



SALT LAKE NO. 1 WELL

COMPLETION REPORT

by

Woodside Oil N.L.

July 1970

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Well Velocity Survey Report.

SUMMARY

Salt Lake No. 1 well was spudded on 12th April, 1970 and reached a total depth of 5395 feet on 4th May, 1970. The well encountered the following sequence:

	<u>Well Depth</u>
Post Gippsland Limestone	0' - 555'
Gippsland Limestone sediments	555' - 2215'
Lakes Entrance Formation	2215' - 2550'
Latrobe Valley Coal Measures	2550' - 4710'
Basalt	4710' - 4845'
Childers Formation	4845' - 5210'
Strzelecki Group	5210' - 5395' (TD)

No oil or gas was encountered during drilling beyond some trivial indications. The well was plugged and abandoned.

A series of sidewall cores were taken to assist in the lithological interpretation of the well section and also for palynological examination.

From a geological point of view this well will assist in a study of Childers Formation with special regard to its relation to the so-called Golden Beach beds. It is also the first time that a modern set of logs have been run over the Childers Formation.

i. GENERAL DATA

- (A) Well name and number: Salt Lake No. 1.
- (B) Location:
(Figure 1) Lat. $38^{\circ} 26' 53''$ S
Long. $147^{\circ} 05' 12''$ E
Datum: Australian Geodetic Datum
Parish: Darriman
- (C) Names of Tenement Holders: Woodside Oil N.L. (Operator),
Australian Oil and Gas Corp. Ltd.,
Continental Oil Co. of Aust. Ltd.,
B.O.C. of Australia Ltd.,
- (D) Petroleum Tenement: Petroleum Exploration Permit 72
issued by the State of Victoria.
- (E) Total Depth: 5395 feet.
- (F) Date drilling began: 12th April, 1970.
- (G) Date reached T.D.: 4th May, 1970.
- (H) Date well completed: 6th May, 1970.
- (I) Date rig released: 8th May, 1970.
- (J) Drilling time to T.D.: 23 days.
- (K) Elevation: Ground level: 62.81 feet
Kelly Bushing: 75.58 feet
(Well Datum)
Datum: Williamstown
- (L) Status: Plugged and abandoned.

2. DRILLING DATA

(A) Contractor: Woodside Oil N.L.'s drilling rig and equipment were operated by Richter Bawden Drilling Pty. Ltd.'s drilling crew.

(B) Drilling Plant:

Make: Brewster
Type: N4
Rated capacity with 3 1/2" drill pipe: 7500'
Rated capacity with 4 1/2" drill pipe: 6000'
Motors: G.M. 6/71

(C) Mast:

Make: Lee C. Moore
Type: Cantilever
Capacity: 386,000 lbs.

(D) Pumps - Two:

Make: Oilwell
Type: P214
Size: 7 1/4" x 14"
Motors: G.M. 6/71

(E) Blowout preventer equipment:

(i) Make: Cameron (ii) Make: Regan 10"
Size: 12" Series: 900
Series: 900

(F) Hole Sizes and Depths:

<u>Depth</u>	<u>Size</u>
K.B. - 35'	26"
35' - 325'	17 1/2"
325' - 2680'	12 1/4"
2679' - 4249'	8 3/4"
4249' - 5048'	8 5/8"
5048' - 5395'	8 1/2"

(G) Casing and Cementing Details:

Size	20"	13 3/8" ✓	9 5/8" ✓
Weight	Conductor	48 lbs.	36 lbs.
Grade	-	H40	J55
Range	-	R2	R2
Setting Depth		317' ✓	2679' ✓
Type of Collar	Welded	S.T.C.	S.T.C.
Depth Collar		Nil	2618'
Type Shoe		Float Shoe	Float Shoe
Cement Plug		Top Cement Plug	Bottom & Top Plugs
Depth Shoe		317'	2679'
Centralizers		Nil	Nil
Qty. Cement	20 bags	325 bags	350 bags
		Surface	1000 ft*
Method used	Poured from surface	Halliburton Cementing Truck	Halliburton Cementing Truck

*Premix 45 bbl. of mix water with 3 1/2% Magogel.
175 bags neat cement placed around shoe.

(I) Drilling fluid:

- (i) Type - A freshwater - bentonite - lignosulphate system of drilling mud was used throughout the well.
- (ii) Treatment: Regularly with the following chemicals:

	<u>lbs.</u>		<u>lbs.</u>
Zeogel	11,600	Q-Broxin	6,450
Barytes	9,408	Cellucol	484
Supercol	11,400	Caustic Soda	2,100
Unical	1,700	Micatex	690
Milcon	4,200	Sodium Bicarb	186 ² / ₃
Soda Ash	280	Diesel Oil	Gals.5,163

(iv) Average Weight Analysis:

Week	Depth	Weight	Visc.	W.L.	F.C.	pH.
1	2290	9.8	49	13	-	9.5
2	3391	9.6	47	8.1	2/32	9.8
3	5395	9.7	54	4.4	2/32	9.4

(J) Water Supply: A water well was drilled to a depth of 178 feet and cased with 6" water bore casing and 9 feet of screens at the bottom. Water was struck at a depth of 161 feet and rose to 60' from ground level. The well was pumped at a rate of 750 g.p.h. giving a drawdown of 30 feet.

(K) Perforating and Shooting: Nil.

(L) Plug back and cementation jobs:

Abandonment plugs were set in the well:

- 5100' - 5225'
- 4725' - 4850'
- 2605' - 2755'
- 0' - 50'

(M) Fishing Operation: Nil.

(N) Side-tracking hole: Nil.

(O) Deviation:

<u>Depth</u>	<u>Degrees</u>	<u>Depth</u>	<u>Degrees</u>
100 feet	1 ⁰ / ₄	3108 feet	1 ³ / ₄
170	1	3391	1 ³ / ₄
325	3 ³ / ₄	3569	1 ¹ / ₂
522	1 ¹ / ₄	3735	3 ³ / ₄
706	2	3910	2
850	1 ¹ / ₄	4249	1 ³ / ₄
1369	1 ³ / ₄	4455	1 ¹ / ₄
1550	1 ³ / ₄	4569	1 ¹ / ₂
2040	2	4683	1
2232	1 ³ / ₄	5048	1 ³ / ₄
2500	1 ¹ / ₂	5280	1 ¹ / ₄
2760	2	5395	1 ¹ / ₂
2963	1 ³ / ₄		

3. LOGGING AND TESTING

(A) Ditch cutings

Representative samples were collected at the shale shaker every 10 feet from 350' to 5395' (T.D.) These samples were washed, dried and examined. Sample descriptions are given in Appendix 2.

(B) Coring

No conventional cores were cut, but 21 sidewall cores were attempted and 17 recovered.

Details of these cores are given in Appendix 3.

(C) Electrical and other logs

Schlumberger Seaco Inco. ran the following logs:-

(1) Induction Electrical log:

Run 1: 316' - 2679'
Run 2: 2681' - 5388'

(2) Borehole Compensated Sonic/Gamma Ray Log:

Run 1: 316' - 2671'
Run 2: 2681' - 5378'

(3) Formation Density Log:

Run 1: 2681' - 5385'

(4) Continuous Dipmeter Survey:

Run 1: 2680' - 5384'

(D) Drilling Time

Drilling time was recorded by a "Geolograph" mounted on the derrick floor. The penetration rate is plotted on the composite log (Enclosure 1).

(E) Gas Log

Gas detecting equipment, including gas chromatography, was supplied, operated and maintained by Data Analysis Pty. Ltd. at the well site. The equipment was operated from a depth of 350' to total depth.

(F) Testing

Nil.

(G) Velocity Survey

A velocity survey was conducted when the well had reached total depth.. This survey was conducted by United Geophysical Corporation whose report will be forwarded when received.

REGIONAL GEOLOGY

The Salt Lake No. 1 well was drilled in the southern part of the Gippsland Basin where the Latrobe Valley Coal Measures contain basalt flows. Sediments occurring above basalt retain the name "Latrobe Valley Coal Measures", while those below are called "Childers Formation" (Thomas & Baragwanath, 1949). In areas where the basalt does not occur the term Childers Formation is not used.

In the onshore part of the Gippsland Basin the "Golden Beach Beds" have not been recognized south of Merriman No. 1 well and it is considered unlikely that they extend as such to this part of the basin.

Apart from the absence of the Golden Beach Beds and the occurrence of basalt and the Childers Formation the regional geology is the same as given in the Collier's Hill well completion report.

STRATIGRAPHY

The sequence found in the Salt Lake No. 1 well was as follows:-

<u>Age</u>	<u>Formation</u>	<u>Depth Top</u>
	No samples.	0'
U.Pliocene-U.Miocene	Jemmy's Point & Tambo River	350'
M.Miocene-L.Miocene	Gippsland Limestone	555'
Oligocene	Lakes Entrance	2215'
Eocene	Latrobe Valley Coal Measures	2550'
	Basalt	4710'
Palaeocene or Eocene	Childers Formation	4845'
L. Cretaceous	Strzelecki Group	5210'
	Total Depth	5395'

The recognition of the rock units given in the Stratigraphic Table is based on sidewall cores, cuttings and wire-line log characters. These characters were correlated with Merriman No. 1 well and other wells drilled in the area. The ages assigned to the rock units are those generally accepted for these units in the Gippsland Basin. (Hocking 1965 and Jenkin 1968.)

Interval without samples (0' - 350')

From regional geological studies this interval may contain Recent sediments, Boisdale Beds and the upper part of the Jemmy's Point Formation. Because sampling and logging began at 350 feet and 320 feet no evidence from these formations was found.

Jemmy's Point and Tambo River Formation (350' - 555')

Sampling began probably towards the base of the Jemmy's Point Formation. From a study of the sonic log two possible points were recognized for the top of the Tambo River Formation, 380 feet or 460 feet. The first seems the more likely of the two based only on lithological evidence.

Based mainly on cuttings two lithological units have been recognized:-

350' - 380' MARL, medium grey to brown, soft, sandy, fossiliferous.

380' - 555' CLAYEY CALCARENITE (Packstone), light-grey to light-brown, soft, fine to medium grained, fossiliferous (occasionally as a coquina), slightly sandy in places. Trace glauconite.

Gippsland Limestone (555' - 2215')

The top of the Gippsland limestone has been selected at the first appearance of grainstone (clean calcarenite) which here is composed in the cuttings only of shell fragments. Comparison of wireline logs with Merriman and Colliers Hill wells were used to identify the top of this unit.

The lithology of this unit consisted of calcarenite, marl and minor limestone. These lithologies grade into each other in places, as well as being interbedded.

From a study of the wire-line logs and cuttings, especially the S.P. curve, the unit has been divided into the following units:-

555' - 1200'	<u>CALCARENITE</u> (Grainstone), light brown, soft, fine to coarse grained, ill sorted, with clayey interbeds and sandy coquinas, rare limestone beds, fossiliferous, traces of glauconite and pyrites. Clayey interbeds dominant from 555' - 630', many sandy coquinas from 630' - 890'.
1200' - 1607'	<u>MARL</u> , pale-grey, soft with occasional hard bands, fossiliferous, very slightly sandy in upper part, trace glauconite.
1607' - 1705'	<u>CALCARENITE</u> , light to medium-brown, cemented, fine to coarse grained, ill-sorted, fossiliferous, traces of glauconite quartz and pyrites.
1705' - 1840'	<u>MARL</u> , light-brown, soft, fossiliferous, with interbeds of calcarenite as for 1607' - 1705'.
1840' - 1990'	<u>MARLY LIMESTONE</u> , pale-grey, hard, clayey in part, fossiliferous, very slightly glauconitic in part, traces of quartz and dolomite.
1990' - 2140'	<u>CLAYEY MARL</u> , grey to pale grey, soft.
2140' - 2215'	<u>MARL</u> , grey, soft, argillaceous.

Lakes Entrance Formation (2215' - 2550')

The marl of the Lakes Entrance Formation differs from the marl of the overlying Gippsland Limestone by being more clayey. This lithological difference is seen on the cuttings as well as a small change in electrical log profile, and following Hocking (1965) has been taken as the top of this formation. However, this change here is not so pronounced as the prominent break which occurs within the Lakes Entrance Formation at a depth of 2386 feet.

The Lakes Entrance Formation has been sub-divided (Hocking & Taylor, 1964) into two units.

(A) Marly unit (2215' - 2500') consisting of two lithologies:

2215' - 2386'	<u>MARL</u> , grey, soft, slightly argillaceous.
2386' - 2500'	<u>CALCAREOUS MUDSTONE</u> , pale grey and greenish-grey, soft, plastic.

(B) Sandy unit (2500' - 2550')

The top of two thin dolomite beds is taken to mark

the top of the "sandy unit" (Hocking 1965). These dolomites are not seen in cuttings but are easily recognized (and correlated in other wells) as sharp peaks on the resistivity curves and sonic/gamma ray log. In Salt Lake No. 1 well the "sandy units" consist of these lithologies:-

- 2500' - 2515' DOLOMITE occurring as two bands separated by 3 feet of siltstone from 2515' - 2527'.
- 2515' - 2527' SILTSTONE, brown, strongly ferruginised, brittle, carbonaceous, pyritic.
- 2527' - 2550' GLAUCONITIC SANDSTONE.

The Glauconitic Sandstone (2527' - 2550') is not seen in the cuttings but has been interpreted from the logs, with glauconite being interpreted from the gamma ray log.

Latrobe Valley Coal Measures (2550' - 4710')

This unit, consisting of sand containing coal seams and minor siltstone and clay beds, represents the first non-marine sediments encountered in the well below 350 feet. The contact with the overlying Lakes Entrance Formation is taken at 2550 feet, assuming that the interval 2527' - 2550' is a glauconitic sandstone. If this assumption is not followed, then the top of the unit will be at 2527 feet.

The lithologies present are fairly constant over the entire interval with the coal being almost completely confined to the upper one thousand feet. For convenience the unit has been divided into four units:-

- 2550' - 3452' SAND, COAL, WITH MINOR BEDS OF CLAY AND SILTSTONE.
SAND, clear to slightly cloudy, quartzose, unconsolidated, medium to coarse grained (occasionally fine and granule) subangular to well-rounded, moderate sorting, good to excellent porosity.
COAL, dark-brown to black, friable to firm, occasionally silty and shaley, pyritic in places.
SILTSTONE, grey to buff-brown, firm, often argillaceous, occasionally carbonaceous, rarely slightly sand.
CLAY, not recovered in cuttings.
- 3452' - 3460' DOLOMITE.
- 3460' - 3467' GRAVEL, quartzose, clear to slightly cloudy, subangular to angular, partly ferruginised.
- 3467' - 4710' SANDSTONE, WITH INTERBEDS OF COAL, SILTSTONE AND CLAY.
SANDSTONE, clear to cloudy, quartzose, semi-consolidated, medium to coarse (occasionally granule) grained, poor to moderate sorting, angular to subangular, occasional pyrite aggregates, occasionally slightly micaceous.
COAL, as from 2550' - 3452'.
CLAY, light to dark brown (rarely pale grey) becoming shaley with depth, often carbonaceous.
SILTSTONE, as for 2550' - 3452'.

Basalt (4710' - 4845')

Underlying the Latrobe Valley Coal Measures is 135 feet of olivine basalt. This unit is easily recognized in the cuttings and on all wire-line logs.

The basalt has been described as:

4710' - 4845' BASALT. Olivine basalt, greenish-black. Massive, but weathered in places, olivine phenocrysts in pyroxene-amphibole ground mass.

Childers Formation (4845' - 5210')

In the South Gippsland Highlands rocks outcropping between the basalt and Strzelecki Group are known as the Childers Formation. In wells at Darriman and Woodside similar sediments occur in the same position and are referred to as Childers Formation.

In the Salt Lake No. 1 well it has been divided into two lithological units identified mainly from the logs because the cuttings are contaminated with caved material.

4845' - 5155' SANDSTONE, pale-grey, medium to very coarse (occasionally gravel) grained, subrounded to subangular, poor sorting. Trace pyrite, calcite, limonite.

5155' - 5210' CLAY with interbeds of SANDSTONE and SILTSTONE.

The relation of these sediments with the "Golden Beach Beds" which occur onshore to the northeast and offshore to the east is not known and any consideration of this aspect is best deferred until these sediments have been examined by a palynologist.

Strzelecki Group (5210' - 5395' T.D.)

The top of the Strzelecki Group has been selected mainly from the Dipmeter survey together with other wire-line logs because the cuttings appear to be heavily contaminated. Two lithological units have been interpreted:

5210' - 5275' MUDSTONE or CLAY.

5275' - 5395' FELDSPATHIC SANDSTONE, greenish-grey, well-consolidated, fine grained, quartzose, kaolinitic, slightly micaceous, sand, carbonaceous, tight with interbeds of SILTSTONE, grey, carbonaceous.

RESULTS OBTAINED FROM DRILLING

The study of the results obtained from drilling are considered under three headings:-

1. "H" to "K" interval.
2. Hydrocarbons.
3. Regional geology.

1. "H" to "K" interval

Before the drilling of the Salt Lake No. 1 well the seismic results indicated two horizons of particular interest. The upper horizon ("H") was considered to represent the top of the Latrobe Valley Coal Measures and the lower horizon ("K") was regarded as the top of the first coal seam.

Between these two horizons sand could have been present.

The velocity survey and sonic logging carried out in this well have made it possible to identify these horizons with more accuracy. The velocity survey allowed the following depth calculation to be made:-

<u>Seismic Horizon</u>	<u>2-Way Reflection Time</u>	<u>Depth using Velocity-Survey</u>
"H"	660 milliseconds	2496' below K.B.
"K"	720 "	2716' " K.B.

From a study of the sonic log the "H" horizon is correlated with a decrease in interval transit time from about 130 to 60 microseconds per foot at a depth of 2500 feet and corresponds to the two dolomite beds occurring at 2500-2515 feet.

The "K" horizon is correlated with a coal seam at 2705' - 2730' on the sonic log. It is interesting to note that between the dolomites and the "K" coal at 2705' - 2730' other coal seams occur:-

2550' - 2587' (37' thick)
2645' - 2660' (15' thick)

2. Hydrocarbons

No commercial hydrocarbons were encountered during the drilling of this well. Some trivial gas detector readings were recorded during drilling of the top coal and sand of the Latrobe Valley Coal Measures (2598' - 2638'); and at 3090' - 3100'. These recordings were too low and significant to warrant further consideration.

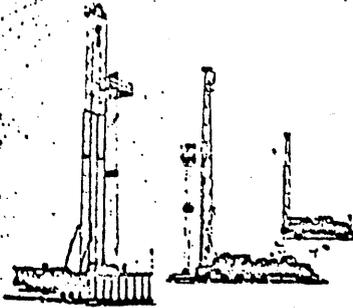
The slight fluorescence recorded from side-wall cores taken from the Childers Formation were too insignificant to be of more than academic interest. The absence of gas detector recordings, together with log analysis indicated that the Childers Formation did not contain hydrocarbons and the fluorescence was considered to be caused by extremely small traces of residual hydrocarbon which was retained in the sediments.

3. Regional Geology

The main interest derived from the drilling of this well comes from the Childers Formation. This is the first time onshore that this formation has been adequately logged, because the earlier intersections at Woodside No. 1 and Darriman No. 1 were drilled too long ago to have been adequately logged.

It is hoped that a palynological study of the sidewall cores taken from the Childers formation in this well will assist in understanding the relation between the Childers Formation and the Golden Beach Beds.

Water Bore Report.



TELEPHONES:
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560 8733

W. L. SIDES & SON PTY. LTD.
DRILLING CONTRACTORS

REGISTERED OFFICE: WELLINGTON RD., CLAYTON, VICTORIA, 3168
P.O. BOX 228, CLAYTON, 3168
TELEGRAMS AND CABLES:
SIDESON, CLAYTON, VICTORIA

31st March, 1970.

Woodside Oil N.L.,
East Tower, Princes Gate,
151 Flinders Street,
MELBOURNE. 3000.

BORE REPORT.

SITE - MCGORRANS BEACH.

<u>Strata.</u>	<u>Depth.</u>	<u>Total.</u>
Clay	10ft.	10ft.
Yellow sand with clay (no water)	140	150
Coarse clayey sand (no water)	11	161
Grey sand coarse to fine.	26	<u>187 ft.</u>

Sand screend between 177ft. and 185ft. with 3 Willscreens - .025 aperture.
Estimated supply 750 g.p.h.

W.L. SIDES & SON PTY. LTD.

(V.J. Schumann)
GENERAL MANAGER.

WOODSIDE OIL N.L.SALT LAKE NO. 1 WELLDRILL CUTTINGS SAMPLE DESCRIPTIONS

0' - 350'	Samples not collected.
350' - 360'	<u>Marl</u> , medium grey, soft-very soft, heterogeneous texture quartz frosted fine-medium grained, ill sorted, rounded. Fossils - Pelecypods, Gastropods, benthonic Foraminifera, lignitic. Interbeds of silt, medium grey, soft fine to medium.
360' - 370'	80% <u>Marl</u> , medium grey-brown, soft, heterogeneous texture, frosted fine-medium quartz grains, angular, poor stratification, fossiliferous, lignitic. 15% <u>Coquina</u> , fossils - Pelecypods, Foraminifera, <u>Dentalium</u> . 5% <u>Marl</u> , as above, with medium quartz sand.
370' - 380'	100% <u>Marl</u> , light-medium brown, soft, heterogeneous texture, ill sorted, with rounded sand and gravel. Fossils - Pelecypods, Foraminifera, <u>Dentalium</u> , lignitic.
380' - 390'	100% <u>Marl</u> , light grey, soft heterogeneous texture, ill sorted, poorly stratified. Fossils Pelecypods, benthonic Foraminifera, Bryozoa, <u>Dentalium</u> .
390' - 400'	90% <u>Packstone</u> , light grey, soft, heterogeneous texture, fine - medium, ill sorted, angular-subangular, poor stratification. Fossils - Pelecypods, benthonic Foraminifera, Bryozoa, <u>Dentalium</u> , Glauconite. 10% <u>Marl</u> , medium grey, soft homogeneous texture, fine, ill sorted, angular.
400' - 410'	As above.
410' - 420'	95% <u>Packstone</u> , light grey-brown, soft, heterogeneous texture, fine-medium ill sorted, angular, poor stratification. Fossils - Pelecypods, Gastropods, Bryozoa, <u>Dentalium</u> , Glauconite.
420' - 430'	As above.
430' - 440'	85% <u>Packstone</u> as above. 10% <u>Siltstone</u> as above. 5% <u>Sand and sandy marl</u> , brown, brittle, heterogeneous texture, medium, ill sorted, angular.
440' - 460'	As above.
460' - 470'	100% - <u>Packstone</u> , as above.
470' - 480'	100% <u>Packstone</u> , as above.

- 480' - 490' 100% Coquina, light brown, loose, heterogeneous texture, medium to coarse, ill sorted. Fossils - Bryozoa, Dentalium, Pelecypoda, Gastropoda, benthonic Foraminifera, Glauconite.
- 490' - 500' 100% Packstone, light brown, soft - brittle, heterogeneous texture, fine-medium, ill sorted, angular. Fossils - Bryozoa, Pelecypoda, Dentalium, Foraminifera, Glauconite.
- 500' - 510' As above.
- 510' - 520' As above.
- 520' - 530' As above with Echinodermata plates and spines.
- 530' - 540' 100% Packstone, light brown, soft-brittle, Heterogeneous texture medium - coarse, ill sorted, angular. Fossils - Bryozoa (branching and encrusting) Pelecypoda, Foraminifera (benthonic and pelagic)
- 540' - 550' 100% Coquina, light brown, medium - coarse, ill sorted, angular, fossils - Bryozoa, Foraminifera (pelagic) Echinodermata, Pelecypoda.
- 550' - 560' 50% Grainstone, light brown, soft - brittle, heterogeneous texture, medium to coarse, ill sorted, angular. Fossils - Bryozoa, Brachiopoda, Pelecypoda, Foraminifera, Echinodermata. 50% Coquina, light brown, very coarse, ill sorted, angular, fossils - Echinodermata, Pelecypoda.
- 560' - 570' 20% Grainstone, as above.
80% Coquina, as above.
- 570' - 580' 100% Coquina, very light brown, heterogeneous texture, medium to coarse, ill sorted, angular, fossils - Bryozoa, Foraminifera, Echinodermata, Pelecypoda.
- 580' - 590' 100% Coquina as above.
- 590' - 600' 60% Packstone as above.
40% Coquina as above.
- 600' - 610' As above.
- 610' - 620' 100% Coquina, light brown, heterogeneous texture, medium to coarse, ill sorted, angular, Fossils - Bryozoa, Echinodermata, Pelecypoda, Foraminifera.
- 620' - 630' 100%. Packstone, light brown, soft, homogeneous texture, medium to coarse, angular, fossiliferous - Bryozoa and Foraminifera.
- 630' - 640' 50% Packstone as above.
50% Coquina, fossils - Bryozoa, Pelecypoda, Foraminifera.
- 640' - 650' 100% Packstone, light brown, soft, homogeneous texture, medium-coarse, angular, fossiliferous - Bryozoa, Pelecypoda, Foraminifera, Echinodermata, lignitic fragments.

- 650' - 660' As above.
- 660' - 670' As above.
- 670' - 680' 100% Packstone as above (with cavings of fossils?)
- 680' - 690' As above.
- 690' - 700' 40% Sandstone, grey to pale grey, medium-fine grained, comprising clear to pale grey quartz; subrounded to subangular, poorly sorted, good porosity.
60% Abundant fossil fragments comprising Pelecypoda, Bryozoa, Foraminifera.
- 700' - 710' 30% Sandstone, as above, poorly consolidated with detrital gypsiferous fragments and minor limestone fragments. Occasional brown clays. The sandstone components show some lithic inclusions.
70% Fossil fragments, abundant foraminifera and coral remnants and Bryozoan remains.
- 710' - 720' 20% Sandstone as above with reddish brown clays.
80% Fossils - strongly Fossiliferous with abundant corals and gastropods and foraminiferal remains.
- 720' - 730' 20% Sandstone - as above, impregnated with fine reddish brown clay.
80% Fossil fragments - as above.
Dark red or reddish brown siltstone grains.
- 730' - 740' 20% Sandstone } as above.
80% Fossil fragments }
Weathered pink feldspars and siltstone fragments.
- 740' - 750' 10% Sandstone, pale grey, poorly consolidated, strongly calcareous (matrix) with occasional colourless subangular quartz grains. Medium - fully grained, poorly sorted, good porosity.
90% Fossil fragments comprise skeletal remains of Bryozoa, Pelecypoda, Gastropoda and Foraminifera. (Polyp corals). Minor reddish brown siltstone fragments, giving the samples a reddish tint.
- 750' - 760' 10% Sandstone, as above, with prominent dark brown black lithic inclusions.
90% Fossil fragments as above.
Reddish clay impregnates the unwashed sample.
- 760' - 770' 10% Sandstone } as above.
90% Fossil fragments }
- 770' - 780' 10% Sandstone } as above.
90% Fossil fragments }
- 780' - 790' Sandstone 20% } as above but with
Fossil fragments 80% } less reddish silts.

910' - 920'	As above
920' - 930'	As above
930' - 940'	As above, some fossils filled with green mud.
940' - 950'	80% <u>Packstone</u> , light brown, soft, homogeneous texture, fine - coarse, ill sorted, angular, fossiliferous - Foraminifera, Bryozoa, Glauconite. Grains in packstone are fossils, quartz, mica, glauconite.
950' - 960'	100% <u>Packstone</u> - <u>Grainstone</u> , light brown, soft, homogeneous texture, fine - coarse, ill sorted, fossiliferous - Foraminifera, Bryozoa, Pelecypoda. Glauconitic, lignitic. Grains in packstone are glauconite, quartz, mica, calcareous fossil fragments.
960' - 970'	100% <u>Grainstone</u> , as above. Fossils - Foraminifera, Bryozoa, Pelecypoda, Echinodermata.
970' - 980'	As above.
980' - 990'	100% <u>Grainstone</u> , with fragments of coarse - medium sand sized particles of fossils, quartz, glauconite.
990' - 1000'	As above.
1000' - 1010'	As above.
1010' - 1020'	As above, with occasional patches of quartz sandstone rich in fossils.
1020' - 1030'	100% <u>Grainstone</u> , with fragments of quartz, fossils, glauconite, with admixed larger fossils (pelecypoda).
1030' - 1040'	100% <u>Grainstone</u> , as above.
1040' - 1050'	100% <u>Grainstone</u> , with fine sand sized grains.
1050' - 1060'	100% As above.
1060' - 1070'	100% As above.
1070' - 1080'	60% <u>Limestone</u> , white, moderately hard, homogeneous texture, very fine grained. 40% <u>Grainstone</u> , as above.
1080' - 1090'	70% <u>Coquina</u> , white, fossils - Bryozoa, Foraminifera. 30% <u>Grainstone</u> , as above.
1090' - 1100'	As above.
1100' - 1110'	90% <u>Coquina</u> , fossils - Bryozoa, Foraminifera. 10% <u>Sandstone</u> and <u>Grainstone</u> .
1110' - 1120'	60% <u>Grainstone</u> 40% <u>Coquina</u> . Fossils - Bryozoa (encrusting, massive, branching) Foraminifera.

- 1120' - 1130' 80% Grainstone, light grey, soft, homogeneous texture, fine - medium, angular, fossil fragments, glauconite.
20% Coquina. Fossils - Bryozoa, Foraminifera.
- 1130' - 1140' 60% Limestone, white hard, homogeneous texture, fine, ill sorted, angular, fossils includes corals.
20% Coquina. Fossils - Bryozoa, Foraminifera.
20% Grainstone, light grey, soft, homogeneous texture, fine - medium, angular, fossil fragments, glauconite.
- 1140' - 1150' 90% Grainstone, as above but fine-grained.
10% Coquina. Fossils - Bryozoa, Foraminifera.
- 1150' - 1160' As above.
- 1160' - 1170' 100% Grainstone, light grey, soft, heterogeneous texture, fine to coarse, ill sorted, angular, fossiliferous - Foraminifera, Pelecypoda, Bryozoa, Glauconite, Pyrites.
- 1170' - 1180' Grainstone, as above.
- 1180' - 1190' As above.
- 1190' - 1200' As above.
- 1200' - 1210' As above.
- 1210' - 1220' 80% Marl, light grey, very fine grained.
20% Grainstone, as above.
- 1220' - 1230' 60% Grainstone.
40% Marl, light grey, very fine grained.
- 1230' - 1240' 50% Grainstone
50% Fossiliferous marl. } as above.
- 1240' - 1250' 30% Sandstone, pale grey, poorly consolidated with strong calcareous matrix.
70% Fossils largely, brachiopods, pelecypods, foraminifera and coralline fragments.
Sample is marly.
- 1250' - 1260' 25% Sandstone, as above with glauconitic grains as infills of microfossils.
75% Fossils, as above.
- 1260' - 1270' 25% Sandstone, with abundant glauconitic infills.
75% Fossils, limestone, marly, abundant fossil fragments.
- 1270' - 1280' 10% Sandstone - as above.
90% Marly limestone - fossiliferous, as above.
- 1280' - 1290' 90% Marl, strongly fossiliferous. Abundant brachiopods, corals, sandy in parts.
10% Sandstone, less glauconitic than previous sample.
Traces calcite &/or traces dolomitic fractions, milky white, hard, crystalline, weathered feldspars.

1290' - 1300' 100% Marl, pale grey to grey, soft, sticky, sandy in parts. Abundant fossiliferous fragments.

1300' - 1310' 100% Marl, grey as above. Glauconitic infills of microfossils.

1310' - 1320' 90% Marl as above. Occasional large sized pelecypods and coralline remains. 10% Sand, cloudy quartz, medium to coarse grained, subrounded to rounded.

1320' - 1330' 90% Marl) As above.
10% Sand)

1330' - 1340' 90% Marl) As above.
10% Sand)

1340' - 1350' 90% Marl) As above, sample very clayey.
10% Sand)

1350' - 1360' 100% Marl, pale grey, abundant fossil fractions, some iron staining on coral fractions.

1360' - 1370' 100% Marl as above.

1370' - 1380' 100% Marl as above.

1380' - 1390' 100% Marl as above.

1390' - 1400' 100% Marl as above.

1400' - 1410' 100% Marl as above.

1410' - 1420' 100% Marl as above.

1420' - 1430' 100% Marl, grey, sticky, soft, sample very clayey. Abundant fossil fragments. Mostly coralline remains and foraminifera. Partly glauconitic. Traces quartz sand, medium to coarse, milky white, subrounded, rounded, some ferruginised. Traces Calcite fractions, crystalline, milky white random sucrosic aggregates.

1430' - 1440' 100% Fossiliferous Marls, grey, sticky, abundant coral fragments and foraminifera. Some caving of reddish silt sized particles from upper levels evident.

1440' - 1450' 100% Fossiliferous marl, as above.

1450' - 1460' 100% Fossiliferous marl, as above.

1460' - 1470' 100% Fossiliferous marl, as above,

1470' - 1480' 100% Fossiliferous marl, as above.

1480' - 1490' 100% Fossiliferous marl, strongly clayey.

1490' - 1500' 100% Fossiliferous marl, as above but abundant glauconitic grains disseminated throughout. Some limestone aggregate - sucrosic appearance.

1500' - 1510' 100% Fossiliferous Marl, as above.

1510' - 1520' 100% Fossiliferous Marl, as above, with occasional lumps of clay, embedded in samples.

1520' - 1530' Fossiliferous marl as above.

1530' - 1540' 100% Fossiliferous marl as above.

1540' - 1550' 100% Fossiliferous marl with glauconitic and quartz grains.

1550' - 1560' As above.

1560' - 1570' 100% Fossiliferous marl and packstone (as interbeds?)

1570' - 1580' As above.

1580' - 1590' As above.

1590' - 1600' As above.

1600' - 1610' 100% Marl, fossiliferous, light brown, very fine, with packstone interbeds? Fossils - Bryozoa, Foraminifera. Sandy and glauconitic.

1610' - 1620' 80% Grainstone, light - medium brown, cemented, homogeneous texture, fine, angular, ill sorted. Fossils - Bryozoa, Foraminifera. Grains of quartz and glauconite.
20% Marl, as before.

1620' - 1630' Grainstone, as above. 50%.
Marl, as above. 50%.

1630' - 1640' 95% Grainstone. Light-medium brown, cemented, homogeneous texture, fine - medium, angular, ill sorted, fossils: Pelecypoda, Bryozoa, Foraminifera, Glauconite, Quartz, Pyrite.
5% Marl, as above.

1640' - 1650' 100% Grainstone, light-medium brown, cemented (with sparry calcite) homogeneous texture, fine-coarse, ill sorted. Fossils - Bryozoa, Foraminifera, Coral and Glauconite.

1650' - 1660' 60% Grainstone, as above.
40% Marl, as above.

1660' - 1670' 60% Grainstone, as above.
40% Marl, as above.

1670' - 1680' 100% Grainstone, light brown, cemented, homogeneous texture, fine-medium, ill sorted, fossils - foraminifera, bryozoa.

1680' - 1690' 50% Grainstone, as above.
50% Marl, light brown, stick, very fine clay.

1690' - 1700' 80% Grainstone, as above.
20% Marl, as above.

1700' - 1710'	60% <u>Marl</u> , fossiliferous, as above. 40% <u>Grainstone</u> .
1710' - 1720'	As above.
1720' - 1730'	80% <u>Marl</u> . 20% <u>Grainstone</u> .
1730' - 1740'	90% <u>Marl</u> , as above. 10% <u>Grainstone</u> , as above.
1740' - 1750'	90% <u>Marl</u> . 10% <u>Grainstone</u> .
1750' - 1760'	100% <u>Marl</u> , light-medium brown, fossiliferous.
1760' - 1770'	95% <u>Marl</u> , as above. 5% <u>Grainstone</u> .
1770' - 1780'	100% <u>Fossiliferous Marl</u> .
1780' - 1790'	As above.
1790' - 1800'	As above.
1800' - 1810'	95% <u>Marl</u> , as above. 5% <u>Grainstone</u> , as above.
1810' - 1820'	80% <u>Marl</u> . 20% <u>Grainstone</u> .
1820' - 1830'	90% <u>Marl</u> . 10% <u>Grainstone</u> .
1830' - 1840'	90% <u>Marl</u> . 10% <u>Grainstone</u> .
1840' - 1850'	95% <u>Marl</u> . 5% <u>Grainstone</u> .
1850' - 1860'	100% <u>Marly Limestone</u> , very strong calcareous. Traces pyritic aggregates.
1860' - 1870'	100% <u>Marly Limestone</u> , pale grey, hard, very strongly calcareous, clayey in parts (marly). Varying amounts of fossiliferous fragments. Dolomite. Coralline remains. Glauconite disseminated throughout.
1870' - 1880'	100% <u>Marly Limestone</u> , as above, trace of medium-fine grained, milky white quartz (ferruginous in parts)
1880' - 1890'	100% <u>Marly Limestone</u> , as above, no trace of quartz, sample very clayey. Abundant fossil fragments.
1890' - 1900'	100% <u>Fossiliferous Marly Limestone</u> , pale grey to grey, poorly consolidated, very strongly calcareous, clayey in parts. Abundant fossil fragments, notably corals and foraminifera. Glauconite grains. Traces quartz, sand, milky white, medium-fine grained, subrounded.

1900' - 1910'	100% <u>Marly Limestone</u> , as above.
1910' - 1920'	100% <u>Marly Limestone</u> , as above.
1920' - 1930'	100% <u>Marly Limestone</u> , as above.
1930' - 1940'	100% <u>Marly Limestone</u> , as above.
1940' - 1950'	100% <u>Marly Limestone</u> , as above.
1950' - 1960'	100% <u>Marly Limestone</u> , as above.
1960' - 1970'	100% <u>Marly Limestone</u> , as above.
1970' - 1980'	100% <u>Marly Limestone</u> , as above.
1980' - 1985'	80% <u>Marls</u> , very clayey (due to shales) (grey to pale grey) tend to wash off. 20% <u>Limestone</u> , sandy in places, fossiliferous. Clayey nature of sample due to shales. Possible top of the Lakes Entrance Formation.
1985' - 1990'	80% <u>Marl</u> } as above, sample very clayey. 20% <u>Limestone</u> }
1990' - 2000'	90% <u>Marl</u> } as above. 10% <u>Limestone</u> }
2000' - 2010'	90% <u>Marl</u> } as above, abundant fossils. 10% <u>Limestone</u> } Traces milky white, subrounded, medium-fine grained quartz with pyrite growths on crystal interfaces.
2010' - 2020'	90% <u>Marl</u> } as above. 10% <u>Limestone</u> }
2020' - 2030'	90% <u>Marl</u> } as above. 10% <u>Limestone</u> }
2030' - 2040'	90% <u>Marl</u> } as above. 10% <u>Limestone</u> }
2040' - 2050'	90% <u>Marl</u> , grey, soft, sticky lumps of clay. 10% <u>Limestone fossils</u> , fragmentary mostly corals and foraminifera. Traces pyrites as aggregates.
2050' - 2060'	100% <u>Marl</u> , as above.
2060' - 2070'	100% <u>Marl</u> , as above, samples very clayey.
2070' - 2080'	100% <u>Marl</u> , as above.
2080' - 2090'	100% <u>Marl</u> , as above.
2090' - 2100'	100% <u>Marl</u> , as above.
2100' - 2110'	100% <u>Marl</u> , as above.
2110' - 2120'	100% <u>Marl</u> , as above.

2120' - 2130'	100% <u>Marl</u> , as above.
2130' - 2140'	100% <u>Marl</u> , as above.
2140' - 2150'	100% <u>Marl</u> , as above.
2150' - 2160'	100% <u>Marl</u> , as above with prominent lumps of clay.
2160' - 2170'	100% <u>Marl</u> , as above. Large lumps of clay.
2170' - 2180'	100% <u>Marl</u> , as above.
2180' - 2190'	100% <u>Marl</u> , as above.
2190' - 2200'	As above.
2200' - 2210'	As above.
2210' - 2220'	Hard clayey marl with sponge spicules (siliceous) quartz, sand grains, glauconite, mica, pelagic foraminifera, etc.
2220' - 2230'	As above.
2230' - 2240'	
2240' - 2250'	<u>Marly limestone.</u>
2250' - 2260'	As above.
2260' - 2270'	<u>Marl</u> , green, slightly sandy.
2270' - 2280'	80% <u>Marl</u> . 20% <u>Glauconitic Grainstone</u> , with some quartz sandstone, pyritic patches.
2280' - 2290'	As above.
2290' - 2300'	As above.
2300' - 2310'	As above.
2310' - 2320'	As above.
2320' - 2330'	As above. Green clayey marl, pyritic in parts.
2330' - 2340'	75% <u>Marl</u> , greenish, soft, plastic, glauconitic, strongly argillaceous. 25% <u>Limestone</u> , reddish brown, green to pale green, very strongly calcareous, glauconitic in part. Fossils fragments, mostly corals, strongly pyritic to some extent. Traces quartz grains, fine-very fine grained, subrounded-rounded, poorly sorted.
2340' - 2350'	90% <u>Marl</u> , as above, bluish grey clay. 10% <u>Limestone</u> , pale green, pyritic veins and aggregates. Occasional glauconitic matrix. Very strongly calcareous. Argillaceous in parts.

2350' - 2360'	90% <u>Marl</u> , 10% <u>Limestone</u>,	)	as above, sample very clayey.
2360' - 2370'	90% <u>Marl</u> , 10% <u>Limestone</u>,	)	as above.
2370' - 2380'	90% <u>Marl</u> 10% <u>Limestone</u>	)	as above.
2380' - 2390'	75% <u>Marl</u> , pale green, sticky plastic. 25% <u>Limestone</u> , white to pale green. Strongly pyritic expressed as veins. <u>Ditrupe</u> worm casts.		
2390' - 2400'	As above.		
2400' - 2410'	90% <u>Marl</u> . 10% Sand-sized carbonate fragments.		
2410' - 2420'	As above.		
2420' - 2430'	As above.		
2430' - 2440'	100% Blue-green <u>marl</u> , slightly sandy. Traces of lignitic material, <u>Glauconite</u> .		
2440' - 2450'	90% <u>Marl</u> , pale grey, and greenish grey, soft sticky plastic, strongly argillaceous, sandy in part. 5% <u>Limestone</u> , pale green, green to white, crystalline with varying amounts of pyrites evidenced as veinlets. 5% <u>Claystone</u> , vivid green, sandy in part, slightly carbonaceous.		
2450' - 2460'	80% <u>Marl</u> 10% <u>Limestone</u> 10% <u>Claystone</u>	)	as above.
2460' - 2470'	80% <u>Marl</u> 15% <u>Limestone</u> 5% <u>Claystone</u>	)	as above.
2470' - 2480'	80% <u>Marl</u> 20% <u>Limestone</u>	)	as above, very clayey.
2480' - 2490'	80% <u>Marl</u> 10% <u>Limestone</u> 10% <u>Claystone</u>	)	as above.
2490' - 2500'	90% <u>Marl</u> 10% <u>Limestone</u>	)	as above.
2500' - 2510'	90% <u>Marl</u> 10% <u>Limestone</u>		
2510' - 2520'	90% <u>Marl</u> 10% <u>Siltstone</u> (claystone) brown, dark brown, strongly ferruginised, brittle, carbonaceous, pyrite growths on some interfaces. Random pyrite aggregates, also as nodules. <u>Siltstone</u> , slightly argillaceous, not soft, very slightly calcareous.		

2520' - 2530'	70% <u>Marl</u> , as above. 20% <u>Limestone</u> , as above. 10% <u>Siltstone</u> .	
	Traces clear, milky white quartz; medium-very fine grained, subrounded, abundant pyrite both as clusters or aggregates and small nodules.	
2530' - 2540'	70% <u>Marl</u> 20% <u>Limestone</u> 10% <u>Siltstone</u>	} as above.
2540' - 2550'	90% <u>Coal</u> , brown to dark brown, earthy, friable, soft, argillaceous in parts. 10% <u>Clay</u> , bluish grey, soft, plastic, glauconitic. Tentative top of Latrobe Valley Coal Measures at 2546'	
2550' - 2560'	100% <u>Coal</u> , with thin bands clay.	
2560' - 2570'	100% <u>Coal</u> .	
2570' - 2580'	100% <u>Coal</u> .	
2580' - 2590'	100% <u>Coal</u> .	
2590' - 2600'	80% <u>Coal</u> , as above. 20% <u>Sand</u> , clear to slightly cloudy, medium-coarse grained, quartz sand, subangular, subrounded, moderate sorting, good to excellent porosity. No fluorescence; but some gas (methane?) recorded, possible emanating from coal beds.	
2600' - 2610'	50% <u>Coal</u> 50% <u>Sand</u>	} as above.
2610' - 2620'	80% <u>Sand</u> 20% <u>Coal</u>	} as above.
2620' - 2630'	90% <u>Sand</u> 10% <u>Coal</u>	} as above.
2630' - 2640'	80% <u>Coal</u> 20% <u>Sand</u>	} as above.
2640' - 2650'	60% <u>Coal</u> 40% <u>Sand</u>	} as above.
2650' - 2660'	75% <u>Coal</u> , dark brown to black, earthy, occasionally woody fragments, friable, soft, (some large chunks coals). Occasional thin clay (grey) bands associated with the coal. 25% <u>Sand</u> , clear, slightly cloudy, unconsolidated medium to very coarse grained, moderate sorting, good porosity. No fluorescence.	
2660' - 2670'	75% <u>Coal</u> 25% <u>Sand</u>	} as above, with lumps of clay and greenish grey marls, possibly cavings.
2670' - 2680'	90% <u>Coal</u> 10% <u>Sand</u>	} as above. Occasionally very coarse grained quartz sand.

- 2680' - 2690' 100% Siltstone, grey and pale brown - red, firm, flakey fracture. About 20% is dark mafic mineral, possibly mica, non calcareous.
- 2690' - 2700' 100% Siltstone, as above, but occasionally the siltstone contains sand-size grains of clear white mineral, possibly quartz.
- 2700' - 2703' 100% Coal, black, dirty, dull, weak to firm, granular fracture.
- 2703' - 2710' 20%
Siltstone, pale creamy brown. As above except that sandy content is slightly higher. Also some of sandy grains appear to be feldspathic. Rare coarse, free grains of quartz present.
80% Coal as above.
- 2710' - 2720' 50% Siltstone, pale cream brown, weak to firm, often clayey, very little sandy material, tabular fracture.
50% Coal, dull black, as above.
- 2720' - 2730' 70% Siltstone, as above.
20% Coal, as above.
10% Sand, clean quartz, angular, well sorted.
- 2730' - 2740' 85% Siltstone, as above, with occasional sand grains.
10% Coal, as above.
5% Sand, as above.
Traces Sandstone, fine grained, white, clayey, tight, rare glauconite.
- 2740' - 2750' 80% Sand, coarse grained, clear quartz, angular, well sorted.
10% Siltstone as above.
10% Coal as above.
Traces of fluorescence, seems to come from a micaceous siltstone.
- 2750' - 2760' 50% Sand, clear quartz, coarse to very coarse, subangular, medium sorting.
5% Sandstone, pale buff grey, very hard, composed, mainly of silt-sized siliceous cement, with about 30% as angular quartz of fine grain size, some calcareous material.
5% Sandstone, white fine grained, hard, feldspathic, tight and slightly glauconitic.
25% Siltstone, as before.
10% Coal, as before.
5% Siltstone, speckled black, weak black material may be mica, but possibly lignite or carbon since rock seems to be gradational to coal.
- 2760' - 2770' 70% Sand, clear quartz, coarse grained, well sorted, rounded to subrounded.
15% Siltstone, buff brown as above.
10% Coal, dull black as above.
5% Sandstone, fine grained, white, well sorted, slightly glauconitic, foraminifera, kaolinitic cement.
Traces of coaly siltstones as above.

- 2770' - 2780' 50% Sand, as above, subangular, poor sorting.
30% Siltstone, as above, occasional sandy grains.
20% Coal, as above, specks of fluorescence present before washing.
- 2780' - 2790' Coal, dull black-brown, weak.
- 2790' - 2800' 95% Coal, as above.
5% Siltstone, as above.
Traces of flakes of white mica.
- 2800' - 2810' 75% Coal, as above.
10% Siltstone, buff brown, as above.
10% Sand, medium-coarse, subangular quartz, medium sorting.
5% Siltstone, white, weak, clayey.
Traces of sandstone, siliceous, silt sized matrix with scattered fine quartz grains.
- 2810' - 2820' 90% Coal, as above.
5% Sand, medium grained, clear quartz.
5% Siltstone, buff coloured, etc., as above.
- 2820' - 2830' 70% Coal, as above.
10% Sand, medium grained, clear quartz, angular, well sorted.
10% Siltstone, buff brown, as above.
10% Siltstone, speckled black, coaly, weak.
- 2830' - 2840' 80% Coal, as above.
10% Sand, medium grained, clear, angular, well sorted quartz.
10% Siltstone, buff coloured, as above, and white clayey.
- 2840' - 2850' 90% Coal, black, fracturing into long slivers with smooth edges. At times conchoidal fractures quite firm.
10% Sand, as above.
- 2850' - 2860' 40% Coal, as above.
40% Sand, clear quartz, medium-coarse, angular, medium-well sorted.
10% Siltstone, buff brown, as above.
10% Siltstone, black, coaly, weak, lustrous.
- 2860' - 2870' 80% Coal, as above.
20% Sand, as above.
Traces Siltstone, both buff and coaly, as above.
Traces Sandstone, medium grained quartz in very high percentage of kaolinitic matrix, about 50% moderate form. Also trace of fine grained kaolinitic sandstone, well sorted.
- 2870' - 2880' 70% Sand, coarse clean white, angular quartz.
15% Siltstone, speckled black, lustrous, coaly? weak to firm.
15% Coal, as above.
- 2880' - 2890' 60% Sand, as above.
20% Siltstone, dark grey, speckled, lustrous as above.
15% Coal, as above.
5% Sandstone, white fine grained, siliceous, hard, low porosity, well sorted.

- 2890' - 2900' 50% Sand, medium-coarse, angular, well sorted quartz.
30% Siltstone, speckled etc. as above, but now often ranges up to very fine sand size with coaly matrix, 50/50%.
20% Coal, as above.
Significant traces of white mica flakes.
- 2900' - 2910' 40% Siltstone, dark grey, speckled weak.
30% Sand, as above.
30% Coal, as above.
- 2910' - 2920' 40% Siltstone, dark grey, speckled, coaly, as above.
30% Coal, black, dull, smooth fracture, etc., as above.
20% Sand, medium-coarse, as above, poorly sorted, subangular.
10% Siltstone, buff brown, etc., as above.
- 2920' - 2930' 100% Coal, dull black, etc., as above, ~~very brittle~~
- 2930' - 2940' 100% Coal, dull black and also brown, weak.
- 2940' - 2950' 100% Coal, brown, earthy, crumbly fracture, weak to firm.
- 2950' - 2960' 100% Coal, brown and black, as above.
- 2960' - 2970' 100% Coal, as above, mostly brown.
- 2970' - 2980' 100% Coal, dark brown, soft, very fine grained.
- 2980' - 2990' 100% Coal, as above.
- 2990' - 3000' 100% Coal, as above.
- 3000' - 3010' 100% Coal, as above.
- 3010' - 3020' 100% Coal, as above. Traces of angular quartz grains, medium grained.
- 3020' - 3030' 100% Coal, as above. Plant fragments visible.
- 3030' - 3040' 95% Coal, as above.
5% Quartz Sand, medium grained, moderate sorting, angular.
- 3040' - 3050' 45% Coal, as above.
5% Quartz Sand, as above.
- 3050' - 3060' 95% Coal,
5% Quartz Sand.
- 3060' - 3070' 95% Coal. Lost circulation material present (Mica)
5% Quartz Sand.
- 3070' - 3080' 100% Coal, dark brown, soft, brittle.
- 3080' - 3090' 95% Coal. Slight gas.
5% Quartz Sand, moderately sorted, angular.

3090' - 3100'	95% <u>Coal</u> , dark brown, soft, brittle, very fine grained. Occasional gas kicks, <u>very</u> minor. 5% <u>Quartz sand grains</u> , medium, poorly sorted. Traces mica books. (L.C.M?)		
3100' - 3110'	100% <u>Coal</u> , dark brown, soft, brittle, friable.		
3110' - 3120'	100% <u>Coal</u> , dark brown, soft, silty.		
3120' - 3130'	100% <u>Coal</u> , as above, with traces of quartz sand.		
3130' - 3140'	100% <u>Coal</u> , black, dark brown, vitreous, abundant woody fragments, striated. Traces clear quartz sand, medium-fine grained, subangular, subrounded. Pyrite aggregates.		
3140' - 3150'	100% <u>Coal</u> , as above.		
3150' - 3160'	100% <u>Coal</u> , as above.		
3160' - 3170'	100% <u>Coal</u> , as above.		
3170' - 3180'	100% <u>Coal</u> , as above.		
3180' - 3190'	100% <u>Coal</u> , as above.		
3190' - 3200'	50% <u>Coal</u> , as above. 50% <u>Sandstone</u> , clear, subangular, angular quartz, medium to coarse grained, moderate sorting, occasional siliceous matrix. Good porosity. No fluorescence. Very slightly calcareous.		
3200' - 3210'	70% <u>Coal</u> . 30% <u>Sandstone</u>.	)	as above.
3210' - 3220'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above.
3220' - 3230'	90% <u>Coal</u> . 10% <u>Sandstone</u>.	)	as above.
3230' - 3240'	90% <u>Coal</u> . 10% <u>Sandstone</u>.	)	as above.
3240' - 3250'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above.
3250' - 3260'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above.
3260' - 3270'	90% <u>Coal</u> . 10% <u>Sandstone</u>.	)	as above. Predominantly as brown coal
3270' - 3280'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above. Brown coal.
3280' - 3290'	70% <u>Coal</u> . 30% <u>Sandstone</u>.	)	as above. Brown coal.
3290' - 3300'	90% <u>Coal</u> . 10% <u>Sandstone</u>.	)	as above. Brown coal.

3300' - 3310'	90% <u>Coal</u> . 10% <u>Sandstone</u>.	)	as above.
3310' - 3320'	80% <u>Coal</u> . 20% <u>Sandstone</u> .		Dominantly clear, medium-coarse grained quartz, sorted, subangular - angular, becoming increasingly more siliceous, very abrasive.
3320' - 3330'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above.
3330' - 3340'	80% <u>Coal</u> . 20% <u>Sandstone</u>.	)	as above.
3340' - 3350'	80% <u>Coal</u> . 20% <u>Sandstone</u> .		Dark brown and dark-medium brown, soft, friable, very fine grained, laminated, some dull, some vitreous. Quartz grained, medium-fine grained moderately sorted, angular, some subangular, equant to bladed. Rare fragments of glauconitic sandstone, very fine grained, poorly sorted.
3350' - 3360'	90% <u>Coal</u> , as above. 10% <u>Sandstone</u> , as above.		
3360' - 3370'	70% <u>Coal</u> , as above. 30% <u>Sandstone</u> , as above.		
3370' - 3380'	40% <u>Coal</u> , as above. 60% <u>Sandstone</u> , as above.		
3380' - 3390'	80% <u>Sandstone</u> . 20% <u>Coal</u> .		
3390' - 3400'	100% <u>Sandstone</u> ,		apparently unconsolidated, quartz grains, poorly to moderately well sorted, angular to subangular, occasionally subrounded.
3400' - 3410'	100% <u>Sandstone</u> .		
3410' - 3420'	100% as above.		
3420' - 3430'	100% <u>Sandstone</u> .		
3430' - 3440'	100% <u>Sandstone</u> .		
3440' - 3450'	70% <u>Sandstone</u> , poorly sorted, slightly gravelly. 30% <u>Coal</u> , dark brown to black, soft, brittle.		
3450' - 3460'	85% <u>Coal</u> , as above. 15% <u>Sandstone</u> ,		slightly gravelly, coarse grained, poorly sorted, milky white, siliceous, subangular - angular. Traces dolomitic fractions. Random pyrite.
3460' - 3462'	100% <u>Gravelly quartz</u> ,		clear, slightly cloudy, subangular to angular, very siliceous, partly ferruginous. Traces of coal.
3462' - 3464'	100% <u>Gravelly quartz</u> ,		as above.

3464' - 3466'	100% <u>Gravelly quartz</u> , as above.	
3466' - 3470'	50% <u>Coal</u> , dark brown, earthy, friable, some woody fragments. 50% <u>Gravelly quartz</u> , milky white to clear fragmented quartz, subangular to angular, coarse to very coarse, moderately well sorted, intensely siliceous.	
3470' - 3480'	60% <u>Coal</u> . 40% <u>Sandstone</u> .	} as above.
3480' - 3490'	60% <u>Coal</u> . 40% <u>Sandstone</u> .	} as above. Slightly ferruginised in parts.
3490' - 3500'	40% <u>Coal</u> . 60% <u>Sandstone</u> .	} as above.
3500' - 3510'	60% <u>Sandstone</u> , fragmented, clear - cloudy, quartz, medium-coarse grained, moderately well sorted. 40% <u>Coal</u> , as above. Traces brown clay, often pyritic.	
3510' - 3520'	60% <u>Sandstone</u> 40% <u>Coal</u>	} as above.
3520' - 3530'	70% <u>Sandstone</u> 30% <u>Coal</u>	} as above.
3530' - 3540'	60% <u>Sandstone</u> 40% <u>Coal</u>	} as above. Small nodules of pale grey clay.
3540' - 3550'	70% <u>Sandstone</u> 30% <u>Coal</u>	} as above, with abundant to medium-fine grained quartz (subangular to angular) Strongly siliceous. Random pyrite nodules. (Occasionally very coarse to granule sized quartz grains as well)
3550' - 3560'	90% <u>Sandstone</u> , coarse grained, poorly sorted, angular grains. 10% Carbonaceous mud (coal?), dark brown, soft, (quartz - granule conglomerate)	
3560' - 3570'	90% <u>Sandstone</u> , as above. 10% <u>Coal</u> , as above.	
3570' - 3580'	100% <u>Sandstone</u> , coarse grained, angular - subangular, poorly sorted quartz fragments, cement unknown.	
3580' - 3590'	As above.	
3590' - 3600'	100% <u>Sandstone</u> , as above.	
3600' - 3610'	100% <u>Sandstone</u> , as above.	
3610' - 3620'	100% <u>Coal</u> , dark brown, soft, very fine grained.	
3620' - 3630'	80% <u>Coal</u> , as above. 20% <u>Sandstone</u> , as above.	

- 3630' - 3640' 90% Sandstone, as above.
10% Coal, as above.
- 3640' - 3650' 70% Sandstone, clear, clay, medium-coarse grained, subangular, angular quartz, moderate-well sorted, strongly siliceous in parts, some pyrite growths on some interfaces.
30% Coal, dark brown to black, fragmented.
- 3650' - 3660' 70% Sandstone, as above with slight increase in pyrite.
30% Coal, as above.
Also trace of colourless, sucrosic, very fine grained siltstones.
- 3660' - 3670' 60% Sandstone, as above. Trace very fine grained (silt sized) quartz, siltstone and conglomerate sandstone. Dominantly very coarse to granule sized, angular quartz material.
40% Coal, as above.
- 3670' - 3680' 80% Coal.
10% Conglomerate sandstone.- } as above.
granule sized quartz (subangular - angular) fragments. Coal content increasing towards base of this interval.
10% Pale brown clay, sticky.
- 3683' Sample at this interval comprised:
90% Pale brown to light yellow clay.
5% Fragmented sandstone as above.
5% Coal - as above.
- 3680' - 3690' 80% Pale brown to buff coloured sticky Clay.
10% Quartz sandstone, subangular, medium-coarse grained.
10% Coal, possibly cavings, at this interval.
Increase of pyrite nodules.
- 3690' - 3700' 70% Sandstone, as above. Traces dolomite?
30% Clay.
- 3700' - 3710' 70% Sandstone }
20% Coal } as above, no trace of
10% Clay } dolomites. Rare pyrite.
- 3710' - 3720' 80% Sandstone }
10% Clay } as above.
10% Coal }
- 3720' - 3730' 80% Sandstone }
10% Clay } as above. Trace dolomitic
10% Coal } fragments?
- 3730' - 3740' As above.
- 3740' - 3750' 80% Sandstone, pyritic, poorly cemented.
10% Clay, white, mottled, soft,
10% Coal,
Traces lithic fragments.
- 3750' - 3760' 100% Sandstone, quartz granules, poorly sorted, angular to subangular, cemented with pale brown soft clay with included very fine grains Mica, Sandstone, Pyritic with cubes and dodecahedral Crystals.

3760' - 3770'	100% <u>Sandstone</u> , quartz granule, varieties of quartz - amethyst, milky.
3770' - 3780'	100% <u>Sandstone</u> , with occasional fragments of sandstone grains, some grains subrounded.
3780' - 3790'	100% <u>Sandstone</u> , with rare lithic fragments.
3790' - 3800'	100% <u>Sandstone</u> , as above, with rare mica.
3800' - 3810'	100% <u>Sandstone</u> , as above.
3810' - 3820'	100% <u>Sandstone</u> , as above.
3820' - 3830'	100% <u>Sandstone</u> , as above.
3830' - 3840'	70% <u>Sandstone</u> , as above. 30% <u>Clay</u> , soft, white.
3840' - 3850'	80% <u>Sandstone</u> , 20% <u>Clay</u> , white soft,
3850' - 3860'	As above.
3860' - 3870'	90% <u>Sandstone</u> , quartz granules grading to very fine sand, pyritic. 10% <u>Clay</u> , white, soft. Traces of coal.
3870' - 3880'	100% <u>Sandstone</u> , coarse to very coarse, colourless, slightly clayey, quartz sand, moderate-well sorted, strongly siliceous in places, pyrite grains. Traces weathered feldspar. Dolomite (?) grains.
3880' - 3890'	95% <u>Sandstone</u> , as above with minor milky white quartz grains. 5% <u>Clay</u> , as nodules. Traces of weathered feldspar, occasional ferruginized grains (not dolomite)
3890' - 3900'	100% <u>Sandstone</u> , coarse grained quartz.
3900' - 3910'	95% <u>Coal</u> , as above. 5% <u>Sandstone</u> , as above.
3910' - 3920'	70% <u>Coal</u> , dark brown, soft, friable. 20% <u>Clay</u> , white very soft. 10% <u>Sandstone</u> , pyritic. Traces of packstone with fossils. Cavings?
3920' - 3930'	70% <u>Sandstone</u> , quartz (varieties of amethyst rare). 20% <u>Coal</u> . 10% <u>Packstone</u> and <u>clay</u> .
3930' - 3940'	As above.
3940' - 3950'	As above, with several fragments of very soft speckled grey siltstone.
3950' - 3960'	90% <u>Sandstone</u> , and occasional lithic fragments. 10% <u>Coal</u> .
3960' - 3970'	As above.

3970' - 3980'	95% <u>Sandstone</u> , granule - coarse quartz grains. 5% <u>Coal</u> .
3980' - 3990'	100% <u>Sandstone</u> , as above.
3990' - 4000'	95% <u>Sandstone</u> . 5% <u>Coal</u> . Traces white clay.
4000' - 4010'	95% <u>Sandstone</u> . 5% <u>Coal</u> with trace of dark brown siltstone. Packstone cavings and white clay.
4010' - 4020'	100% <u>Sandstone</u> .
4020' - 4030'	90% <u>Clay</u> , white-light grey, very soft. 10% <u>Sandstone</u> , as above.
4030' - 4040'	50% <u>Clay</u> , as above. 50% <u>Sandstone</u> , as above.
4040' - 4050'	70% <u>Sandstone</u> , as above. 30% <u>Clay</u> , white-light grey, very soft.
4050' - 4060'	70% <u>Sandstone</u> . 30% <u>Sandy Clay</u> , white, light grey, very soft.
4060' - 4070'	100% <u>Sandstone</u> , pale grey to colourless, comprising colourless to slightly cloudy, subangular, angular, coarse to very coarse quartz grains, moderately well sorted, siliceous in parts, no fluorescence, fair to poor porosity. Abundant pyrite aggregates represented as very coarse granule sized nodules, often with grains of quartz as inclusions. Occasional buff coloured, weathered fragments - not calcareous.
4070' - 4080'	100% <u>Sandstone</u> , as above. Some clay contamination. Traces colourless fragments (very fine - fine grained probably dolomitic origin).
4080' - 4090'	70% <u>Sandstone</u> , as above, with abundant medium-coarse grained, subrounded quartz sand. No fluorescence. 30% <u>Clay</u> , buff coloured, very soft and washes away easily.
4090' - 4100'	90% <u>Sandstone</u> .) As above. Circulated sample. 10% <u>Clay</u>) No fluorescence. No gas "kicks".
4100' - 4110'	90% <u>Sandstone</u>) As above. Not as siliceous 10% <u>Clay</u> (dark brown)) as before. No fluorescence No gas "kicks".
4110' - 4120'	90% <u>Sandstone</u>) As above. Poorly consolidated sand. Good porosity. 10% <u>Clay</u> (dark brown)) No fluorescence. No gas "kicks".
	From 4092' abundant, medium-fine grained, subangular sand encountered. Probable lithological change.
4120' - 4130'	100% <u>Sandstone</u> , as above samples, but gradual increase in coarse to medium grained quartz sand. Moderately well sorted. Traces coal (brown and black). No fluorescence. No gas "kicks". Good porosity.

- 4130' - 4140' 100% Sandstone, dominant coarse to very coarse quartz sand. Random pyrite aggregates. (Traces brown and black coal). Good porosity. No fluorescence or gas "kicks".
- 4140' - 4150' 100% Sandstone - as above.
- 4150' - 4160' 100% Sandstone, as above.
- 4160' - 4170' 100% Sandstone, as above.
- 4170' - 4180' 100% Sandstone, as above. Increase in very coarse to minor granule sized quartz grains, random milky white, some minor pyrites.
- 4180' - 4190' 90% Sandstone, as above, dominantly coarse grained, slightly cloudy quartz, well sorted.
10% Clay, dark brown, soft.
Relative increase in pyrite content, generally present as aggregates. No fluorescence. No gas "kicks".
- 4190' - 4200' 90% Sandstone) As above. No fluorescence.
10% Clay) No gas "kicks".
- 4200' - 4210' 90% Sandstone) As above.
10% Clay)
Trace pyrite and cavings(?) of coal, small amounts only. (Trace Dolomite fractions?)

4210' - 4220'	90% <u>Sandstone</u> , coarse grained, poorly sorted, angular-subangular. 10% <u>Coal</u> , dark brown, soft, with conchoidal fracture in hard black cuttings of coal.	
4220' - 4230'	As above.	
4230' - 4240'	As above.	
4240' - 4250'	100% <u>Coal</u> , light brown, dark brown, soft.	
4250' - 4260'	90% <u>Sandstone</u> . 10% <u>Coal</u> .	
4260' - 4270'	90% <u>Coal</u> . 10% <u>Sandstone</u> .	
4270' - 4280'	90% <u>Coal</u> . 10% <u>Sandstone</u> .	
4280' - 4290'	60% <u>Sandstone</u> . 40% <u>Coal</u> .	
4290' - 4300'	80% <u>Coal</u> . 10% <u>Sandstone</u> . 10% <u>Clay</u> .	
4300' - 4310'	90% <u>Coal</u> . 10% <u>Sandstone</u> .	
4310' - 4320'	90% <u>Sandstone</u> . 10% <u>Coal</u> .	
4320' - 4330'	95% <u>Coal</u> , dark brown-black, soft, friable. 5% <u>Sandstone</u> .	
4330' - 4340'	100% <u>Sand</u> , coarse, angular, well sorted.	
4340' - 4350'	100% <u>Sand</u> , as above.	
4350' - 4360'	100% <u>Sand</u> , coarse, well sorted, angular, subangular quartz.	
4360' - 4370'	95% <u>Sand</u> , as above. 5% <u>Coal</u> , as above.	
4370' - 4380'	100% <u>Sand</u> , as above.	
4380' - 4390'	100% <u>Sand</u> , as above.	
4390' - 4400'	90% <u>Sand</u> , as above. 10% <u>Coal</u> .	
4400' - 4410'	90% <u>Sandstone</u> . 10% <u>Coal</u>.	) as above.
4410' - 4420'	90% <u>Sandstone</u> . 10% <u>Coal</u>.	) as above.
4420' - 4430'	90% <u>Sandstone</u> . 10% <u>Coal</u>.	) as above.
4430' - 4440'	90% <u>Sandstone</u> , comprising colourless, coarse - very coarse subrounded quartz-sand, moderately well sorted, good porosity. No fluorescence; no gas "kicks". 10% <u>Coal</u> , dark brown to black, earthy, soft. Random pyrite nodules.	

4440' - 4450'	95% <u>Sandstone</u> , as above, with increase in pyrite content. 5% <u>Coal</u> , black, brown, soft, earthy.
4450' - 4460'	90% <u>Sandstone</u> , as above. 10% <u>Coal</u> , black, dirty.
4460' - 4470'	100% <u>Sandstone</u> , clean, white, coarse grained, subrounded, moderately sorted.
4470' - 4480'	90% <u>Sandstone</u> , as above, very coarse, gravel. 10% <u>Coal</u> , black as above.
4480' - 4490'	90% <u>Sandstone</u> , as above, trace of pyrite. 10% <u>Coal</u> , black as above.
4490' - 4500'	100% <u>Sandstone</u> , as above.
4500' - 4510'	100% <u>Sandstone</u> , as above.
4510' - 4520'	50% <u>Sandstone</u> , as above. 50% <u>Shale</u> , light-dark brown, well laminated, massive, silty, mica, very carbonaceous with coaly streaks.
4520' - 4530'	70% <u>Sandstone</u> , white, coarse grained, poor sorted, subangular - subrounded, loose quartz sand. 20% <u>Shale</u> , light brown, laminated, mica, silty, very carbonaceous. 10% <u>Coal</u> , black - dark brown, silty, brittle.
4530' - 4540'	70% <u>Sandstone</u> , as above. 30% <u>Shale</u> , as above.
4540' - 4550'	80% <u>Sandstone</u> , as above, rounded - subrounded. 10% <u>Shale</u> , as above. 10% <u>Coal</u> , black and minor pebbles of quartzite.
4550' - 4560'	100% <u>Sandstone</u> , as above.
4560' - 4570'	90% <u>Sandstone</u> , dominantly clay, milky white, coarse-very coarse, subrounded, subangular, quartz grains, moderately well sorted, poor porosity. No fluorescence, no gas kicks. 5% <u>Clay</u> , brown, oozy. 5% <u>Coal</u> , dark brown, black, soft. Traces pyrite nodules and aggregates.
4570' - 4580'	100% <u>Sandstone</u> , dominantly medium - coarse grained. Occasional pyrite grains. No coal.
4580' - 4590'	100% <u>Sandstone</u> , as above.
4590' - 4600'	100% <u>Sandstone</u> , as above.
4600' - 4610'	95% <u>Sandstone</u> . 5% <u>Coal</u> .) as above with traces of weathered feldspars.
4610' - 4620'	100% <u>Sandstone</u> , as above with traces of coal.
4620' - 4630'	100% <u>Sandstone</u> , as above.
4630' - 4640'	100% <u>Sandstone</u> , as above.
4640' - 4650'	100% <u>Sandstone</u> , as above.

- 4650' - 4660' 100% Sandstone, as above, traces very coarse and granule sized quartz sand. Still pyritic in parts.
- 4660' - 4670' 100% Sandstone, as above. Trace of coal.
- 4670' - 4680' 80% Sandstone, massive consolidation, comprising dominantly coarse to very coarse (rare granule sized) subangular, subrounded quartz grains, poorly sorted. Poor porosity.
10% Brown Clay, sticky, soft.
10% Coal, black, brown, recovered as chips, fragile.
- 4680' - 4690' 70% Sandstone, loose unconsolidated white quartz sand, coarse grained, subangular - subrounded as above.
20% Coal, black, dirty, soft-brittle with conchoidal fracture grading into
10% Shale, brown - dark brown, very carbonaceous with coaly streaks, in parts laminated, silty and mica.
- 4690' - 4700' 80% Sandstone, as above.
20% Shale, light brown, very carbonaceous, as above.
Traces coal, pyrite with fossiliferous glauconite. L/S (Gippsland L/S cavings?)
- 4700' - 4710' 90% Sandstone, as above.
10% Coal and carbonaceous Shale.
- 4710' - 4720' 40% Sandstone, as above.
60% Highly altered rock - mostly chlorite and zeolite with abundant limonite and pyrite. Probably weathered basalt of Childer's Formation.
- 4720' - 4730' 90% Olivine Basalt, greenish black, olivine phenocrysts, pyroxene-amphibole grained, massive. Slightly weathered in part, occasional limestone flakes, Kaolinitic in parts.
10% Quartz, up to granule sized, milky white, cloudy, mostly subangular, strongly pyritic, with inclusions of quartz.
Traces of clays, brownish white, soft plastic.
- 4735' 95% Olivine Basalt.
5% Quartz, dominantly very coarse to coarse, grained. Less pyritic.
- 4730' - 4740' 95% Olivine basalt, dominantly olivine phenocrysts and pyroxene-amphibole, fine grained, ground mass. Slightly limonitic, only slightly weathered.
5% Quartz, milky white, clay, very coarse to coarse grained, occasional nodules of pyrites. Traces calcite?
- 4745' 100% Olivine basalt. Greenish black, dense, unweathered. Green olivine phenocrysts and black, dense, fine grained ground mass. Occasional limonite flakes, nodules of pyrite with inclusions of quartz grains, Kaolinitic in parts, traces quartz infilling, random milky white, cloudy, very coarse grained quartz.

- 4740' - 4750' 100% Olivine basalt, as above. Occasionally kaolinitic with less quartz fractions.
- 4755' 100% Olivine basalt with increase in olivine content. More kaolinitic than sample above. Traces quartz fractions. Relative increase in limonitic particles.
- 4750' - 4760' 50% Olivine basalt, as above, strongly weathered in places, exposing the olivine as discrete crystals/aggregates. Occasionally pyritic.
50% Clay, grey to buff coloured, firm, does not wash away too easily.
- 4765' 75% Olivine basalt)
25% Clay) as above.
- 4760' - 4770' 90% Olivine basalt, as above, strongly kaolinitic. Occasionally calcitic veins, rare pyrite.
10% Clay, as above.
- 4770' - 4780' 100% Olivine Basalt, as above.
- 4780' - 4790' 100% Olivine Basalt, as above. 50% Fresh. 50% Altered.
- 4790' - 4800' 70% Basalt, as above, mostly altered to chlorite and zeolites.
30% Clay, grey - green, soft, washes away.
- 4800' - 4810' 50% Basalt, as above, all altered.
50% Clay, perhaps Tuff, brown, soft, some glassy material visible.
- 4810' - 4820' 70% Sandstone, white, coarse grained, poorly sorted, subangular - rounded, loose quartz sand. Latrobe Valley Coal Measures lithology.
30% Basalt, as above, altered.
- 4820' - 4830' 40% Mudstone, brown, silty mica and very carbonaceous.
30% Sandstone, white, coarse grained, subangular - rounded, loose quartz sand.
30% Olivine Basalt, green and black, altered to chlorite and zeolite.
Traces coal, black brittle.
- 4840' - 4850' 70% Clay, buff coloured to yellow, sticky, dense, firm, difficult to washaway, probable weathered product of basalt.
20% Olivine Basalt, black and greenish black, olivine phenocrysts have been variably weathered. Strongly kaolinitic elsewhere.
10% Sandstone, pale grey comprising milky white to cloudy, very coarse grained quartz, subrounded, subangular, poorly sorted with prominent pyrite nodules. No shows. No fluorescence.
Traces calcite and limonite.
- 4850' - 4860' 50% Sandstone, as above, poor porosity. No shows and no fluorescence.
40% Clay, as above.
10% Basalt, as above. Traces olivine, plagioclase.

- 4860' - 4870' 80% Sandstone, as above with abundant coarse to very coarse and granule sized quartz, poorly sorted, no fluorescence, no shows.
10% Clay, as above.
10% Basalt, as above, with small grains of olivine and plagioclase aggregates often weathered. Traces of pyrite.
- 4870' - 4880' 80% Sandstone, dominantly very coarse to coarse grained, moderately well sorted, no shows, no fluorescence.
10% Clay, as above.
10% Basalt, strongly weathered, grey, aphanitic, weathered feldspars (plagioclase), strongly kaolinitic, exposed olivine phenocrysts.
- 4880' - 4890' 70% Sandstone, as above, traces ferruginised quartz grains.
20% Basalt, as above, but fresh (unweathered).
10% Clay, as above.
- 4890' - 4900' 90% Sandstone, as above.
10% Basalt, as above, fresh.
- 4900' - 4910' 50% Sandstone, white, coarse grained, subangular - rounded, loose quartz sand.
50% Basalt, black, green and whitish, fresh to altered, some with distinct flow banding.
- 4910' - 4920' 90% Sand and Gravel, white, very coarse grained, subangular - rounded.
10% Basalt, as above.
- 4920' - 4930' 100% Sand and Gravel, as above. Trace Basalt.
- 4930' - 4940' 100% Sand and Gravel, as above. Trace Basalt.
No fluorescence.
- 4940' - 4950' 100% Sand and Gravel, as above. No shows.
- 4950' - 4960' 100% Sand and Gravel, as above. Trace pyrite and Basalt.
- 4960' - 4970' 60% Basalt, green and black, probably cavings.
40% Sand and gravel, as above.
- 4970' - 4980' 100% Sand and gravel, as above. Trace basalt.
- 4980' - 4990' 70% Sand and Gravel, as above.
20% Coal, black, brittle. Trace brown clay.
10% Basalt, green, altered to chlorite.
- 4990' - 5000' 80% Sand and Gravel, as above.
10% Coal, black, brittle with traces brown, carbonaceous clay.
10% Basalt, green and altered as above.
- 5000' - 5010' 70% Sand and Gravel, as above.
30% Basalt, green and altered as above.
- 5010' - 5020' 50% Sand and Gravel, as above.
20% Coal, black and brittle.
20% Basalt, green as above.
10% Mudstone, brown, ~~xer~~ soft, silty, carbonaceous.

- 5020' - 5030' 40% Sandstone, pale grey, comprising medium to coarse grained, subrounded quartz, good sorting, fair porosity. No shows. No fluorescence.
40% Basalt, olivine phenocrysts, part weathered, weathered plagioclase prominent.
20% Clay, dark brown, soft, puggy.
- 5030' - 5040' 40% Sandstone }
40% Basalt } As above. Traces pyrite.
20% Clays }
- 5040' - 5050' 60% Clay, dark brown, sticky, soft.
20% Sandstone, as above.
20% Basalt, as above. Abundant weathered olivine. Traces pyrite with quartz inclusions. Occasional quartz, strongly ferruginised. Siltstone, dark brown; micaceous in parts, strongly argillaceous,, in parts.
- 5050' - 5060' 75% Gravelly Sandstone, pale grey to white, moderately well consolidated, comprising coarse to very coarse milky white and slightly cloudy, subangular quartz, fair sorting, occasionally pyritic, poor to nil porosity. No shows or fluorescence.
25% Olivine Basalt, strongly weathered in places.
5% Clays, probable weathered product of basalt. Traces coal, black vitreous, soft, brittle.
- 5060' - 5070' 100% Gravelly Sandstone, as above with occasional granule sized quartz fragments. Often pyritic. Trace of basalt.
- 5070' - 5080' 100% Sandstone, as above, comprising dominantly medium-coarse grained, subangular quartz. Occasionally pyritic.
- 5080' - 5090' 100% Sandstone, pale grey, poorly consolidated, abundant medium to coarse grained, angular, subangular, moderately well sorted, fair porosity, no fluorescence; no gas "kicks". Traces olivine, weathered basalt, pyrite.
- 5090' - 5100' 100% Sand and Gravel, white, very coarse grained, subangular, rounded, unconsolidated. No shows or fluorescence.
- 5100' - 5110' 100% Sand and Gravel, as above. Traces of basalt and coal.
- 5110' - 5120' 100% Sandstone, white, coarse grained, as above. Traces Coal, black, brittle.
- 5120' - 5130' 100% Sandstone, as above, with traces of coal.
- 5130' - 5140' 100% Sandstone, as above with traces of basalt.
- 5140' - 5150' 70% Sandstone, as above with traces of basalt.
30% Coal, black, brittle.
- 5150' - 5160' 50% Sandstone, white, coarse grained, subangular - rounded, loose quartz grains. No shows or fluorescence.
50% Coal, dark brown - black, brittle.

- 5160' - 5170' 50% Sandstone, as above.
50% Coal, as above. Trace of basalt.
- 5170' - 5180' 90% Sandstone, pale grey, dominantly very fine grained to medium, also coarse, subangular, moderately well sorted, poor to fair porosity, no fluorescence, no gas kicks.
10% Coal, black, brittle, soft.
- 5180' - 5190' 90% Sandstone } as above. Trace of clays.
10% Coal }
- 5190' - 5200' 75% Sandstone, pale brown, well consolidated, micaceous in parts, well cemented, kaolinitic in part, no porosity.
Sandstone, pale grey, loosely cemented, comprising very fine to coarse grained quartz sand, moderately well sorted, some porosity. No fluorescence or gas kicks.
25% Coal, black, brittle, soft.
Abundant pyrites, found as nodules and aggregates.
Weathered olivine basalt, limonitic fragments.
Traces siltstone, pale grained, micromic, sandy in part.
- 5200' - 5210' 25% Sandstone, as above, less pyritic.
75% Coal, black, brittle.
- 5210' - 5220' 50% Sandstone, pale grey, coarse to medium grained, moderately well cemented, poor porosity.
50% Coal, as above.
Small amounts of buff coloured fractions, affected by acid, calcite? dolomite? Minor olivine basalts, random pyrites.
- 5220' - 5230' 50% Sandstone, as above with minor granule sized quartz, also milky white quartz.
Small amounts of dolomite, strongly calcareous.
50% Coal, as above.
Traces pyrite, siltstone including pale brown to grey varieties. Micromic, sandy in part. Minor weathered plagioclase.
- 5230' - 5240' 50% Sandstone, pale grey variety, well consolidated, strongly siliceous, micromic, colourless variety, poorly consolidated comprising very fine to coarse grained, subangular quartz, some porosity. Very calcareous. Also calcite (dolomite) components.
50% Coal, black to dark brown, earthy, brittle.
- 5240' - 5250' 25% Sandstone, pale grey, well consolidated, fine to medium grained, strongly siliceous in parts, kaolinitic in parts, with dark green lithic inclusions. Abundant milky white to colourless coarse to medium grained, subangular quartz. Moderately well sorted, poor porosity. No fluorescence or flow.
75% Coal, black, massive, vitreous.

- 5250' - 5260' 60% Coal, as above.
 25% Sandstone, dominantly colourless to pale grey, loosely consolidated, comprising fine to coarse grained, subangular, subrounded, poorly sorted, poor porosity. No fluorescence, no gas kicks.
 15% Weathered Olivine basalt, showing streaks of weathered plagioclase (buff coloured) and weathered olivine.
 Trace siltstone, dark grey to pale brown, argillaceous in parts, micaceous, carbonaceous streaks, kaolinitic in parts. Pyrite aggregates, limonitic fragments, occasional ferruginised quartz grains.
- 5260' - 5270' 75% Coal } As above. Occasionally calcareous.
 25% Sandstone } Strongly calcareous. (Calcite?)
 Traces of pyrite, less limonitic fragments, minor clays.
- 5270' - 5280' 75% Coal } As above.
 25% Sandstone }
- 5280' - 5290' 80% Coal, as above.
 10% Sandstone, fine to medium grained, white, calcareous, clayey, lithic. Tight porosity.
- 5290' - 5300' 50% Sandstone, grey, fine to medium grained, calcareous, lithic with dirty grains.
- 5300' - 5310' 60% Sandstone, grey, fine - medium grained, lithic, very calcareous, clayey, dirty fragments.
 30% Siltstone, grey, very micaceous, carbonaceous.
 10% Sand, white, loose quartz grains.
- 5310' - 5320' 90% Sandstone, fine - medium grained, as above.
 10% Sand, loose quartzose, as above.
- 5320' - 5330' 90% Sandstone, fine - medium grained, as above.
 10% Sand, as above.
- 5330' - 5340' 90% Sandstone, fine - medium grained, as above.
 10% Sand, as above.
- 5340' - 5350' 70% Sandstone, fine - medium grained, as above.
 20% Siltstone, green, micaceous.
 10% Sand, as above. Trace coal.
- 5350' - 5360' 80% Sandstone, greenish grey, well consolidated, fine grained, siliceous, strongly kaolinitic, feldspathic, micaceous in parts, very strongly calcareous, friable, tight, no porosity. Carbonaceous in parts. Abundant loose coarse grained quartz.
 20% Siltstone, grey, sandy in part, carbonaceous, micromicaceous.
- 5360' - 5370' 60% Sandstone, as above.
 40% Siltstone, as above. Sample very clayey.
- 5370' - 5380' 50% Sandstone } as above.
 50% Siltstone }
- 5380' - 5390' 50% Sandstone } as above.
 50% Siltstone }
- 5390' - 5395' 60% Sandstone } as above, but sample less clayey.
 40% Siltstone }

T.D. DRILLER 5395'

SALT LAKE NO. 1SIDEWALL CORE DESCRIPTIONS

Number Taken: 21

Number Recovered: 17

<u>Core Number</u>	<u>Depth</u>	<u>Recovery</u>	<u>Lithology</u>
1.	5323'	1"	<u>SANDSTONE</u> , greenish grey, friable, very fine grained, strongly siliceous matrix, strongly calcareous, kaolinitic, very feldspathic with varying amounts of dark lithic inclusions. Generally tight, no fluorescence.
2.	5306'	$\frac{3}{4}$ "	<u>SANDSTONE</u> , greenish grey, friable, very fine to fine grained, strongly siliceous with a calcareous matrix, very feldspathic, strongly kaolinitic, micromicaeous, carbonaceous, occasionally ferruginised, generally tight, no fluorescence.
3.	5259'	1"	<u>MUDSTONE</u> , dark grey, massive, friable, soft, very strongly argillaceous, slightly silty in places, micromicaceous.
4.	5216'	$\frac{1}{2}$ "	<u>MUDSTONE</u> , pale green, massive, soft, very calcareous matrix, micromicaceous, occasionally silty.
5.	5200'	1"	<u>MUDSTONE</u> , pale grey, strongly laminated increase in carbonaceous content has given rise to the dark grey to black layers, occasionally sandy, slightly calcareous, kaolinitic in part.
6.	5173'	1"	<u>SILTSTONE</u> , greyish black, massive, soft, friable, occasionally sandy, micromicaeous.
7.	5165'	1"	<u>SILTSTONE</u> , dark grey, massive, soft, friable, occasionally sandy, with rare carbonaceous specks and streaks.
8.	5139'		No recovery.
9.	5104'	$\frac{3}{4}$ "	<u>SANDSTONE</u> , pale grey, friable, very fine to fine grained, strongly siliceous matrix, slightly calcareous, kaolinitic together with abundant loose colourless fine to very fine, subangular to subrounded quartz grains. Occasional carbonaceous specks disseminated throughout the sample. Fair porosity, no fluorescence.
10.	5055'	$1\frac{1}{4}$ "	<u>SANDSTONE</u> , pale grey, friable, dominantly medium to coarse grained, strongly siliceous matrix, strongly kaolinitic, slightly argillaceous in places, together with minor colourless to slightly cloudy, coarse to medium grained, occasionally granule sized, subangular to subrounded quartz grains. Minor dark lithic inclusions and carbonaceous specks. Fair porosity with a faint spotty fluorescence.

<u>Core Number</u>	<u>Depth</u>	<u>Recovery</u>	<u>Lithology</u>
11.	5040'		No recovery.
12.	5000'	1 $\frac{1}{4}$ "	<u>SANDSTONE</u> , pale grey, friable medium to coarse grained, strongly kaolinitic, weakly siliceous matrix, carbonaceous inclusions, slightly calcareous together with occasional loose, colourless to clear, coarse grained, angular to subangular, moderately well sorted quartz. Good to fair porosity with a faint spotty fluorescence.
13.	4900'	1 $\frac{1}{4}$ "	<u>SANDSTONE</u> , pale grey, friable, gritty, weakly siliceous matrix, strongly kaolinitic, slightly calcareous with minor dark brown and black lithics, together with occasional loose, colourless to clear, very coarse to granule sized, subrounded to subangular, moderately well sorted quartz grains. Good porosity with a dull patchy fluorescence.
14.	4876'	1 $\frac{1}{4}$ "	<u>SANDSTONE</u> , pale grey, friable, fine to coarse grained, poorly sorted, weakly siliceous matrix, strongly kaolinitic, slightly calcareous with occasional ferruginised patches, together with minor clear to slightly cloudy, coarse grained, subangular to subrounded quartz. Good to fair porosity with a dull and patchy fluorescence.
15.	4840'	1 $\frac{1}{4}$ "	<u>OLIVINE BASALT</u> , <u>TUFF</u> , heavily weathered, pale green to greenish grey olivine phenocrysts and dull yellow groundmass (dominantly plagioclase). Massive, soft, strongly argillaceous in places, weathered feldspars and siliceous components (often found as glass shards) generally orientated as streaks or striations. Strongly calcareous, occasionally carbonaceous.
16.	4785'	1 $\frac{1}{4}$ "	<u>OLIVINE BASALT</u> , heavily weathered with a predominantly clayey matrix. Occasional vugs contain chlorite and zeolite. Strongly calcareous, slightly carbonaceous.
17.	4745'		No recovery.
18.	4680'	$\frac{1}{4}$ "	<u>SILTSTONE</u> , dark grey, massive soft, friable, slightly sandy in places, strongly micromicaceous, occasionally carbonaceous.
19.	4244'	1 $\frac{1}{4}$ "	<u>SANDSTONE</u> , pale grey, dominantly very fine to fine grained, siliceous matrix, slightly calcareous, slightly argillaceous, occasionally kaolinitic, variably carbonaceous with minor loose colourless to slightly cloudy, medium to coarse grained, angular to subangular, well sorted quartz. Fair to poor porosity. No fluorescence.

<u>Core Number</u>	<u>Depth</u>	<u>Recovery</u>	<u>Lithology</u>
20.	3914'	1 $\frac{1}{4}$ "	<u>SILTSTONE</u> , grey to pale grey, massive, friable, strongly argillaceous matrix with prominent carbonaceous specks and streaks. Occasionally micaceous, slightly sandy in places.
21.	3465'	No recovery.	

Sample descriptions by
A. MARIMUTHU

MICROFLORAL ASSEMBLAGES

A. Latrobe Valley Coal Measures

3914 feet

Well preserved plant microfossils including spores, pollen grains, and rare dinoflagellate cysts occur in the sample. Species identified include:

Spores	<u>Gleicheniidites circinidites</u> (Cookson) <u>Laevigatosporites ovatus</u> Wilson & Webster <u>Trilites kopkuensis</u> Couper
Pollen	<u>Casuarinidites cainozoicus</u> Cookson & Pike <u>Dacrydiumites balmei</u> Cookson <u>D. ellipticus</u> Harris <u>D. florinii</u> (Cookson & Pike) <u>Duplopollis orthoteichus</u> (Cookson & Pike) <u>Malvacipollis diversus</u> Harris <u>Nothofagidites emarcidus</u> (Cookson) <u>N. cinctus</u> (Cookson) <u>N. goniatus</u> (Cookson) <u>N. heterus</u> (Cookson) <u>Phyllocladidites mawsonii</u> Cookson <u>P. reticulosaccatus</u> Harris <u>Podocarpidites ellipticus</u> Cookson <u>Proteacidites subscabratus</u> Couper <u>Triorites harrisii</u> Couper <u>Tricolporites prolata</u> Cookson
Microplankton	<u>Kenylea fimbriata</u> Cookson & Eisenack <u>Ginginodinium tabulatum</u> Cookson & Eisenack
Remanié	<u>Cicatricosisporites australiensis</u> (Cookson) -sCretaceous

4244 feet

The sample provided abundant and well preserved spores and pollen grains. The following forms were observed:

Spores	<u>Cyathidites australis</u> Couper <u>C. splendens</u> Harris <u>Gleicheniidites circinidites</u> (Cookson) <u>Lycopodiumsporites</u> sp. <u>Stereisporites antiquasporites</u> (Wilson & Webster) <u>Trilites tuberculiformis</u> Cookson
Pollen	<u>Dacrydiumites balmei</u> Cookson <u>D. ellipticus</u> Harris <u>D. florinii</u> (Cookson & Pike) <u>Dilwynites granulatus</u> Harris <u>Microcachryidites antarcticus</u> Cookson <u>Nothofagidites emarcidus</u> (Cookson) <u>N. brachyspinulosus</u> (Cookson)

Phyllocladidites mawsonii Cookson
P. reticulosaccatus Harris
Polycolpites sp.
Polyporina fragilis Harris
Proteacidites crassus Cookson
P. subscabratus Couper
Tricolporites prolata Cookson
Triorites harrisii Couper
T. edwardsi Cookson & Pike
Tricolpites gillii Cookson

4680 feet

Well preserved spores and pollen grains extracted from the sample comprise the following diverse microfloral suite:

Spores Gamarozonosporites amplus (Stanley)
 C. sp.
 Ceratosporites equalis Cookson & Dettmann
 Cyathidites australis Couper
 C. splendens Harris
 Lycopodiumsporites sp.
 Stereisporites antiquasporites (Wilson & Webster)
 S. sp.
Pollen Verrucatosporites speciosus Harris
 Araucariacites australis Cookson
 Dacrydiumites balmei Cookson
 D. ellipticus Harris
 D. florinii (Cookson & Pike)
 Nothofagidites emarcidus (Cookson)
 Phyllocladidites mawsonii Cookson
 P. reticulosaccatus Harris
 Podocarpidites ellipticus Cookson
 Proteacidites crassus Cookson
 P. reticulosabratus Harris
 P. subscabratus Couper
 Tricolpites gillii Cookson
 Triorites edwardsi Cookson & Pike
 T. harrisii Couper

B. Childers Formation

4876 feet

A sparse assemblage of well preserved spores and pollen grains was extracted from the sample. Types identified include the following forms, some or all of which may be contaminants (see discussion in following section):

Spores	<u>Baculatisporites comaumensis</u> (Cookson) <u>Neoraistrickia</u> sp.
Pollen	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
	<u>Dacrydiumites balmei</u> Cookson
	<u>D. ellipticus</u> Harris
	<u>D. florinii</u> (Cookson & Pike)
	<u>Nothofagidites emarcidus</u> (Cookson)
	<u>N. cinctus</u> (Cookson)
	<u>Phyllocladidites mawsonii</u> Cookson
	<u>Podocarpidites ellipticus</u> Cookson
	<u>Proteacidites subscabratus</u>
	<u>P. spp.</u>
Microplankton	<u>Triorites harrisii</u> Couper
	<u>Ginginodinium spinulosum</u> Cookson & Eisenack

4900 feet

The well preserved microflora is sparse and probably includes contaminants (see below). The following types were observed:

Spores	<u>Cyathidites australis</u> Couper
	<u>Gleicheniidites circinidites</u> (Cookson)
	<u>Laevigatosporites ovatus</u> Wilson & Webster
	<u>Verrucatosporites speciosus</u> Harris
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
Pollen	<u>Dacrydiumites ellipticus</u> Harris
	<u>Microcachryidites antarcticus</u> Cookson
	<u>Nothofagidites emarcidus</u> (Cookson)
	<u>N. goniatus</u> (Cookson)
	<u>Phyllocladidites mawsonii</u> Cookson
	<u>Podocarpidites ellipticus</u> Cookson
	<u>Proteacidites crassus</u> Cookson
<u>Triorites harrisii</u> Couper	

5000 feet

The residue contains fairly plentiful plant microfossils that comprise the following restricted assemblage:

Spores	<u>Gleicheniidites circinidites</u> (Cookson)
	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
Pollen	<u>Dacrydiumites ellipticus</u> Harris
	<u>Nothofagidites emarcidus</u> (Cookson)
	<u>Phyllocladidites mawsonii</u> Cookson
	<u>Podocarpidites ellipticus</u> Cookson
	<u>Proteacidites crassus</u> Cookson
	<u>P. subscabratus</u> Couper
	<u>Triorites edwardsii</u> Cookson & Pike
Microplankton	<u>T. harrisii</u> Couper
	<u>Ginginodinium spinulosum</u> Cookson & Eisenack

5055 feet

The well preserved spore-pollen suite is sparse and contains a significant proportion of contaminants (see below). The following types were observed:

Spores Clavifera triplex (Bolkhovitina)
 Gleicheniidites circinidites (Cookson)
 Stereisporites antiquasporites (Wilson & Webster)

Pollen Dacrydiumites ellipticus Harris
 Duplopollis orthoteichus (Cookson & Pike)
 Nothofagidites cinctus (Cookson)
 Phyllocladidites mawsonii Cookson
 Podocarpidites ellipticus Cookson
 Proteacidites annularis Cookson
 P. subscabratus Couper
 Triorites harrisii Couper
 T. edwardsii Cookson & Pike
 T. magnificus Cookson

5104 feet

The sample provided a sparse assemblage in which one to several examples of the following types were observed:

Spores Stereisporites antiquasporites (Wilson & Webster)

Pollen Nothofagidites emarcidus (Cookson)
 Phyllocladidites mawsonii Cookson
 Podocarpidites ellipticus Cookson
 Proteacidites crassus Cookson
 Triorites harrisii Couper

5165 feet

Spores and pollen grains extracted from the sample are abundant and noticeably less well preserved than those from higher horizons. Several of the types represented are probably contaminants.

Spores Baculatisporites comaumensis (Cookson)
 Ceratosporites equalis Cookson & Dettmann
 Cyathidites australis Couper
 C. minor Couper
 Dictyophyllidites crenatus Dettmann
 Foraminisporis asymmetricus (Cookson & Dettmann)
 Klukisporites scaberis (Cookson & Dettmann)
 Kraeuselisporites jubatus Dettmann & Playford
 Leptolepidites verrucatus Couper
 L. major Couper

Lycopodiumsporites austroclavatidites (Cookson)
L. eminulus Dettmann
L. nodosus Dettmann
Pollen Stereisporites antiquasporites (Wilson & Webster)
Araucariacites australis Cookson
Alisporites grandis (Cookson)
Classopollis cf. classoides Pflug
Microcachryidites antarcticus Cookson
Phyllocladidites mawsonii Cookson
Podocarpidites ellipticus Cookson
Tsugaepollenites dampieri (Balme)

5173 feet

The microflora exhibits similar preservation quality to that from 5165 feet and includes the following species of spores and pollen grains; some of which are derivatives from higher horizons:

Spores Baculatisporites comaumensis (Cookson)
Ceratosporites equalis Cookson & Dettmann
Cyathidites australis Couper
C. minor Couper
C. punctatus (Delcourt & Sprumont)
Cicatricosisporites ludbrookii Dettmann
Dictyotosporites speciosus Cookson & Dettmann
Leptolepidites verrucatus Couper
Lycopodiumsporites nodosus Dettmann
Klukisporites scaberis (Cookson & Dettmann)
Matonisporites cooksoni Dettmann
Pilososporites notensis Cookson & Dettmann
Rouseisporites reticulatus Pocock
Pollen Stereisporites antiquasporites (Wilson & Webster)
Alisporites grandis (Cookson)
Cycadopites nitidus (Balme)
Nothofagidites emarcidus (Cookson)
Microcachryidites antarcticus Cookson
Podocarpidites ellipticus Cookson
Tricolpites sp.
Triorites sp.
Tsugaepollenites dampieri (Balme)

5200 feet

A diverse assemblage of spores and pollen together with rare acritarchs occurs in the sample. Preservation quality of the microfossils is generally fair although several species (contaminants) exhibit good preservation.

Spores	<u>Baculatisporites comaumensis</u> (Cookson) <u>Ceratosporites equalis</u> Cookson & Dettmann <u>Cicatricosisporites australiensis</u> (Cookson) <u>Cyathidites australis</u> Couper <u>C. minor</u> Couper <u>Foraminisporis dailyi</u> (Cookson & Dettmann) <u>Gleicheniidites circinidites</u> (Cookson) <u>Klukisporites scaberis</u> (Cookson & Dettmann) <u>Leptolepidites verrucatus</u> Couper <u>Lycopodiumsporites austroclavatidites</u> (Cookson) <u>L. facetus</u> Dettmann <u>L. nodosus</u> Dettmann <u>L. reticulumsporites</u> (Rouse) <u>Laevigatosporites</u> sp.
Pollen	<u>Araucariacites australis</u> Cookson <u>Alisporites grandis</u> (Cookson) <u>Classopollis</u> cf. <u>classoides</u> Pflug <u>Microcachryidites antarcticus</u> Cookson <u>Phyllocladidites mawsonii</u> Cookson <u>Podosporites microsaccatus</u> (Couper) <u>Podocarpidites ellipticus</u> Cookson <u>Tsugaepollenites dampieri</u> (Balme)
Acritarcha	<u>Micryhstridium</u> sp. <u>Schizosporis spriggi</u> Cookson & Dettmann
Remanié	<u>Nuskoisporites</u> sp.

C. Strzelecki Group

5216 feet

The residue obtained from the sample appears to consist entirely of species derived from horizons of the Latrobe Valley Coal Measures. This is not unexpected since the original sample appeared to be composed of drilling mud.

5259 feet

An abundant and fairly preserved spore-pollen suite was obtained from the sample. Species identified include:

Spores	<u>Baculatisporites comaumensis</u> (Cookson) <u>Ceratosporites equalis</u> Cookson & Dettmann <u>Cicatricosisporites australiensis</u> (Cookson) <u>Cyathidites australis</u> Couper <u>C. minor</u> Couper <u>Dictyophyllidites crenatus</u> Dettmann <u>Dictyotosporites speciosus</u> Cookson & Dettmann <u>Foraminisporis dailyi</u> (Cookson & Dettmann) <u>F. asymmetricus</u> (Cookson & Dettmann)
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	<u>Gleicheniidites circinidites</u> (Cookson)
	<u>Klukisporites scaberis</u> (Cookson & Dettmann)
	<u>Laevigatosporites</u> sp.
	<u>Lycopodiumsporites austroclavatidites</u> (Cookson)
	<u>L. facetus</u> Dettmann
	<u>L. nodosus</u> Dettmann
	<u>Leptolepidites verrucatus</u> Couper
	<u>L. major</u> Couper
	<u>Pilosporites notensis</u> Cookson & Dettmann
	<u>Reticulatisporites pudens</u> Balme
	<u>Rouseisporites reticulatus</u> Pocock
	<u>Tilites</u> cf. <u>tuberculiformis</u> Cookson
Pollen	<u>Stereisporites antiquasporites</u> (Wilson & Webster)
	<u>Alisporites grandis</u> (Cookson)
	<u>Araucariacites australis</u> Cookson
	<u>Classopollis</u> cf. <u>classoides</u> Pflug
	<u>Microcachryidites antarcticus</u> Cookson
	<u>Podocarpidites ellipticus</u> Cookson
	<u>Podosporites microsaccatus</u> (Couper)
Remanié	<u>Ara-trisporites</u> sp. - Triassic
	<u>Nuskoisporites</u> sp. - Permian

5306 feet

The sample yielded a small residue composed entirely of wood fragments.

5323 feet

Wood fragments and occasional cuticular material comprise the plant matter obtained from the sample.

AGE OF THE MICROFLORAS

A. Latrobe Valley Coal Measures

The upper sample of the Latrobe Valley Coal Measures from 3914 feet contains a well preserved microflora in which spores and pollen grains predominant and dinoflagellate cysts are rare. The spore-pollen suite is of Lower Tertiary aspect with occasional recycled Cretaceous forms (Cicatricosporites australiensis). Amongst the Tertiary forms represented Dacrydiumites balmei, Phyllocladidites reticulosaccatus, and Duplopollis orthoteichus collectively suggest reference of the horizon to Harris' (1965) Triorites edwardsi/Duplopollis orthoteichus Concurrent

Range Zone of Middle - Upper Paleocene age. Other forms (e.g. Nothofagidites goniatus) are known only from Eocene microfloras and are interpreted as contaminants from higher in the sequence. A Middle - Upper Paleocene age is supported by the contained dinoflagellate cysts referred to Kenylea fimbriata and Ginginodinium tabulatum (see Cookson and Eisencak 1965; 1967a,b).

Samples from 4244 and 4680 feet contain Dacrydiumites balmei, D. ellipticus, Phyllocladidites reticulosaccatus, and Triorites edwardsii, the association of which signify a Middle Paleocene age (Harris 1965) and reference of the sediments to Harris's Triorites edwardsii Assemblage Zone.

B. Childers Formation

Samples from between 4876 feet and 5104 feet yielded 'mixed' microfloras containing uppermost Cretaceous - Paleocene, and Eocene or later elements. As discussed previously the samples were friable sandstones suspected as having been invaded by drilling mud and it is possible that all forms extracted are derivatives from higher horizons. The Eocene forms (Triorites magnificus, Nothofagidites goniatus etc.) generally exhibit a distinct mode of preservation from those of Paleocene - uppermost Cretaceous age, and a close search did not reveal the presence of pre-uppermost Cretaceous forms.

The age of the microfloras is here adduced from the occurrence of Dacrydiumites balmei, D. ellipticus, Triorites edwardsii, and Ginginodinium tabulatum. Collectively these forms indicate an uppermost Cretaceous - lowermost Tertiary age. The absence of Phyllocladidites reticulosaccatus (present in stratigraphically higher horizons) may suggest an age older than that of horizons between 4244 and 4680 feet in the Latrobe Valley Coal Measures. It should be emphasized that the uppermost Cretaceous - lowermost Tertiary age can only be regarded with caution in view of the

possibility of contamination from stratigraphically higher sediments.

Samples taken from siltstone and mudstone horizons between 5165 and 5200 feet from the basal part of the Childers Formation yielded high concentrations of plant microfossils including abundant spores and pollen grains and rare acritarchs. Stratigraphically significant species identified include Dictyotosporites speciosus (5173 feet), Pilososporites notensis (5173 feet), Foraminisporis asymmetricus (5165 feet), and Dictyophyllidites crenatus (5165 feet). The presence of these species suggests the horizons are from the middle or upper portions of Dettmann and Playford's ⁽¹⁹⁶⁷⁾ Dictyotosporites speciosus Zone (i.e. from the top of the Cyclosporites hughesi Subzone or from the Crybelosporites striatus Subzone) of Lower Cretaceous (Neocomian - Lower Albian) age. The majority of other forms represented are long-ranging within the Upper Mesozoic. However, the residues also include occasional angiospermous grains (Nothofagidites, simple tricolpate and triporate forms), Phyllocladidites, and Kraeuselisporites jubatus, the majority of which are interpreted to represent contaminants from higher horizons in the well. Nevertheless, the presence of K. jubatus is bewildering, since the species is known only from Late Albian - Early Senonian, and thus could hardly be expected to have derived from the latest Cretaceous - Tertiary section in the well. It is possible that the horizons are of mid Cretaceous age and that their contained microfloras are largely reworked from pre-Upper Albian strata. However, the evidence is inconclusive and can only be evaluated in the light of other stratigraphical data.

If the horizons are in fact within the Dictyotosporites speciosus Zone, then the lower portion of the Childers Formation can be regarded as a correlative of the Strzelecki Group.

C. Strzelecki Group

The sample from 5216 feet is considered to represent sediment from stratigraphically higher horizons in the well on account of the preponcity of Eocene and Paleocene types represented in the microflora.

The sample from 5259 feet provided a rich assemblage of fairly preserved spores and pollen grains. Stratigraphically significant species identified include Dictyotosporites speciosus, Pilosporites notensis, Rouseisporites reticulatus, and Foraminisporis asymmetricus. On this basis the sediment is considered to be from within the middle or upper portion of the Dictyotosporites speciosus Zone (i.e. from the upper part of the Cyclosporites hughesi Subzone or the Crybelosporites striatus Subzone). A close search failed to reveal the presence of the indices of either the C. hughesi or C. striatus Subzones, and hence the age attribution can be no more precise than Neocomian - Lower Albian. The microflora also yielded several examples of reworked types of Permian and Triassic age.

Underlying horizons (5306 and 5323 feet) failed to provide spores and pollen grains, although fine woody material was observed in both samples.

COMPARISON AND CORRELATION OF SALT LAKE No.1 WITH
OTHER WELL SEQUENCES IN THE GIPPSLAND BASIN

In order to appreciate the biostratigraphic relationships existing between the Latrobe Valley Coal Measures, the Childers Formation, and the "Golden Beach Beds" in Salt Lake No.1, Colliers Hill No.1, Merriman No.1, and Golden Beach West No.1, core samples from the last two-mentioned wells have been reinvestigated (see also data documented in Dettmann 1966^a) and the results incorporated in Table 1.

If the uppermost Cretaceous - lowermost Tertiary dating of the middle and upper portions (4876 - 5104 feet) of the Childers Formation in Salt Lake No.1 is correct, then the basalt, which overlies the Childers Formation and is itself overlain by Paleocene horizons of the Latrobe Valley Coal Measures, can be regarded as uppermost Cretaceous - lowermost Tertiary age. Similarly the middle and upper portions of the Childers Formation in Salt Lake No.1 can be considered correlatives of the basal portions of the Latrobe Valley Coal Measures in Colliers Hill No.1 and Golden Beach West No.1.

From Table 1 it is also evident that the top of the "Golden Beach Beds" is clearly younger in Merriman No.1 (sediments containing Nothofagidites Microflora) than in Colliers Hill No.1 (Tricolpites pachyexinus Zone). In Colliers Hill No.1 an hiatus is suspected to occur within the "Golden Beach Beds" between horizons of the Tricolpites pachyexinus and Appendicisporites distocarinatus Zones. In Merriman No.1 and Golden Beach West No.1 a disconformity also appears to be represented within the "Golden Beach Beds"; the precise time extents of the hiatus is however difficult to adduce because of insufficient coverage of samples. In Merriman No.1 the hiatus appears to include some or all of the interval of time represented by the T. pachyexinus together with the Clavifera triplex and/or Appendicisporites distocarinatus Zones. In Golden Beach West No.1 the disconformity may represent a lesser time interval during which portions of the C. triplex and/or A. distocarinatus Zones were deposited.

The basal horizons of the Childers Formation in Salt Lake No.1 are possibly of Lower Cretaceous age and within the Dictyotosporites speciosus Zone. Such an assignment suggests that the base of the

Childers Formation in Salt Lake No.1 is equivalent to portions of the Strzelecki Group as developed in other sequences in the Gippsland Basin (see Table 2). The top of the Strzelecki Group in Salt Lake No.1 is also within the D. speciosus Zone and is clearly older than upper horizons of the Strzelecki Group examined in Woodside South No.1, Darriman No.1, and Lake Reeve No.1 (see Table 2). This evidence and other data tabulated in Table 2 indicates that the top of the Strzelecki Group does not form a time-concordant surface.

REFERENCES

- Cookson, I.C. and Eisenack, A. 1965. Microplankton from the Paleocene Pebble Point Formation, south-western Victoria. Proc. Roy. Soc. Vict. 79, 139-46.
- Cookson, I.C. and Eisenack, A. 1967a. Some microplankton from the Paleocene Rivernook Bed, Victoria. Ibid. 80, 247-58.
- Cookson, I.C. and Eisenack, A. 1967b. Some early Tertiary microplankton and pollen grains from a deposit near Strahan, western Tasmania. Ibid. 80, 131-40.
- Dettmann, M.E. 1965a. Palynological report on Woodside Wellington Park No.1 well. Unpubl. report submitted to Haematite Explorations Pty. Ltd. 9/8/65.
- Dettmann, M.E. 1965b. Palynological examination of Rosedale, Darriman, and Tarwin Meadows wells. Ibid. 4/11/65.
- Dettmann, M.E. 1966a. Palynological examination of core samples from Golden Beach West No.1 and Merriman No.1 wells. Ibid. 18/2/66.
- Dettmann, M.E. 1966b. Palynological report on core samples from wells sunk in the Gippsland Basin. Ibid. 14/4/66.
- Dettmann, M.E. 1970a. Palynological report on Woodside Colliers Hill No.1 well, 4416 - 5550 feet. Unpubl. report submitted to Woodside Oil NL 22/4/70.
- Dettmann, M.E. 1970b. Palynology of Upper Cretaceous and Lower Tertiary sediments in Woodside Colliers Hill No.1 well. Ibid. 21/7/70.
- Dettmann, M.E. and Playford, G. 1969. Palynology of the Australian Cretaceous; a review. Chapter 9 in Stratigraphy and Palaeontology; Essays in Honour of Dorothy Hill; K.S.W. Campbell Ed., A.N.U. Press, Canberra.
- Harris, W.K. 1965. Basal Tertiary microfloras from the Princetown area, Victoria, Australia. Palaeontographica 115B, 75-106.

24th September, 1970.

Mary E. Dettmann,
Department of Geology,
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St. Lucia, Qld. 4067.

PALYNOLOGICAL REPORT ON WOODSIDE SALT LAKE No.1 WELL,

3914 - 5323 FEET

The present account documents microfloral evidence obtained from fifteen sidewall cores from Woodside Salt Lake No.1 well, between 3914 and 5323 feet. This section is documented (refer Attachment 2; letter 27th July, 1970 E2/88/11) as including the lower portion of the Latrobe Valley Coal Measures (3914 - 4710 feet), basalt (4710- 4845 feet), Childers Formation (4845 - 5210 feet), and Strzelecki Group (5210 - T.D.5395 feet). The sidewall cores examined are from the sedimentary units and include sandstones, mudstones, and siltstones. Several of the sandstone samples (particularly those from the Childers Formation) were found to be extremely friable and were noted as having been impregnated with drilling mud. Moreover, the sample from 5216 feet (Strzelecki Group) appeared to consist entirely of drilling mud contamination.

The samples were cleaned as thoroughly as possible before preparation by the procedure outlined by Dettmann (1970a), and the resultant residues mounted in glycerine jelly on glass microscope slides for microscopic analyses of the contained plant microfossils. All samples were found to contain, in varying quantities, plant microfossils including spores, pollen grains, and fragments of wood and cuticle. Samples from the Latrobe Valley Coal Measures and the Childers Formation also yielded rare dinoflagellate cysts. Qualitative estimates of the individual microfloral assemblages extracted from the samples are documented below. It should be noted that several of the samples yielded readily recognizable contaminants from younger horizons and reworked types from older strata. The possibility that other samples contain high proportions of contaminants and/or recycled forms is discussed in a subsequent section of the report.

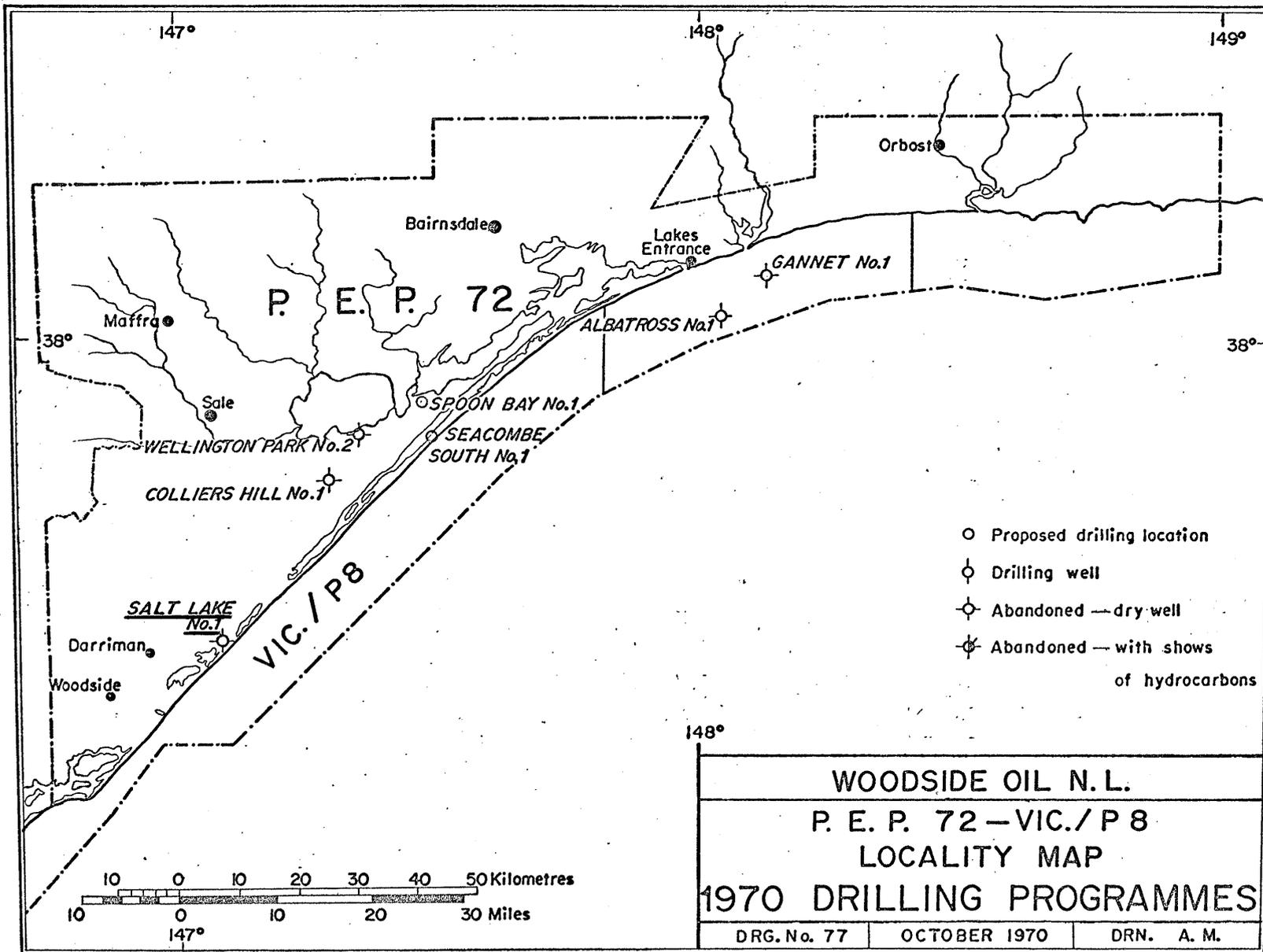
	Colliers Hill No.1	Golden Beach West No.1	Merriman No.1	Salt Lake No.1
Eocene	1860-2905ft.	5076 ft.	not identified in sampled section	not identified in sampled section
Paleocene	not identified in sampled section	not identified in sampled section	not identified in sampled section	3914-4680 ft.
uppermost Cretaceous- lowermost Tertiary	4090 ft.	5415 ft.	not identified in sampled section	4876-5104
<u>Nothofagidites</u>	absent	not identified in sampled section	4705 ft.	absent
<u>T ricolpites</u> <u>Bachyexinus</u>	4159-5250ft.	6380 ft.	? absent	absent
<u>Clavifera triplex</u>	?absent	{ 6848 ft.	{ 5070 ft.	absent
<u>Appendicisporites</u> <u>distocarinatus</u>	5425-5550 ft.			?absent

TABLE 1. Biostratigraphic relationships of sediments in Colliers Hill No.1, Golden Beach West No.1, Merriman No.1, and Salt Lake No.1 wells. Upper Cretaceous spore-pollen zones are those defined by Dettmann and Playford 1969.

Legend:  Latrobe Valley Coal Measures
 Childers Formation
 "Golden Beach Beds"

Well	Depth (ft.)	Spore-pollen Zone
Darriman No.1	4474-5	<u>Coptospora paradoxa</u> (base)
Tarwin Meadows No.1	600-2572	<u>Dictyotosporites speciosus</u> undiff.
Rosedale No.1	2469-3447	<u>Dictyotosporites speciosus</u> undiff.
	3447-4496	<u>Cyclosporites hughesi</u>
Woodside South No.1	3279-99	<u>Coptospora paradoxa</u>
	3489-509	<u>Crybelosporites striatus</u>
Bellbird No.1	995-1000	<u>Coptospora paradoxa</u> or <u>Crybelosporites striatus</u>
Lake Reeve No.1	6080-96	<u>Coptospora paradoxa</u> (probably upper part)
Seaspray No.1	4872-5556	<u>Coptospora paradoxa</u>
Duck Bay No.1	2831-51	? <u>Crybelosporites stylosus</u>
Carrs Creek No.1	4522-5507	<u>Dictyotosporites speciosus</u> undiff.
Wellington Park No.1	3818-4340	<u>Crybelosporites striatus</u>
	6845-9019	<u>Cyclosporites hughesi</u>

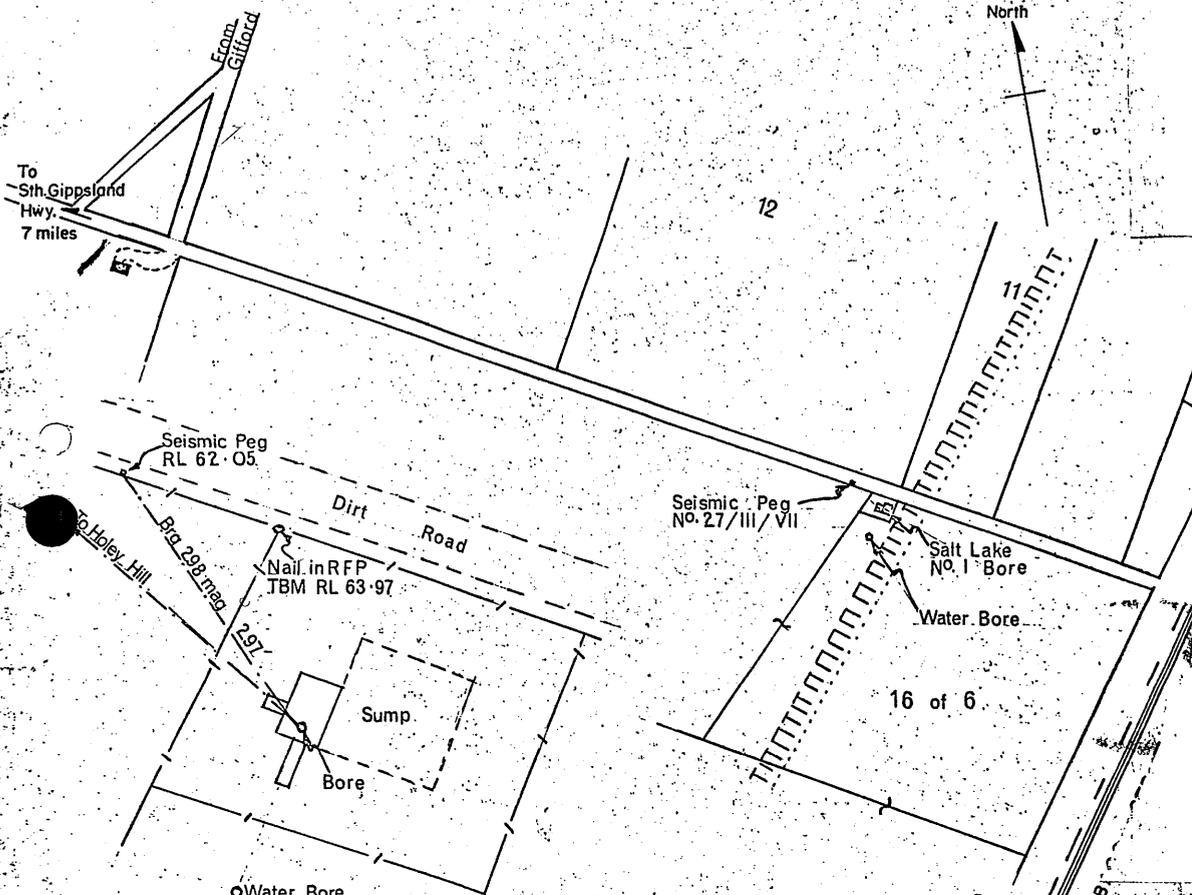
TABLE 2. Palynological zonation of the Strzelecki Group in wells in the Gippsland Basin. Data extracted from Dettmann (1965a,b; 1966); spore-pollen zones are those of Dettmann and Playford 1969.



WOODSIDE OIL N.L.
 P. E. P. 72 - VIC./P8
 LOCALITY MAP
 1970 DRILLING PROGRAMMES
 DRG. No. 77 OCTOBER 1970 DRN. A. M.

WOODSIDE OIL N.L.
GIPPSLAND OIL RIG LOCATION SKETCH.

LOCATION:- Salt Lake Bore No. 1.



Water Bore
GEOGRAPHICALS:- LATITUDE 38°26'53" LONGITUDE 147°05'12"

AMG Coordinates N 5,744,459.20 E 507,575.70
(Metres) A Zone 55

REDUCED LEVELS:- Ground Level 62.81
Rotor Table 74.25
Kelly Bushing 75.58

LEVEL DATUM:- Williamstown

CADASTRAL DESCRIPTION:-
Crown Allotment 16 of 6.
Parish of Darriman
County of Bula Bula

NOTE: The coordinates for the well are based on the Australian Geodetic Datum and not on the Sydney Observatory Datum.

□□□□□□ represents an escarpment, the dots representing the downhill edge.

Surveyed By	R. J. Fennell	Approved	<i>[Signature]</i>
Calculations	R. J. Fennell	Date	1-5-70.
Drawn	R. J. Fennell	Drawing No.	112/3

BIBLIOGRAPHY

- Esso Exploration Australia Inc. 1966. Esso Gippsland Shelf No. 1 well.
Petrol Search Subs. Act. Pub. 76:74 pp.
- Hocking J.B. 1965. Characteristics of the Tertiary Formation of Southern and South-Eastern Gippsland.
Geol. Surv. Vict. (unpub. Report).
- Hocking J.B. & Taylor D.J. 1964. Initial Marine Transgression in the Gippsland Basin, Victoria.
A.P.E.A. Journal for 1964: 125-132
- Ingram F.T. 1963. Merriman No. 1, Final Well Report.
Arco Ltd./Woodside (Lakes Entrance) Oil Co. N.L. (unpub.)
- Jenkin J.J. 1968. The Geomorphology and Upper Cainozoic Geology of South-East Gippsland, Victoria.
Geol. Surv. Vict. Memoir 27:147 pp.
- Richards K.A. & Hopkins B.M. 1969. Exploration in the Gippsland, Bass and Otway Basins Australia. (unpub.)
- Thomas D.E. & Baragwanath W., 1949. Geology of the Brown Coals of Victoria, part 1.
Min. Geol. J. of Vict. 3(6):28-55
- Wallis W.E., 1967, Offshore Petroleum Exploration Gippsland and Bass Basin - South East Asia.
Proc. 7th Wld. Petrol. Congr. 2:783-791
- Weeks L.G., & Hopkins B.M. 1967. Geology and Exploration of Bass Strait Basins, Australia.
Amer. Assoc. Petrol. Geol. Bull. 51(5):742-760
- Woodside (Lakes Entrance) Oil Company N.L. 1961 Wellington Park No. 1 Well.
Petrol. Search Subs. Act. Pub. 71:9 pp.

BOCAL PTY. LTD.

PETROPHYSICAL NOTE NO. 81

GOV. BORE 29/75/3

GIPPSLAND ONSHORE P.E.P. 89

LOGS AVAILABLE

<u>Date</u>	<u>Run</u>	<u>Log</u>	<u>Interval (feet)</u>
4-7-75	1	BHCS/GR/CAL FDC/CAL IES/SP LITH. LOG	3444 - 350 3440 - 1500 3396 - 1500 (Provisional sketch)

LITHOLOGICAL UNITS

All depths relate to Kelly Bushing at an elevation above permanent datum (mean sea level). All units are log-units.

- | | |
|-----------------------|--|
| 1. Surface - 350 feet | No data available. |
| 2. 350 - 535 feet | Marl, Limestone. |
| 3. 535 - 2141 feet | Marl, Limestone; dolomitic in parts, minor Dolomite streaks. |
| 4. 2141 - 2332 feet | Marl; geopressured. |
| 5. 2332 - 2626 feet | Calcareous Claystone |
| 6. 2626 - 2654 feet | Shale, Dolomite, Limestone interbeds. |
| 7. 2654 - 2730 feet | Sandstone; glauconitic, becoming cleaner towards base. |
| 8. 2730 - 2774 feet | Sandstone. |
| 9. 2774 - 2874 feet | Coal, minor Shale streaks. |
| 10. 2874 - 3322 feet | Shale, Coal, Sandstone interbeds. |
| 11. 3322 - 3357 feet | Sandstone |
| 12. 3357 - 3444 feet | Mudstone, argillaceous Sandstone; chloritic. |

SUMMARY OF INTERPRETATION

<u>Unit</u> (No.)	<u>Porosity</u> (%)	<u>Sw</u> (%)	<u>Salinity</u> (ppm NaCl)	<u>Temperature</u> (Deg. F)
7	20	100	1400	120
8	31	100	600	121
10	27	100	600	123
11	20	100	600	130
				BHT 132

COMMENTS

The porosity values given in the summary are matrix corrected. Sonic response is affected by unconsolidation at shallow depth. A compaction factor of 1.6 was therefore applied to bring sonic porosity in line with density porosity. The salinity changes across the unconformity between Units 7 and 8. There is no shale break at the bottom of Unit 7. The log response is due to shoulder effect at the unconformity.

The objective sands in the basal part of the Lakes Entrance Formation (Unit 7) and in the top of the Latrobe Formation (Unit 8) are basically fresh water sands, as are the other sands within the Latrobe Group.

The magnitude of the indicated pore pressure in Unit 4 is of the order of 0.54 psi/ft or 10.4 lbs/gal in terms of equivalent mud density.

RKN/mmm

16/7/75.

WOODSIDE OIL N.L.

GEOLOGICAL NOTE

GOVERNMENT BORE 29/75/3

GIPPSLAND ONSHORE P.E.P. 89

INTRODUCTION

In May 1975 the Operator was advised that the Mines Department was about to drill Bore No. 29/75/3 as part of routine ground-water and stratigraphic studies carried out by the Geological Survey. After discussions with the Department and the plotting of the location on our seismic maps, it became apparent that the Bore would test an undrilled fault bound seismic culmination on Latrobe Group level (see Encl. No.5, Gippsland Onshore Report, map date October 1, 1969).

The Bore is located near shotpoint 866a of seismic line 106, approximately 100 metres from Lake Wellington and 13 kilometres due east of Sale, and was programmed to fully penetrate the Latrobe Group.

In order to fully evaluate the potential reservoirs Woodside, as Operator, sought and received approval by Partners to commission Schlumberger to run a suite of logs at total depth.

The following logs were run on July 4, 1975, and copies of the final prints were distributed to Partners and the Mines Department on July 22, 1975.

- 1) Borehole Compensated Sonic Log - Gamma Ray
(3,450' - 350') Scales 2" and 5"/100'
- 2) Induction Electrical Log
(3,396' - 1,500') Scales 2" and 5"/100'
- 3) Compensated Formation Density Log
(3,440' - 1,500') Scales 2" and 5"/100'

RESULTS

A stratigraphic section incorporating the main findings of the Petrophysical Note is attached as Figure 1, and the Bore location has been plotted on the Gas Map of the area, Figure 2.

The main hydrocarbon objectives in this Bore are the basal sands of the Lakes Entrance Formation (2,654 - 2,730 feet b.k.b.) and sands in the top of the Latrobe Group (2,730 - 2,774 feet b.k.b.) trapped in what is interpreted as a loosely controlled, fault-bound seismic structure, Figure 3.

Log interpretation has shown that all reservoir sands are water-wet. The reservoir characteristics of the sands are excellent with log derived porosities up to 31%. Adequate seals are provided by marls and clays of the Lakes Entrance Formation and intra-formational coals and shales in the Latrobe Group.

An interesting phenomenon is the change in salinity of the formation waters in the basal Lakes Entrance sand (1400 ppm NaCl) and in the top of the Latrobe Group (600 ppm NaCl) as witnessed by the reversal of the S.P. curve.

If the salinity change had been more pronounced, it would have been indicative of trapping conditions in the basal Lakes Entrance Formation with the main front of fresh water flushing below the unconformity at 2,730 feet. However, both salinity values indicate fresh water and the slight difference is probably due to the fact that the basal Lakes Entrance sands are marine and the underlying Latrobe sands are continental. Subsequent flushing (slightly more effective in the cleaner Latrobe sands) has effectively taken place over the whole interval between 2,654 - 2,774 feet.

CONCLUSIONS

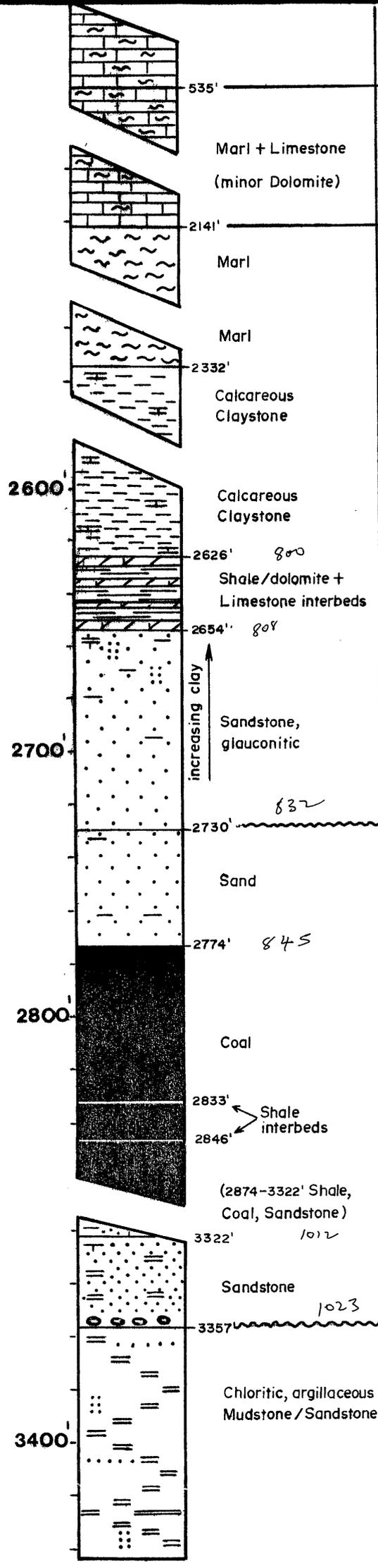
1. The objective reservoirs in Government Bore 29/75/3 are water-wet and are fresh water flushed.
2. The flushed reservoirs indicate that adequate trapping conditions do not exist or were insufficient to protect the objectives from flushing.
3. The integration of efforts by the Mines Department and the P.E.P. 89 Partnership is mutually beneficial in that a prospective structure has been tested at little cost to the Partnership, and the logging provided the Mines Department with a valuable source of data.

Close cooperation with the Mines Department will continue in the near future. Further Bores will be drilled within the confines of the permit and a programmed Bore north of Lake Wellington may be located to test the gas anomalies in that area.

Melbourne, August 11, 1975.

Figures 1, 2 and 3.

Lithological Unit	Salinity ppm	Sw %	Porosity %	Objectives
Unit 7	1400	100	20	[Hatched pattern]
Unit 8	600	100	31	
Unit II	600	100	20	[Hatched pattern]



TAMBO RIVER FM
(UPPER MIOCENE)

GIPPSLAND LIMESTONE
(MIOCENE)

LAKES ENTRANCE FM
(OLIGOCENE)

unconf.

LATROBE GROUP
(EOCENE)

unconf.

STRZELECKI GROUP
(LOWER CRETACEOUS)

T. D. driller: 3444 ft
logger: 3453 ft

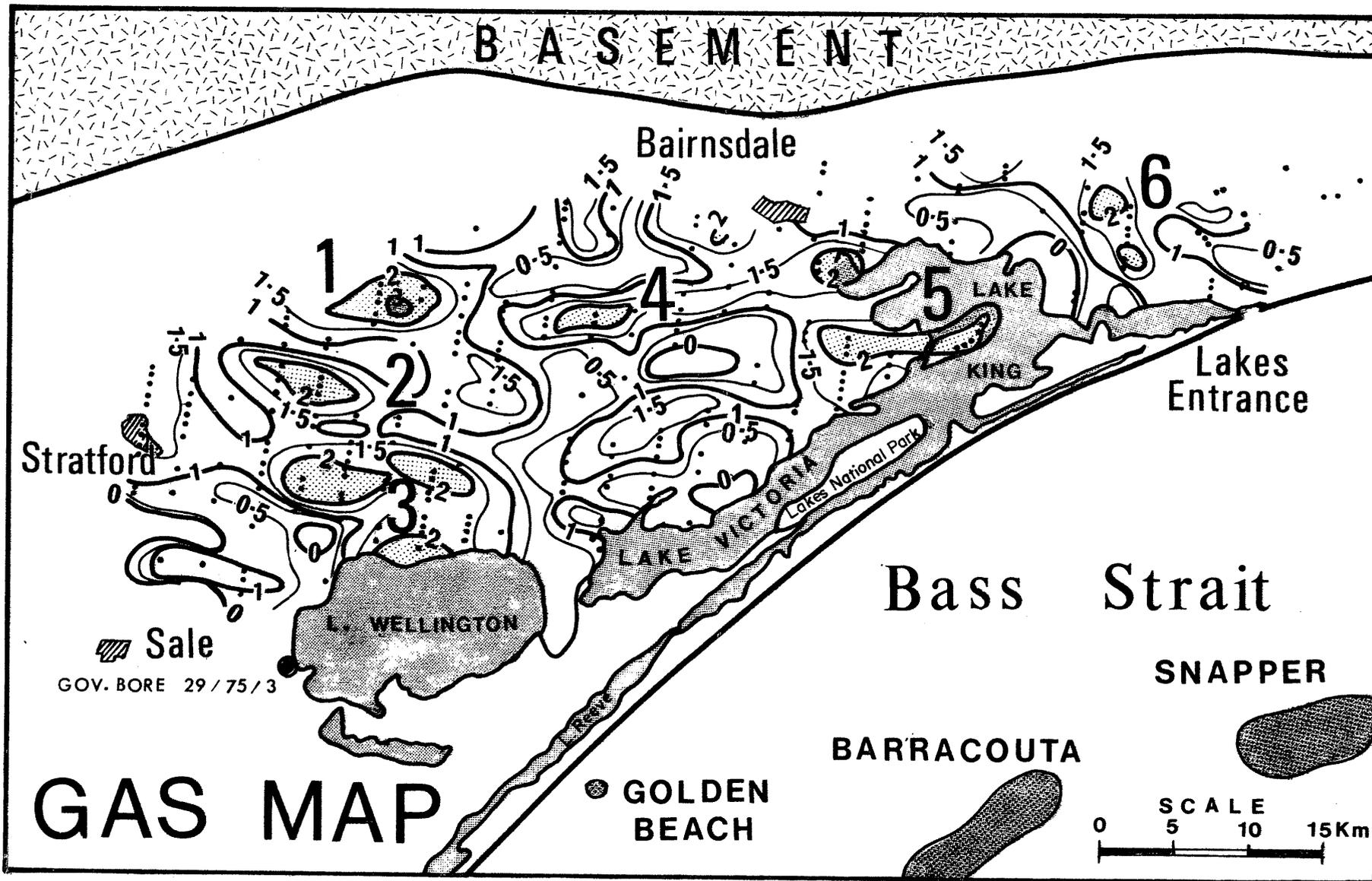


Fig. 2

PE906289

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- DESCRIPTION = Structure Map of Horizon 'K', Enclosure
21 of Gippsland Onshore Report (Oct
1969)
- REMARKS = Hand coloured
- DATE_CREATED =
- DATE_RECEIVED =
 - W_NO = W583
 - WELL_NAME = SALT LAKE-1
- CONTRACTOR =
- CLIENT_OP_CO = WOODSIDE OIL COMPANY

(Inserted by DNRE - Vic Govt Mines Dept)

GIPPSLAND BASIN

HORIZON 'K'

Report: Gippsland Onshore
Encl. 21 Oct 1969
Scale 1:250 000



DEPT. NAT. RES & ENV



PE906289

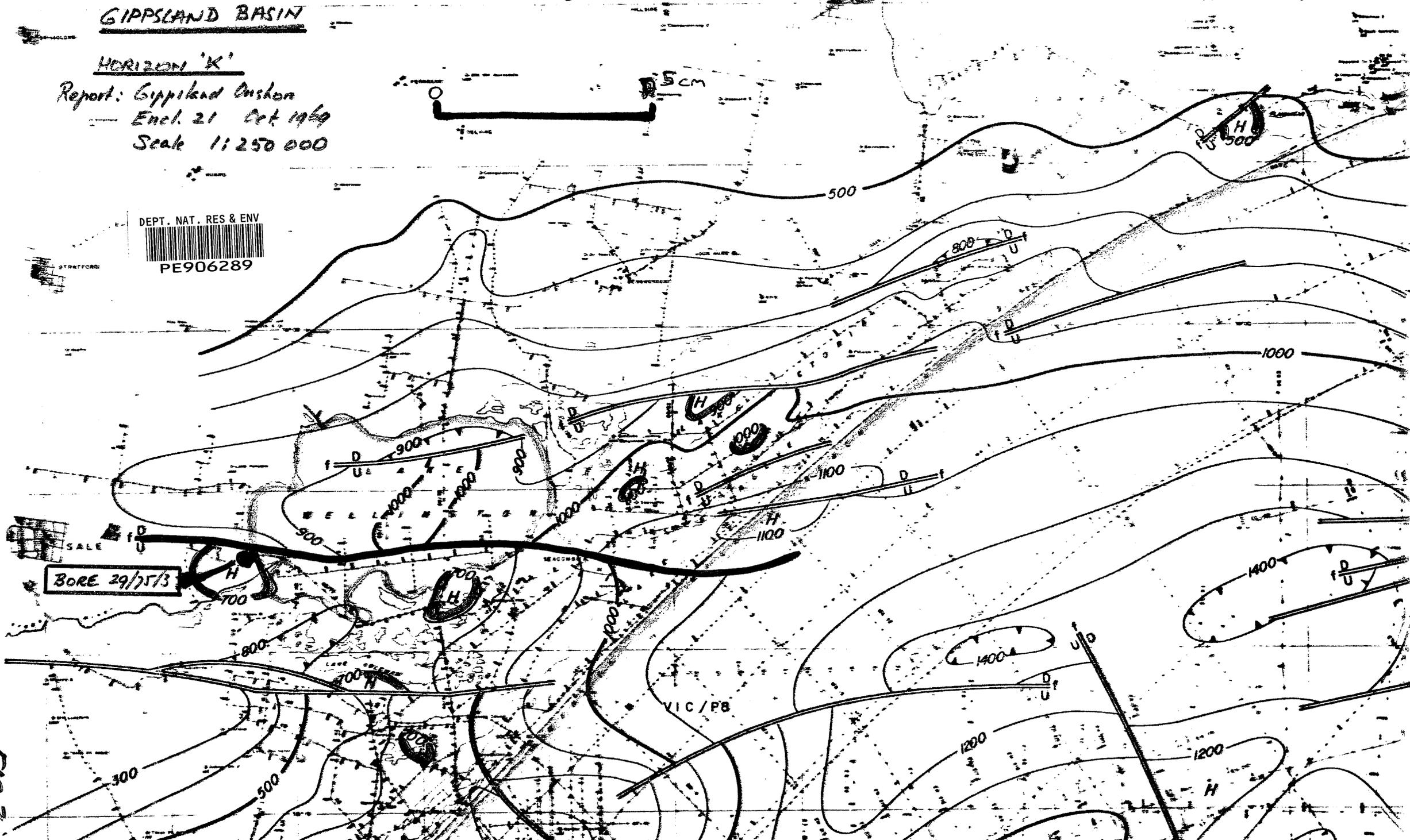


FIG 3

PE601476

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2, (enclosure from WCR) for Salt Lake-1
- REMARKS =
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- DATE_RECEIVED =
- W_NO = W583
- WELL_NAME = Salt Lake-1
- CONTRACTOR = Woodside Oil NL
- CLIENT_OP_CO = Woodside Oil NL

(Inserted by DNRE - Vic Govt Mines Dept)

PE601477

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- REMARKS =
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- DATE_RECEIVED =
- W_NO = W583
- WELL_NAME = Salt Lake-1
- CONTRACTOR = Woodside Oil NL
- CLIENT_OP_CO = Woodside Oil NL

(Inserted by DNRE - Vic Govt Mines Dept)