

FROME LAKES-1, 1A (W444, W445)

Well Summary Report

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Gippsland Bores Table, 3 of 4

Gippsland Bores Table, 4 of 4

WELL <i>From Lakes Giffstand No 1.</i>	TYPE	BASIN <i>Giffstand.</i>
Tenement Holder <i>From Lakes Pty Ltd</i>	Map Used <i>Well Completion Report- Ph. Ba 1100/19.</i>	<i>Map. (Rept From 7100-G-59)</i>
Operator	Latitude	
Tenement <i>PPL 157.</i>	Longitude	
Elevation <i>DF. 36'.</i>	Total Depth <i>790</i>	Status <i>Dry + Abandoned.</i>
Spud <i>24-Sept-1956.</i>	Completed	Abandoned <i>4-10-56</i>
Casing <i>6 1/2" OD at 582'</i>		

STRATIGRAPHY

See Well Completion Report (Used 1957)

0-4 Pleistocene + Recent
4-582' Lower Pleistocene
(Jimmy Point Formation)
582'-TD. Upper Miocene
(Mitchell River Member).

See ^{at} Giffstand 1A.



FORMATION TESTS

DRILL PIPE STUCK AT 7691' ON 29-9-1956.
HOLE ABANDONED ON 4-10-1956.
ALL DRILL PIPE & COLLARS WERE RETRIEVED AT A LATER DATE

LOG SUMMARY AND INTERPRETATION

From Lakes GIFFSTAND No 1

COMPLETION REPORT

FROM LAKES 1-5

Frome Report No. 7100-G-59

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EXPLORATION DRILLING IN THE TERTIARY BASIN OF SOUTHEAST
GIPPSLAND, VICTORIA

by

Richard L. Wood

FROME-LAKES PROPRIETARY LTD.,
MELBOURNE, AUSTRALIA.

April, 1957.

Completion Report Frome Lakes Gippsland N°1
" " " N°1A
" " " N°2
" " " N°3
" " " N°4
" " " N°5

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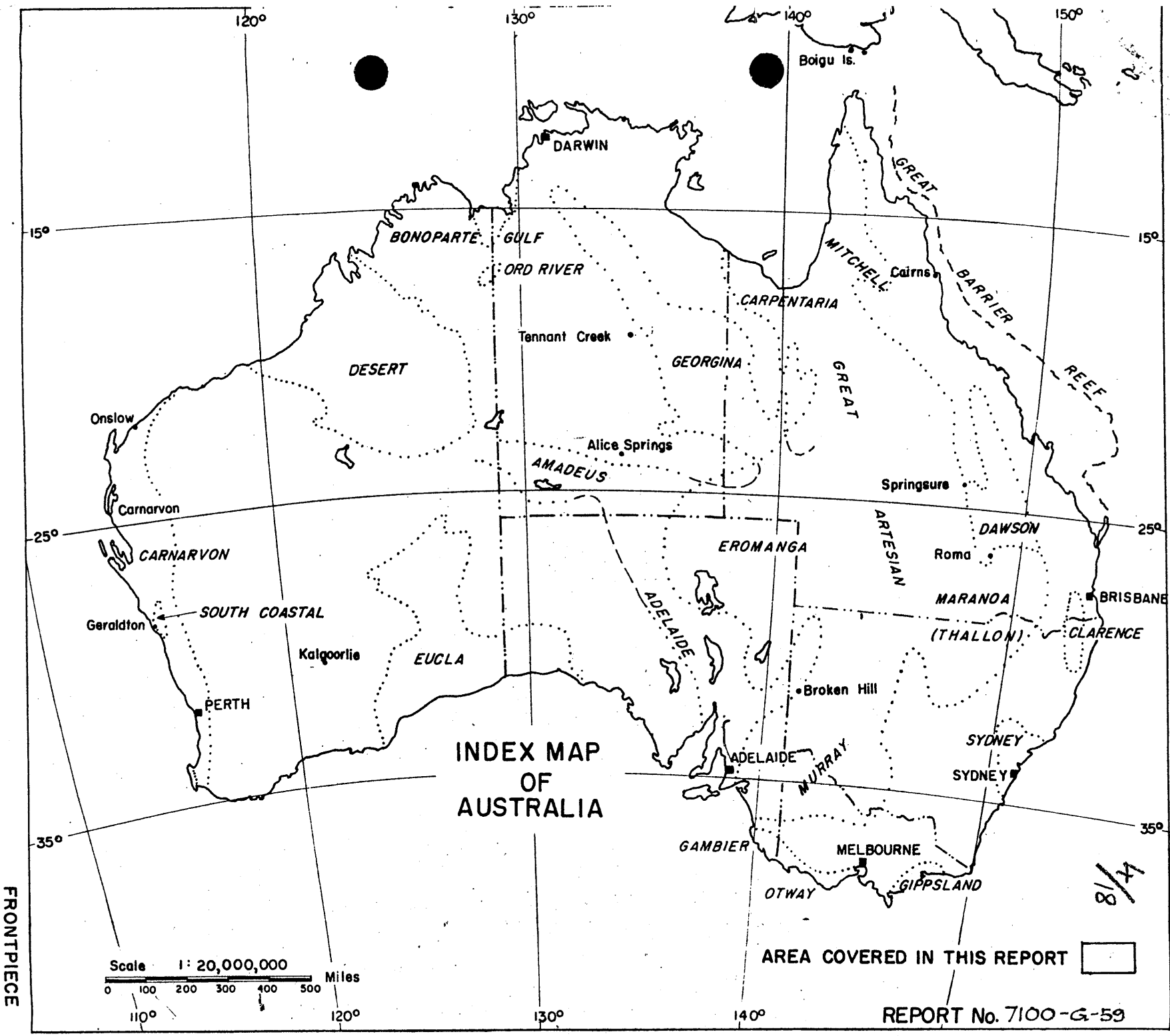
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Table: Data on Gippsland Bores.



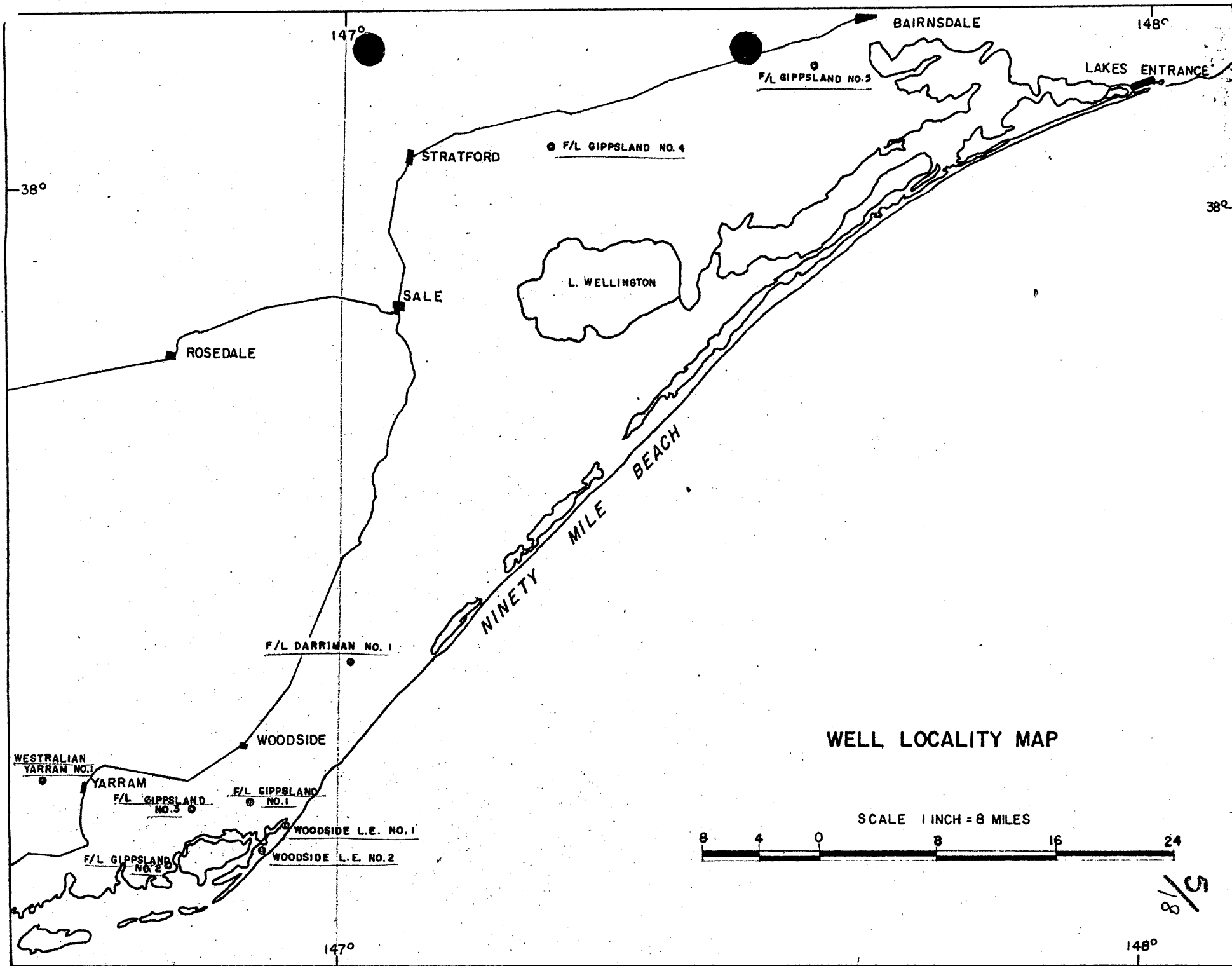
FRONTPIECE

Scale 1:20,000,000
 0 100 200 300 400 500 Miles

AREA COVERED IN THIS REPORT

REPORT No. 7100-G-59

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WELL LOCALITY MAP

SCALE 1 INCH = 8 MILES



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EXPLORATION DRILLING IN THE TERTIARY BASIN OF SOUTHEAST
GIPPSLAND, VICTORIA

ABSTRACT

Frome-Lakes Gippsland wells were drilled through the base of the marine Tertiary on local gravity anomalies in southeast Gippsland. The wells were drilled to test the glauconitic sandstone, a shore line facies of the basal marine Tertiary formation. In some parts of the Gippsland basin this sandstone is known to contain small quantities of oil. All of the present wells penetrated the objective horizon with no indications of oil or gas.

Subsurface maps constructed from bore information do not indicate any features favouring Tertiary petroleum prospects. The Gippsland Tertiary oil appears to be unaffected by structure but to be preserved in small stratigraphic traps only. These traps are apparently the result of porosity and permeability variations within the glauconitic sandstone.

EXPLORATION DRILLING IN THE TERTIARY BASIN OF SOUTHEAST
GIPPSLAND, VICTORIA

By Richard L. Wood

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Completion Report on
Frome Lakes Gippssland 1

INTRODUCTION

In September 1956 Frome-Lakes Pty. Ltd. "spudded in" the first of a series of shallow exploratory wells in southeast Gippsland, Victoria. Five wells had been drilled by January 25, 1957 when the drilling program was suspended pending analysis of the results of the five wells drilled and a study of this data and that from other wells in the area. An exchange of information, well by well, was arranged between Frome-Lakes Pty. Ltd. and two other companies with adjacent areas, Woodside (Lakes Entrance) Oil Company and Westralian Oil Company.

In the light of the large amount of new information available as the result of the recent exploration wells in Gippsland, a revision of previous subsurface maps is necessary. This report will therefore be a completion report on the five Gippsland wells and will also include a set of revised subsurface maps similar to those in my report entitled "Subsurface Studies of East and South Gippsland, Victoria", May 1956.

Two new subsurface maps are included and discussed in this report. One of these maps the "Log Map of the Lakes Entrance Formation with Isopach Lines of the Glauconitic Sand" combines all of the present information directly relating to the Tertiary oil of Gippsland, and the major discussion will relate to this map.

OBJECTIVE

Frome-Lakes five shallow exploration wells were drilled for the purpose of testing the oil prospects of the marine Tertiary, mainly the basal member - the so-called glauconitic sandstone - from which small quantities of oil have been reported in several parts of Gippsland, chiefly the Lakes Entrance area.

2
3
4
5



DRILLING LOCATIONS

Frome Lakes drilled their Darriman No. 1 well in the southwestern part of their lease area hoping to find the glauconitic sandstone favourably developed in that area. No sign of oil was found in the Darriman well and the base of the marine Tertiary was not developed in a true sandstone facies.

When the Woodside (Lakes Entrance) Oil Company drilled a glauconitic sandstone facies with shows of oil in one of their wells southeast of Darriman and nearer to the granite outcrop at the southwestern edge of the basin, it became apparent that the elusive glauconitic sandstone must be a shore line facies of the basal marine section. With this idea in mind, Frome-Lakes decided to test the basal marine Tertiary within its licence area on gravity anomalies in localities more favourable for shore line development. The Darriman well, located on a seismic and gravity high suggested that gravity is related to structure in this area and therefore gravity highs were selected in four of the five wells drilled. No. 3 was located on a gravity low re-entrant to ensure gravity representation and geographic distribution in the southern part of the basin. No. 5, west of Bairnsdale, was located on both a gravity and topographic high.

NOTES ON THE ACCOMPANYING PLATES

Plates 1-5 are the individual lithologic logs of the Gippsland wells. A drilling rate log is plotted against the detailed 10 foot descriptive log of the lithology.

Plate 6 is a well data sheet. This sheet shows generalized stratigraphic sections of the Gippsland wells, two Woodside (Lakes Entrance) Oil Company wells and one Westralian Oil Company well. A brief resumé of operational and testing data accompanies each section.

Plates 7-9 are revised subsurface maps which have been reviewed in detail in my previous report "Subsurface Studies of South and East Gippsland, Victoria" (May 1956). The addition of the results of the

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recent exploration drilling in Gippsland brings these maps up to date and fills in some detail especially in the south-western section of our licence area.

Plate 10 is a new subsurface map contoured on the base of the marine Tertiary in the Lakes Entrance/Sale/Woodside area. All depths have been computed from mean sea level. The base of the marine Tertiary is taken to be the base of the glauconitic sandstone where present, alternatively the top of the Yallourn formation.

The bore information for the construction of plates 7-10 is listed in Table 1 accompanying this report.

GEOLOGY

The stratigraphy and structure of the Gippsland Tertiary Basin have been reviewed in detail by Evans (1954) and Boutakoff (1955) and this will not be discussed in this report in any more detail than revealed in the individual wells.

The five Gippsland wells penetrated all of the known marine Tertiary formations present in Gippsland. The No. 5 well penetrated the entire Tertiary section and was abandoned below sands correlated with the Yallourn formation in metamorphic rocks of assumed Ordovician age.

Four of the wells penetrated the glauconitic sandstone with no indications of any oil or gas. One well penetrated a deeper-water limestone facies of the glauconitic sand and it also had no indications of any oil or gas.

The thickness of the formations encountered in the five wells are recorded in the following table - (See also Plate 6, Well Data Sheet).

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Formation and Age (Crespin 1954)	Lithology	Thickness in feet				
		No. 1	No. 2	No. 3	No. 4	No. 5
Jemmy's Point L. Pliocene	Clay and sands with shelly bands	578	370	657	360	394
Mitchell R. U. Miocene	Sandy marl, marl - glauconitic in places	628	625	493	390	256
Gippsland Limestone L. Miocene	Polyzoal limestones and marls	565	499	625	670	260
Lakes Entrance Miocene	Fine-grained marls, some places micaceous becoming glauconitic and sandy towards the base	166	68	90	327	440
Yallourn M. Eocene	Lignitic sands and clays with intercalated brown coal seams	21+	5+	11.5+	68+	135

Plates 7 and 10 illustrate structural conditions in the Tertiary, but it is emphasised that these maps, as well as Plates 8 and 9, represent regional trends rather than a detailed picture of conditions, as close bore control is lacking over a large part of the area under review.

The most prominent feature of Plate 10, "Contour Map of the Base of the Marine Tertiary" is the large synclinal trough developed through Lake Wellington and Seacombe to the southeast. This regional low is presumably the eastward extension of the Latrobe Valley syncline.

Three faults in the southern half of the area are suggested by the bore information, as plotted on the subsurface maps. It is felt they may have been pre-Tertiary faults that have been active during

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the deposition of the Tertiary. The large east-west fault known as the Rosedale fault has been substantiated by surface evidence.

Within the wedge formed by the two faults south of the Latrobe River the base of the marine Tertiary appears to form a nose pitching to the northeast. Detailed bore information is lacking in this area and the contours are incomplete.

A second synclinal trough is suggested in the Woodside area, plunging east-southeast. Information from several recent wells in that area suggest that the basin rises rapidly to the west with the marine Tertiary practically disappearing in the Westralian Yarram No. 1 Well about two miles west of Yarram.

As a result of the large number of bores drilled in the Lakes Entrance area, more precision is possible in contouring. A large inset of this area is shown on Plate 10 to include the detail. The main feature of this inset is a structural terrace dipping gently southward. The slope of the base of the marine Tertiary breaks and becomes more gentle between bores 95 and 96 and forms the structural terrace. Only the base of the marine Tertiary which is the glauconitic sandstone in this area is affected by this feature. Since the larger accumulation of oil from this sandstone is located on the southern slope of the structural terrace around Foster's bore (No. 104), it appears that this feature may have more control over the small accumulation of oil in that area.

Plate No. 11 entitled "Log Map of the Lakes Entrance Formation with Isopach Lines of the Glauconitic Sand" is the major plate in this report. Compiled on this plate is all of the presently known pertinent information relating to the main occurrence of Tertiary oil in Gippsland.

Its purpose is to depict by lithologic logs, electric logs where possible, the lithologic development of the Lakes Entrance formation. The map shows the areal distribution of this stratigraphic interval, each log being shown on the map at the location of the bore from which it was derived. The oil-bearing basal sandstone member is not present throughout the basin as glauconitic sand but Isopach lines of this sand or its equivalent have been superimposed upon the log map, and oil shows are indicated against the pertinent logs.

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Only three electric logs were available when compiling the map. Most of the information is from drillers' logs from bores dating back as far as 1924. Except for a few bores from which cores were examined by the Commonwealth Palaeontologist, the bores were drilled without any geologic supervision. Therefore, there are no stratigraphic divisions for most bores and they must be interpreted from the lithologic descriptions which in practically all cases are anything but definite and provide no information as to porosity and permeability. Since most of the bores were drilled for oil, the depth and thickness of the potential reservoir rock, the glauconitic sand, is fairly accurate. Table I shows the information from which the map was constructed. Where the records appeared contradictory the figures that seemed more reliable were used.

The logs show the Lakes Entrance formation to consist mainly of marl which towards the base becomes glauconitic and either arenaceous or calcareous depending mainly on the distance from the old shore line. They also roughly indicate the shape of the Tertiary basin. In the southwest the formation thins rapidly from Woodside to Yarram as shown by the three Frome-Lakes bores. Two miles west of Yarram in the Westralian Yarram No. 1 there is present no marine formation recognisable as the Lakes Entrance. North of the Ninety Mile Beach the formation thins against Jurassic and Palaeozoic hills. East of Lakes Entrance, the Lakes Entrance formation might be abruptly cut out. At Lakes Entrance the thickness is fairly uniform with glauconitic sand at the base.

In Cobden's bore (No. 116) there is no glauconitic sand recorded and possibly no Lakes Entrance formation. The records are not very clear. Gravity and magnetic data for that area suggest the presence of a fault to the east of which crystalline basement and old Palaeozoic rocks are probably near the surface.

The isopach map of the glauconitic sand suggests three main areas of sand deposition separated by two marine embayments. Oil and gas have been reported from all three sand areas, with the best shows from the thicker sand deposits. The Lakes Entrance Field, with glauconitic sand thickness up to 85 feet, has actually produced small

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quantities of oil. The large map does not show the sand at Lakes Entrance in detail. An inset showing all of the bores drilled in that area indicates which bores contained oil and where they are located in relation to the reservoir thickness.

Near Lake Wellington oil was reported in two bores. Oil and gas shows were reported from the glauconitic sand in the Amalgamated Oil Bore No. 1 (No. 48). In the Pelican Point bore (No. 50) which did not penetrate to the glauconitic sand, numerous shows of oil and gas were reported from the limestone above the Lakes Entrance formation. Frome-Lakes Gippsland No. 4 bore was drilled west of these bores and penetrated a thinner section of glauconitic sand with no shows. Frome-Lakes Gippsland No. 5 well was drilled to the north of the Amalgamated Oil bore, and although encountering a similar very sandy facies of the Lakes Entrance formation, did not contain any oil or gas in the glauconitic sand. A thin film of oil was noticed momentarily when the first sand sample was washed, but this film could not be reproduced or any other indication of oil observed.

CONCLUSIONS

Considering their favourable distribution for adequately testing the Woodside-Yarram area, the results of the exploration wells drilled by Frome-Lakes, Woodside Oil Co. and Westralian Oil Ltd. must be accepted as condemning the southern part of the Gippsland Basin as a potential source of commercial oil, whether structure or porosity variation is the controlling factor in accumulation. Further, the Frome-Lakes Stratford and Bairnsdale wells finally discourage the idea that the northern marginal zone might be favourable.

Analysis of the log map, Plate 11, suggests that the oil in the marine Tertiary of Gippsland does not follow any definite pattern of accumulation. No bores with shows of oil were drilled on definite structures, while all Frome-Lakes bores including the

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Darriman No. 1 bore were drilled on either gravity or seismic structure and those that penetrated glauconitic sand had no shows of oil or gas. The Tertiary oil appears not to be controlled by structure but must accumulate in small stratigraphic traps associated with porosity variation in the glauconitic sandstone. A complicating and discouraging feature is the appearance of fresh water in the glauconitic sands throughout the region, denoting considerable flushing.

Isopach map, Plate 11, shows two areas where there appears to be a thickening of the glauconitic sandstone and near which some shows of oil have been reported in bores. No structural association is suggested by aeromagnetism or gravity however. These areas are about the same size as Lake Entrance, but the depth to the glauconitic sand is much deeper - greater than 2,600 feet at Lake Victoria and greater than 1,300 feet at Lake King.

The description of the glauconitic sandstone in the bore logs is not sufficiently detailed to allow a comparison of porosity and permeability between different areas. We are therefore unable to say whether the Lakes Victoria and King areas are more or less favourable in this respect than the Lakes Entrance area. It is probable that they are more or less the same and that consequently no accumulation of oil large enough to justify the great expense of probing for stratigraphic traps can be expected.

APPENDIX

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OPERATIONAL NOTES ON THE FROME-LAKES
GIPPSLAND WELLS

The Gippsland wells were drilled for Frome-Lakes Pty. Ltd. by a local contractor, W. L. Sides and Son, with a Failing 1500 rotary plant. The standard Failing was supplemented by additional equipment such as shale shaker, weight indicator, and blowout preventor etc. This was the contractor's first oil drilling venture with rotary equipment and some difficulties were experienced while drilling the No. 1 well with both men and equipment. These difficulties were overcome once a pattern for drilling was set up and the balance of the wells were drilled quite smoothly and efficiently.

Plate No. 6 "Well Data Sheet" sets out the basic information for each of the Gippsland wells with a lithologic section. Recently drilled competitors' wells are included on this plate with as much information as is available at present.

Presented below in tabulated form are the operational details of the five Frome-Lakes wells for reference and comparison.

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	No. 1	No. 1A	No. 2	No. 3	No. 4	No. 5
Location (Refer: Well Locality Map)	Approx. 4 miles south of Woodside, Vic.		8 miles SE of Yarram	8 miles ESE of Yarram	9 1/2 miles east of Stratford	3 miles SW of Bairnsdale
Elevation (1) Derrick Floor	36'	37'	15'	30'	126'	253'
(2) Ground Level	33.5'	33.5'	12'	27'	123'	250'
Date commenced	24.9.56	9.10.56	3.11.56*	15.11.56	18.12.56	10.1.57
Date abandoned	4.10.56	28.10.56	15.12.56	30.11.56	8. 1.57	25.1.57
Casing (1) Length	582'	615'	1065'	783'	488'	423'
(2) Size	6 1/2" O.D.	6 1/2" O.D.	6" O.D.	6 1/2" O.D.	6 1/2" O.D.	6" O.D.
(3) Cement	at bottom W/25 sks.	to surface W/95 sks.	to surface W/133 sks.	to surface W/100 sks.	to surface W/60 sks.	to surface W/56 sks.
Total depth	790'	1962'	1552'	1876' 6"	1815'	1550'
Drilled	790'	1904'	1518'	1866' 6"	1745'	1495'
Cored	-	58'	34'	10'	70'	55'
Recovery	-	8'	25.5'	1'	28'	16.25'
	-	11%	75%	10%	40%	30%
Maximum deviation	-	0°	0°	2°	2°	5°
Depth of "	-	998'	1500'	1500'	1500'	1000'
Testing Program	-	Bailed glauconitic sand zone - no shows of oil or gas	Bailed as in No. 1A No shows	Bailed as in No. 1A No shows	Bailed as in No. 1A No shows	Bailed as in No. 1A No shows
Hole troubles	Well abandoned with "frozen pipe" at 769' recovered later	Tight hole at 750' - changed mud - no further difficulty	Core barrel stuck 3 days at 621' - no further trouble	None	None	None
Test bailing						
+ Mud level	Not tested	No record	108'	122'	97'	114'
+ Mud down level		No record	240'	148'	213'	333'
+ Equilibrium level on standing		45'	Flowing	35'	98'	258'
Gallons bailed		No record	2400	2700	2500	3600
Oil or Gas show		Nil	Nil	Nil	Nil	Nil

* Suspended 10-11 to 10-12.56
 + Depth below well head

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For completeness a few general and a few qualifying statements are necessary.

$7\frac{7}{8}$ inch hole was drilled from the surface in all wells into a solid marl where casing was set. At that point either $6\frac{1}{2}$ inch O.D. or 6 inch O.D. casing was cemented as indicated in Table I. The hole was then reduced to about $5\frac{3}{4}$ inch depending on the size of bits available and this reduced hole was carried down to total depth.

Hole trouble started in the No. 1 well after it had reached a depth of 790 feet in soft sand. While making a trip the pipe became frozen at 769 feet. The well finally had to be abandoned and the No. 1A well started 80 feet away. The reason for the pipe becoming "frozen" was thought to be poor mud. A local clay had been used with Bentonite on the No. 1 well. A pure Bentonite mud was used on the remaining wells with no further tight hole problems.

Loss of circulation while coring on the No. 2 well resulted in a 3 day fishing job - there was no repetition of this type of trouble either.

A coring program had been set up to obtain maximum information with minimum coring. It was intended, as a rule, to core only the prospective oil horizon, the "glauconitic sand" zone, but the program was flexible and the well site geologist was authorized to call for a core at any time considered necessary. A total of 227 feet were cored for all the wells with a 34.7% recovery of $78\frac{3}{4}$ feet.

All cores proved to be barren of oil or gas but as a final check before abandoning the wells each hole was bailed as quickly as possible until the fluid level could be lowered no further and then maintained at that state for about $\frac{1}{2}$ - 1 hour. The well was then allowed to rest approximately 30 minutes until equilibrium fluid level under normal conditions was reached. After resting a further sample was dipped from the top of the column to be checked for signs of oil or gas. No indications of oil or gas were observed throughout the bailing tests.

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LITHOLOGY

FROM LAKES - 1

F/L GIPPSLAND No.1

0-80: brownish sand/gravel, weak clayey cement.

80-130: not as gravelly, also less clayey.

130-190: as above, grey, shelly material. Gravel disappears by 150', so possibly contain^r from above. Many shells have blue-grey colouration.

190-220: weakly cemented med. sand, some ^{only} shell frags. [grey in various shades, pres. due to dr. mud] darker colour at 200'

220-460: clean grit, loose, limited ^{to rare} amt. of fine shell fragments, lt. gy. to brnsh. gy.

460-640: coarse sand/gravel abundant shell frags inc. Ditrupea.

* at 480: fine sand ^{if in shell} shell frags + chips of brn. coal.

640-720: whitish limy mat. ^{fine. sandy limestone} ~~to little apparent shell fragments~~ shell frags; honeycomb polyzoa at 680-90ft.

720-790: limestone chips, abundant shell material inc. Ditrupea ^{appreciat} polyzoa

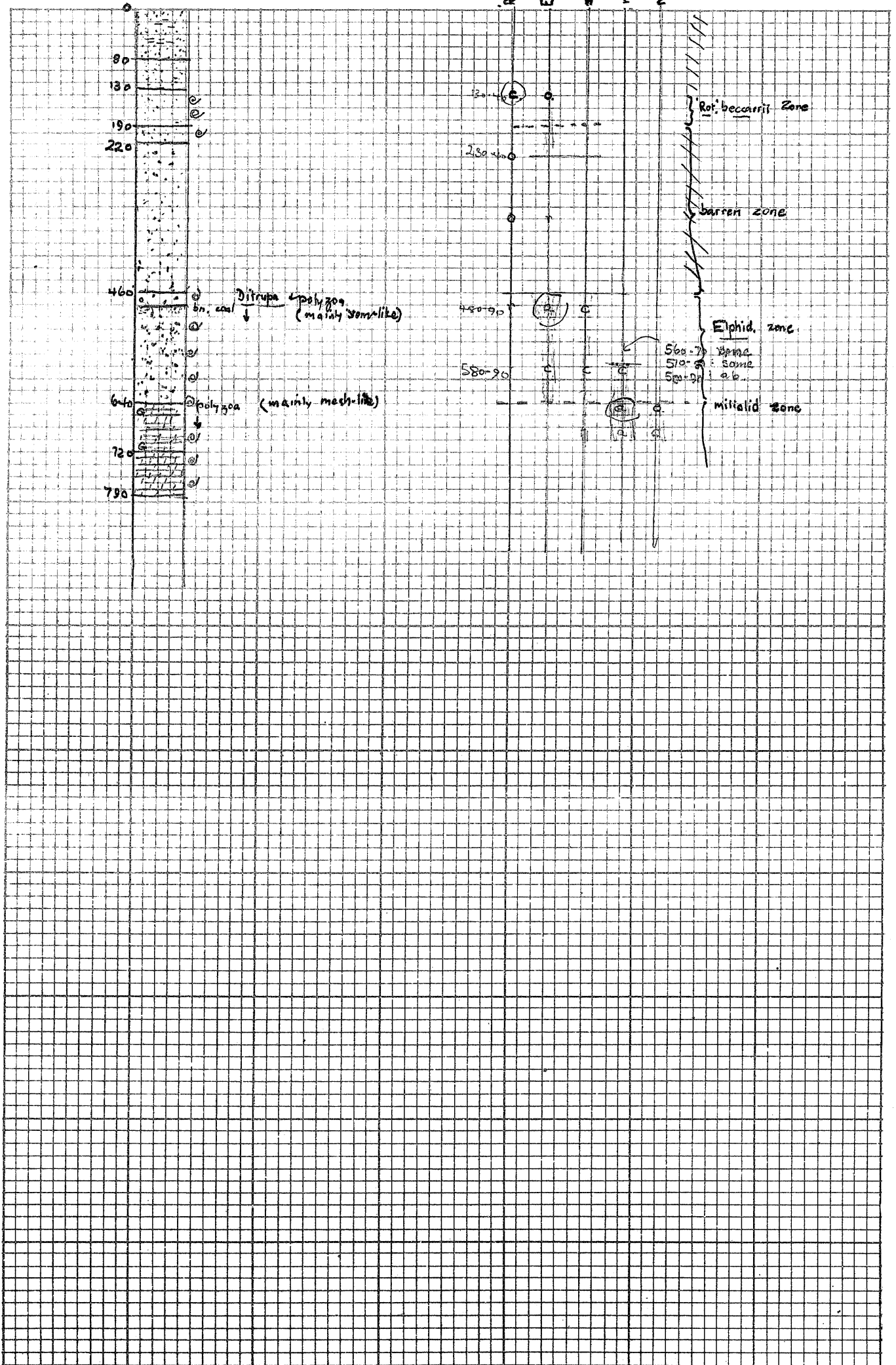
No samples below 790 ft.

fairly clean, also typical.

* Coal v. common at 480.

→ gravel at top is contain^r from above. This is obviously all a true sand.

F/L GIPPSLAND No. 1



LITHOLOGY

FRONT-LAKES - 1A.

FROME - LAKES GIPPSLAND No. 1 A

Location: Lat. 38°33'51"S, long. 146°52'54"E, Parish of Balloong.

Elevation: 36 ft.

Total Depth: 1962 ft.

Year: ~~1956~~ Sept. 1956

Samples: Cuttings, often poorly contaminated. Cores at 1299-1309 ft., 1922-41 ft., and 1943-62 ft.: poor recovery.

Lithologic Log:

Supplemented, to a certain extent, by Frome-Lakes log ^(information) ~~above~~ above 5000 ft. refers to F/L Gippsland No. 1, 76.5 ft. N. of No. 1A.)

- 0-10: Topsoil.
- 10-40: sandy clay
- 40-~~70~~⁷⁰: quartz sand tightly cemented with clay.
- 70-~~110~~¹¹⁰: ~~coarse~~^{brown} sand, coarse, with a ferruginous cement.
- 110-140: lt. gy. ~~argillaceous~~^{calcareous sand and} clayey sand.
- 140-~~190~~¹⁹⁰: lt. grey sandy marl ~~with~~ with large shell fragments ~~including~~ including Turritella; sand becomes more marly & fossiliferous.
- 190-220: as above, but becoming more sandy towards base.
- 220-250: pure sand with no foss. fragments.
- 250-~~300~~³⁰⁰: qz. sand (with traces of fossils & forams.)
- 300-460: lt. gy. med. gr. quartz sand.
- 460-~~510~~⁴⁸⁰: lt. gy. fossiliferous sandy marl, common forams.; also coarse gr. milky qz.
- ~~480-510~~⁴⁸⁰⁻⁵¹⁰: qz. sand with shell frags., forams. & pyrite.
- 500-570: sand & gravel, fine shell fragments. Ditrypa, but not ^{forams + occ. glauc. gr. sh.} common.
- 570-600: gravel, Ditrypa rel. abundant. Appears to be a certain amt.
- ~~600-710~~⁶⁰⁰⁻⁷¹⁰: ~~grey, shelly~~ ^{contamination.} grey, shelly ~~marl~~ ^{faintly} marl, ~~limestone~~ ^{glauconitic} glauconitic.
- 710-910: lt. gy. soft polyzoal ~~limestone~~ ^{limestone}, sandy, traces of glauc. Ditrypa v. ^{Common.}
- 910-940: yellowish sandy limestone.
- 940-980: lt. gy. marly limestone, polyzoal. ? sandy & glauconitic
- 1000-1060: grey polyzoal marly limestone interbedded with hard mid-grey ^{dolomitic} sandy limestone, partially glauconitic.
- 1060-1400: lt. gy. polyzoal marly limestone.

- 1400-1545: darker grey polyzoal marly limestone.
- 1545-1680: whitish polyzoal limestone and minor lt. gy. marly limestone.
- 1680-1760: lt. gy. marly limestone.
- 1760-19¹³: hard rel. dense lt. brown calcareous mudstone and/or marl, traces of glauc. in parts, ~~sponges~~ ^{also pyrite} ~~common~~
- 1913-1926: very hard and tight grey to brown glauconitic dolomitic limestone
- 1926-1941: greenish grey rel. soft marl to calcareous mudstone, glauconitic also pyritic, with a few quartz granules.
- 1943-1962: recovered: 2' of soft brown coal, ~~and~~ 2' of soft brownish grey micaceous mudstone with carbonaceous fragments; also a very dark grey carbonaceous micaceous grit.

Biostratigraphy of F/L G. 1A: Below 500ft. :-

? - 710 feet (Jemmys Pt. Formation):

Trace fragments of coal. Fauna includes Bagnia philipiensis, Elphidium spp. Massilia lapidigera, ~~and~~ Miliolids spp., and Nommi victoriensis.

710 - 1760 feet (Gippsland Limestone):

710 - 940 ft. (Bairnsdalian): -

● Polyzoal limestones with abundant Ditrupea, also sandy limestones. Orbulina universa was not observed below 940ft. Elphidium parri and Operculina victoriensis are commonly associated as in Woodside Nos. 2 & 3. ? abundant horizon of Op. victoriensis?

940 - 1190 ft. (Balcombian): -

Polyzoal marly limestones & hard grey sandy dolomitic limestone. Faunas are poor, although Globigermia bispherica & Astronomion obsum both occur.

1190 - 1290 ft. (Batesfordian): -

Polyzoal marly limestone with Lepidocyclus sp., also Amphistegia lessonii.

1290 - 1760ft. (Longfordian): -

Limestones marly limestones typified by Astronomion centroplax. Pelagics are rare.

1760-1943 feet (Lakes Entrance Formation equivalent)

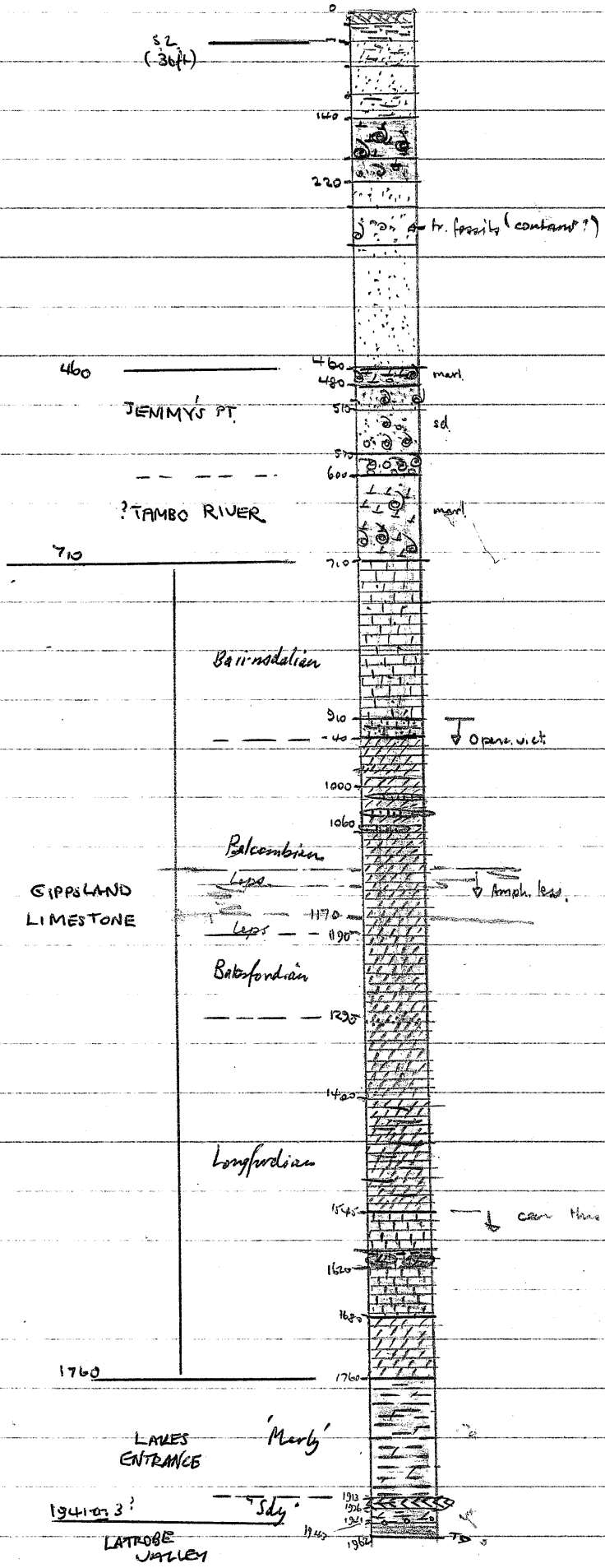
Brownish marl and/or calc. mudstone underlain by ^{grey} glauconitic dolomitic marls. Globigerina ampliapertura occurs ^{in the upper beds,} at 56 Globorotalia opima opima, Astronomor centrofax, Elphidium crespinae, and Corysidina zealandica. In the glauconitic marls, ~~etc.~~

Below 1943 ft. (Latrobe Valley Coal Measures).

Brown coal, etc. ~~etc.~~



Frame Lakes GIPPSLAND No. 1A



Log.

F/L. Gippsland No. 1A

- 500-570: sand & gravel, ^{fine} shells fragments. *Ditrypa*, not common.
- 570-600: gravel, *Ditrypa* rel abundant. Blue coloration of some shell frags suggests a certain degree of contamination.
- 600-660: grey shelly marl, faintly glauconitic
- 660-670:
- 710

- 710-790: pale colour - powder. *Ditrypa* common, also *polyzoa*.
- 790-830: gap
- 830-910: st. darker again.

- 910-940: yellow sandy limestone to whitish (or 960)
- 940-980: whitish marly ^{st.} - inc. chips hard grey marly ^{st.}
- 980-1000: grey marly limestone
- 1000-1080: grey marly ^{st.} (?sandy), *polyzoa*, *Ditrypa*, etc, are abundant. *Operculina*. Dark grey chips of dense ^{sandy} limestone (glauc. moulds, etc).

is it sandy or is it powdery
my ^{st.}

1050-60 darker: grey
1060-70 lighter: white

- 1080-1190: mud continuation
- 1190-1400: *Amphistegina* at 1190.
- Chips of ^{st.} marly ^{st.} *polyzoa*, etc., some grey marly ^{st.}
- 1400-1545: signif. ^{st.} *inc.* in ^{st.} grey marly ^{st.}
- 1545-1680: whitish ^{st.} (or ?marly limestone)
- 1680-1760: fine greyish chippings come in again, even more so at 1700.

1190-1280...?
1200-1250: Leps

- 1760-1948: first of calcareous mudstone type (or could it be called a lt. bn. gy mottled marl: good complete sample at 1800-10)
- 1940-1948: virtually no chips

Log & sample cores later

1948: Brown coal chips.

Cores

1299-1309.

- 1: Porous whitish grey lst., rel. hard.
- 2: Soft lt. grey ?marly limestone.

1922-41:

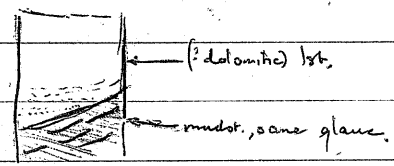
- 1: hard grey (crystalline) dolomite, gray pellets. (no app efferv in cold)
- 2: yellowish gy. polyzonal ~~limestone~~ ^{and} limestone. (fine white associated) (ON HCl)
- 3: as for 1. (slow eff. in cold)
- 4: ^{rel. soft} grey glauconitic ~~rock~~ mudstone. (ON HCl)

(rec. 2') ↑

1943-62:

- 1 ● brown coal (≈ 1943-1949) (rec 4')
- 2: brownish grey micaceous mudstone, app plant + corals fragments. (rec 4')
- 3: v. dark grey cart. micaceous grit (≈ 1949-1955) (rec 4')

Same as Woodside South No. 1 ?



CONCENTRATE ON ① Clastic significance of Lepos + Amph, etc
 ② Cyclic sedimentation, woods ?

Get charitic to check woodside area
 'Mitch' 'Katie' faunas + upper marine zone,
 For plank + F.D.

[extra checks]

From Lakes 1A.

- ① 940-50 : common hard grey marly 1st chips, fossils, etc ; common Ditrupe
- 930-40 : cream colored calc. sst ; abundant
- ~~920~~ 920-30 : as above
- 910-20 : as above
- 900-10 : grey (pres. sdy) marly 1st c bryozoa, etc, Ditrupe common, occ. uniloid. } brach. common
- 890-900 : " " " " " " } Ditrupe less common

Opt. v.ict.
 v. uncomm.
 " "
 " "
 ?
 X
 X

- ② 1200-10 : v. uncommon Amph. less, (Lepos uncomm. too)
- ~~1190~~ 1190-1200 : " " " " (?)

- 1180-90 : Amph. Openc. Lepos (!) (none common) sly marly 1st
- 1170-80 : tr. only of hard marly 1st chips, rest is clean 1st c obt fossil frags

Optimal
 Laminated
 woodside
 and south woodside

Lepos
 Leps.

- 1160-70 : as above ; Amph., no app^t Lepos, Openc. some Ditrupe, + apprec. ⁴³ sd. {check: no L.
- 1150-60 : tends to be rex^d sly marly 1st, Amph., no app^t Lepos, as ~~above~~ above. { " "
- 1140-50 : marly 1st, mostly 1st (?) Amph., no Lepos, Openc. becoming more common { " "
- 1130-40 : 1st c hard marly 1st chips, Amph., Openc. { " "
- 1120-30 : 1st./marly 1st, Amph. (unc), Lepos ! (not unc, inc. some, v. int. whole)
- 1110-20 : marly 1st / 1st, Amph., Lepos (few rel. whole spec^d)
- 1100-10 : 1st c Openc., no app^t Amph. etc.
- 1090-1100 : as above, Openc. v. worn, no Amph.
- 1080-90 : as above, mostly clean bryoz. frags.
- 1070-80 : 1st. (fossil frags) c high % sand gravel (+ Gr (M) ?), Ditrupe, even rare Amph.?
 + minor frags marly 1st
 mostly partially rd.

2.
Note CORE @ 1299-1309

③ 1299
~~1299-1300~~: high prop. F-M sd + vc/Gr, not much rdg, also fossil frags, inc.
^{rare} Leps + Amph., gyish looking (cf. ^{other} whitish frags), occ. Elph. parvi, no elo + Opere.
^{core} appears contain^d though!

● 1290-1300: no sd, nearly all whitish fossil frags, some Opere, no Leps.

④ 1550-1600: cream colored fossil fragments, supposedly lst.
* 1600: lt. grey marly lst fragm., soft relegy looking high mud contain^d.
1600-20: as for 1550-1600, but gy. chips
1620-21680: as above, v. few chips
1680 → gy. chips more prevalent.
(?1675)

* overall lst is few marly lst intersects which are missing in zone described below
v. subtle diff really.

- the lower one is perhaps cleaner, if a choice has to be made.

* washed: common M sd. (4 Gr rare, rd), + fossil/str frags, inc. Amph. Opere, even Elph. parvi.

Well file carries a typed lithological log of this well but on comparing it with weekly Drilling Reports submitted by the company several differences were seen. These differences are recorded here and noted on above log.

- 690' - 705' in W.D.R:- Light grey polyzoal lime with first appearance of green streaks. The shells encountered here are in a state of transition from shell to lime. Shells cannot be recovered from formation due to their crumbling state.

- 738' - 753' in W.D./R:- Grey green polyzoal lime and fragmentary limestone. Heaviest coral yet encountered. The coral shafts having diameters up to $\frac{3}{4}$ ".

- 787' - 798' in W.D.R:- As added note - Finely flaked mica cream coloured coral.

- 823' - 839' in W.D.R:- Water green polyzoal lime with granular limestone.

- 839' - 847' in W.D.R:- Greenish grey polyzoal lime with granular limestone.

- 1159' - 1164' in W.D.R:- Greenish grey polyzoal limey marl containing large number of bi-valves, some heavy coral, sand and a few crystals of pyrites.

- 1164' - 1170' in W.D.R:- Greenish grey marl.

- 1611' - 1623' in W.D.R:- Hard to soft grey to blueish grey and green shales with some sand and quartz grains.

- 1669' - 1677' in W.D.R:- Hard sandy shale.

- 1677' - 1687' Alternating bands of shale and brown sandstone.

.....

PE603435

This is an enclosure indicator page.
The enclosure PE603435 is enclosed within the
container PE906105 at this location in this
document.

The enclosure PE603435 has the following characteristics:

ITEM_BARCODE = PE603435
CONTAINER_BARCODE = PE906105
 NAME = Lithological Log
 BASIN = GIPPSLAND
 PERMIT = PPL 157
 TYPE = WELL
 SUBTYPE = WELL_LOG
DESCRIPTION = Lithological Log of Frome Lakes-1 and
 1A
REMARKS =
DATE_CREATED = 30/04/1957
DATE_RECEIVED =
 W_NO = W444, W445
 WELL_NAME = FROME LAKES-1
CONTRACTOR =
CLIENT_OP_CO = FROME-LAKES PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906106

This is an enclosure indicator page.
The enclosure PE906106 is enclosed within the
container PE906105 at this location in this
document.

The enclosure PE906106 has the following characteristics:

- ITEM_BARCODE = PE906106
- CONTAINER_BARCODE = PE906105
- NAME = Table of Gippsland Bores 1 of 4
- BASIN = GIPPSLAND
- PERMIT = PPL 157
- TYPE = WELL
- SUBTYPE = DIAGRAM
- DESCRIPTION = Data Table of Gippsland bores
containing data on location and
stratigraphic depths 1 of 4.
- REMARKS =
- DATE_CREATED = 30/04/1957
- DATE_RECEIVED =
- W_NO = W444, W445
- WELL_NAME = FROME LAKES-1
- CONTRACTOR =
- CLIENT_OP_CO = FROME-LAKES PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906107

This is an enclosure indicator page.
The enclosure PE906107 is enclosed within the
container PE906105 at this location in this
document.

The enclosure PE906107 has the following characteristics:

ITEM_BARCODE = PE906107
CONTAINER_BARCODE = PE906105
 NAME = Table of Gippsland Bores 2 of 4
 BASIN = GIPPSLAND
 PERMIT = PPL 157
 TYPE = WELL
 SUBTYPE = DIAGRAM
DESCRIPTION = Data Table of Gippsland bores
 containing data on location and
 stratigraphic depths 2 of 4.
REMARKS =
DATE_CREATED = 30/04/1957
DATE_RECEIVED =
 W_NO = W444, W445
 WELL_NAME = FROME LAKES-1
CONTRACTOR =
CLIENT_OP_CO = FROME-LAKES PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906108

This is an enclosure indicator page.
The enclosure PE906108 is enclosed within the
container PE906105 at this location in this
document.

The enclosure PE906108 has the following characteristics:

ITEM_BARCODE = PE906108
CONTAINER_BARCODE = PE906105
 NAME = Table of Gippsland Bores 3 of 4
 BASIN = GIPPSLAND
 PERMIT = PPL 157
 TYPE = WELL
 SUBTYPE = DIAGRAM
DESCRIPTION = Data Table of Gippsland bores
 containing data on location and
 stratigraphic depths 3 of 4.
REMARKS =
DATE_CREATED = 30/04/1957
DATE_RECEIVED =
 W_NO = W444, W445
 WELL_NAME = FROME LAKES-1
CONTRACTOR =
CLIENT_OP_CO = FROME-LAKES PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)

PE906109

This is an enclosure indicator page.
The enclosure PE906109 is enclosed within the
container PE906105 at this location in this
document.

The enclosure PE906109 has the following characteristics:

ITEM_BARCODE = PE906109
CONTAINER_BARCODE = PE906105
 NAME = Table of Gippsland Bores 4 of 4
 BASIN = GIPPSLAND
 PERMIT = PPL 157
 TYPE = WELL
 SUBTYPE = DIAGRAM
DESCRIPTION = Data Table of Gippsland bores
 containing data on location and
 stratigraphic depths 4 of 4.
REMARKS =
DATE_CREATED = 30/04/1957
DATE_RECEIVED =
 W_NO = W444, W445
 WELL_NAME = FROME LAKES-1
CONTRACTOR =
CLIENT_OP_CO = FROME-LAKES PTY LTD

(Inserted by DNRE - Vic Govt Mines Dept)