLING AND EXPLORATION LTD
- CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906283

This is an enclosure indicator page.
The enclosure PE906283 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE906283 has the following characteristics:

- ITEM_BARCODE = PE906283
- CONTAINER_BARCODE = PE904030
- NAME = Electric Dip Log Survey
- BASIN = GIPPSLAND
- PERMIT = PPL192
- TYPE = WELL
- SUBTYPE = DIAGRAM
- DESCRIPTION = Electric Dip Survey for Rosedale-1
- REMARKS =
- DATE_CREATED = 10/05/60
- DATE_RECEIVED =
- W_NO = W462
- WELL_NAME = ROSEDALE-1
- CONTRACTOR = ELECTRIC WELL LOG
- CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906284

This is an enclosure indicator page.
The enclosure PE906284 is enclosed within the
container PE904030 at this location in this
document.

The enclosure PE906284 has the following characteristics:

- ITEM_BARCODE = PE906284
- CONTAINER_BARCODE = PE904030
- NAME = Directional Survey
- BASIN = GIPPSLAND
- PERMIT = PPL192
- TYPE = WELL
- SUBTYPE = CROSS_SECTION
- DESCRIPTION = Directional Survey Enclosure for
Rosedale-1
- REMARKS =
- DATE_CREATED = 10/05/60
- DATE_RECEIVED =
- W_NO = W462
- WELL_NAME = ROSEDALE-1
- CONTRACTOR = ELECTRIC WELL LOG
- CLIENT_OP_CO = APM DEVELOPMENT PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)