



**LAKES OIL N.L.**

(A.C.N. 004 247 214)

as operator

**PETRO TECH PTY LTD**

(A.C.N. 009 116 429)

as permit holder

**FARMINEES:**

**GIPPSLAND OFFSHORE PETROLEUM LTD**

(A.C.N. 111 418 270)

**RILO EXPLORATIONS PTY LTD**

(A.C.N. 009 174 001)

**BANJO-1 and BANJO-1A**

**STRATIGRAPHIC WELL**

**in**

**PEP 155 (east) VICTORIA**

**WELL COMPLETION REPORT**

**BY**

**B. EDWARDS**

LAKES OIL N.L.  
LEVEL 11,  
500 COLLINS STREET,  
MELBOURNE 3000  
FEBRUARY 2006

## **TABLE OF CONTENTS**

### **1.0 SUMMARY**

### **2.0 WELL HISTORY**

#### **2.1 GENERAL DATA**

#### **2.2 RIG DATA**

#### **2.3 DRILLING DATA**

#### **2.4 LOGGING AND TESTING**

### **3.0 GEOLOGY**

#### **3.1 REGIONAL GEOLOGY**

#### **3.2 TECTONIC HISTORY**

#### **3.3 STRUCTURAL ELEMENTS**

#### **3.4 EXPLORATION HISTORY**

#### **3.5 PEP 155**

#### **3.6 REASONS FOR DRILLING**

#### **3.7 GEOLOGICAL SUMMARY**

#### **3.8 HYDROCARBON SHOWS**

### **4.0 CONCLUSIONS**

### **5.0 COMPLETION**

## TABLE OF FIGURES AND ATTACHMENTS

### LIST OF FIGURES

Figure 1	Locality map for Banjo-1 and Banjo-1A
Figure 2	Well Completion Diagram
Figure 3	Drilling Time vs Depth Curve
Figure 4	Generalised Gippsland Basin Stratigraphic Table
Figure 5	Major Structural Elements of the Gippsland Basin
Figure 6	Site photograph of Banjo-1A

### LIST OF TABLES

Table 1	Hole Sizes and Depths
Table 2	Casing Data
Table 3	Stratigraphic Table for Banjo-1A

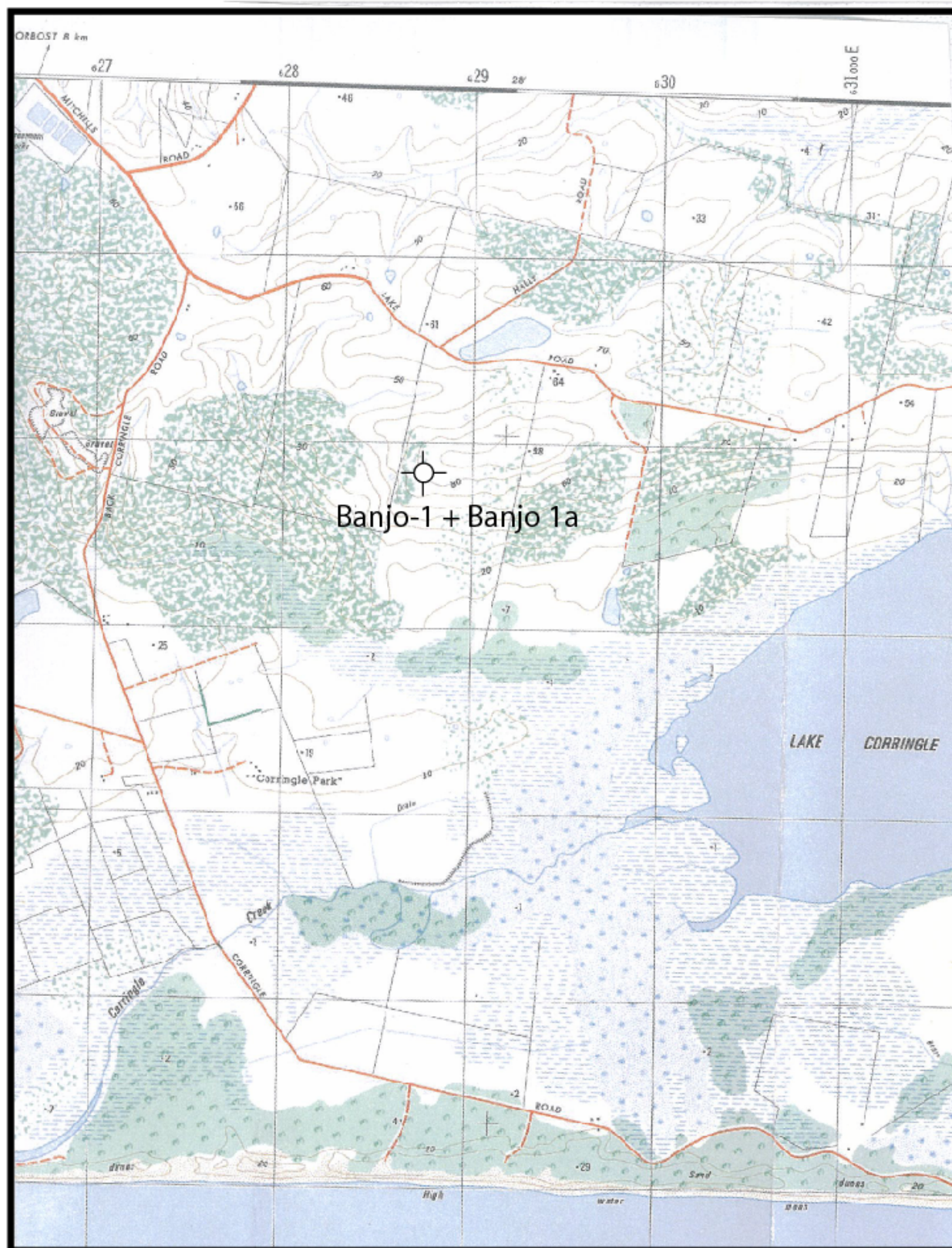
### LIST OF APPENDICES

Appendix 1	Cuttings Descriptions
Appendix 2	Core Description
Appendix 3	Paleontological Report (Steven Gallagher)
Appendix 4	Well Location Survey Plan (Kluge Jackson)
Appendix 5	Core Photographs

### LIST OF ENCLOSURES

Enclosure 1	Composite Well Log
Enclosure 2	Mud Log
Enclosure 3	Electric Logs
	Suite 1 (@ T.D.)
	<u>Type Log</u>
	GR, CCL, PRS, TMP
	<u>Interval (m)</u>
	280.1m - Surface

**FIGURE 1 Topographic map of Banjo 1 and Banjo 1A well site location**



## 1.0 SUMMARY

Banjo No. 1 and Banjo No. 1A was located in PEP 155 (east) and was designed to provide stratigraphic and reservoir information regarding the Cunninghame Greensand Member/Giffard Sandstone Member of the Lakes Entrance Formation and the underlying Colquhoun Gravel at this location (if present). The well was located approximately 7km south of Orbost. Access was via a purpose built track on the south side of Lake Road. The location was approximately 600m south of Lake Road (Figure 1).

Banjo No. 1A well was designed to drill the southern edge of a structural high which runs roughly E-W parallel to the coast. The Banjo No. 1A well had potential targets in the Cunninghame Greensand and the Colquhoun Gravel testing the possibility of up-dip hydrocarbon migration from the spilling offshore fields in the far eastern onshore portion of the eastern Gippsland Basin and its entrapment in the greensands. A similar stratigraphic and structural setting is known to occur in the Lakes Entrance Field to the west.

The Drilltec Cable-tool rig preset a 250mm casing at 68m prior to the rotary drilling rig moving onto the site. Banjo No. 1 was spudded on the 6<sup>th</sup> December, 2005. 149mm hole was drilled to 72m before the contractor lost complete circulation. The contractor continued drilling ahead to 81.3m with no returns. Over the course of the next 7 days the contractor mixed and pumped LCM and 11 cement plugs before abandoning Banjo No. 1 due to complete loss of circulation on the 13<sup>th</sup> December, 2005.

The Drilltec Cable-tool rig arrived back on-site on the 15<sup>th</sup> December, 2005 and drilled Banjo-1A, drilled 3m south-west of Banjo-1 to a depth of 100m and preset 152mm casing at 86m prior to spud. Banjo-1A was spudded from 100m by the rotary drilling rig on the 11<sup>th</sup> January, 2006. 114mm hole was drilled to 229.6m before 101mm casing was run to 229.6m and cemented in place. Attempts to retrieve the 152mm casing were abandoned and the 101mm casing was cemented to the surface before installing and pressure testing the BOP's. 63.5mm continuous core was then cut to 282m (Total Depth).

Electric logs run were: Surface to 280.3m (GR-CCL-PRS-TMP). The hole was drilled with a KCl/AMC PAK-L Polymer/ bentonite mud system. Water was trucked to the site from the township of Orbost.

No gas readings were recorded in the Haunted Hills Gravels, Jemmy's Point Formation or Gippsland Limestone. Trace to 1 unit of background gas was observed in the Lakes Entrance Formation from 165-172m, 229.6m-249m and from 270-271m within an unnamed claystone. No gas was observed in the Palaeozoic metamorphics. No oil fluorescence was observed in Banjo No. 1A.

Cement plugs were set across the shoe at 229.6m and at the surface. Banjo No. 1A well was plugged and abandoned on 26<sup>th</sup> January 2006.

## **2.0 WELL HISTORY**

### **2.1 General Data**

2.1.1	Well Name and Number	Banjo No. 1 and Banjo No. 1A
2.1.2	Banjo-1A Location	AMG Co-ordinates 629 234.83 E 5818 730.55 N Latitude 37° 46' 10.21" S Longitude 148° 28' 02.43" E
2.1.3	Elevations	G.L. 68.90 m A.S.L. R.T. 69.70 m A.S.L.
2.1.4	Petroleum Tenement	PEP 155 (east)
2.1.5	Name of Operator	LAKES OIL N.L. Level 11, 500 Collins Street Melbourne Victoria 3000
2.1.6	Other Participants	GIPPSLAND OFFSHORE PETROLEUM LTD Level 7, 530 Collins Street Melbourne Victoria 3000  RILO EXPLORATIONS PTY LTD Level 7, 530 Collins Street Melbourne Victoria 3000
BANJO-1		
2.1.7	Date Drilling Commenced	6 December 2005
2.1.8	Date Drilling Completed	13 December 2005
2.1.9	Date Rig Released	13 December 2005
2.1.10	Drilling Time to T.D.	8 days
2.1.11	Total Depth	81.3m (driller)
2.1.12	Status	Plugged and Abandoned.
BANJO-1A		
2.1.13	Date Drilling Commenced	11 January 2006
2.1.14	Date Drilling Completed	21 January 2006
2.1.15	Date Rig Released	26 January 2006
2.1.16	Drilling Time to T.D.	11 days
2.1.17	Total Depth	282m (driller) 280.3m (logger)
2.1.18	Status	Plugged and Abandoned.

## 2.2 Rig Data (Rig 1)

Drilling Contractor:	Drilltec Pty Ltd Drilling Depot Rd, Morwell, Vic. 3840
Rig:	Bournedrill THD25VP (rotary rig)
Rig Carrier:	Truck Mounted
Weight Indicator:	Hydraulic Pressure
Power:	Truck Engine
Rotary:	Top Drive
Blocks:	Not Applicable
Pumps:	Duplex 5" × 6" Double Action
Mud Mixing:	Gardener Denver Duplex
Sump Pump:	Not Applicable
Transfer Pump:	Not Applicable
Tubulars:	Mayhew Pipe
Fishing Tools:	None on Site
Handling Tools:	Drilltec Toolbox
Stabilizer:	5 <sup>5</sup> / <sub>8</sub> "
Spare Parts:	As reasonably required to conduct operations for programmed well.
Personnel:	Driller plus 2 crew
Drilling Hours:	Rig Operated During Daylight Hours Only

**Rig Data (Rig 2)**

Rig:	Bournedrill C500 (cable tool rig)
Rig Carrier:	Truck Mounted
Weight Indicator:	Hydraulic Pressure
Power:	Truck Mounted Auxiliary Power Source
Rotary:	Not Applicable (Cable Tool Rig)
Pumps:	Not Applicable
Tubulars:	Not Applicable
Fishing Tools:	None on Site
Handling Tools:	Drilltec Toolbox
Stabilizer:	Not Applicable
Spare Parts:	As reasonably required to conduct operations for programmed well.
Personnel:	Driller plus one crew
Drilling Hours:	Rig operated during daylight hours only



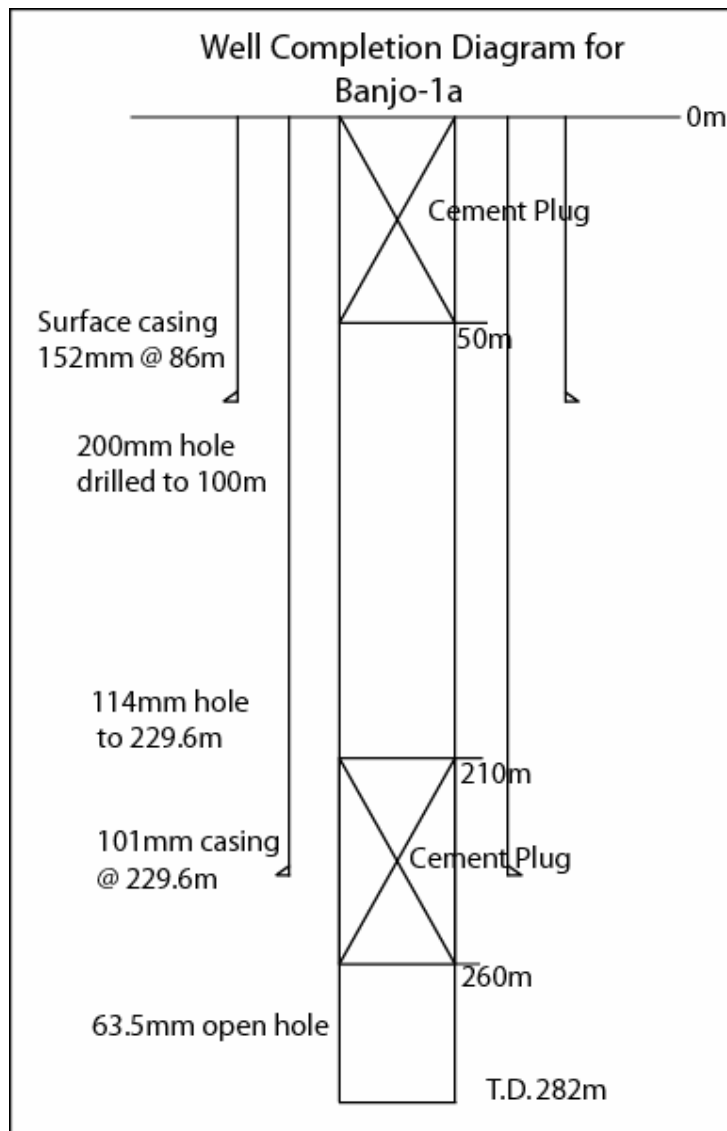


FIGURE 2) Well Completion Diagram

## 2.3 Drilling Data

The following is the daily operations summary for Banjo No.1. It has been compiled from the daily drilling reports. Onsite drilling supervision for Lakes Oil N.L. was provided by D Sisely. Further details are provided in the time/depth curve (Figure 3).

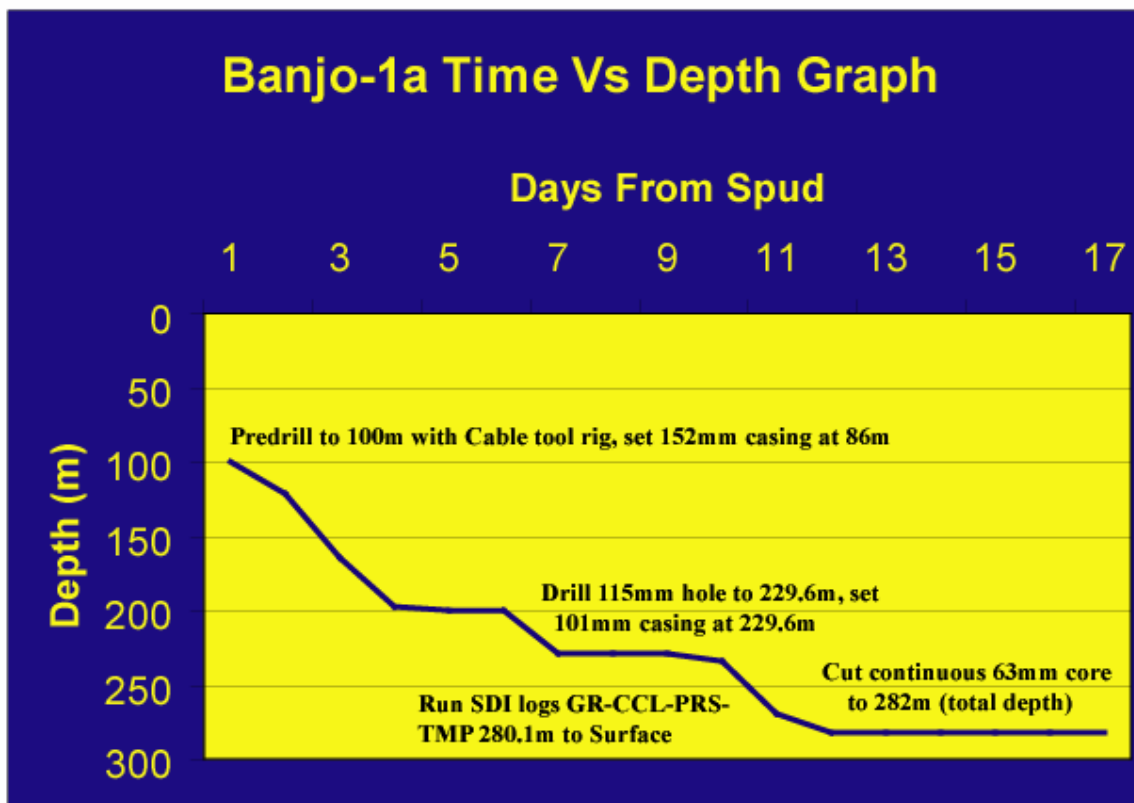


FIGURE 3: Banjo No.1A Time Vs Depth Graph

Prior to drilling the Banjo-1 well, a 152mm conductor pipe was preset by the Drilltec Cable Tool rig at 68m. Banjo No. 1 was spudded at 1115hrs on the 6<sup>th</sup> of December, 2005. The well was spudded with 114mm hole and drilled to 72m before complete circulation was lost. The contractor continued to drill ahead to 75m before pulling out of the hole. After mixing a heavy viscous pill the contractor attempted to regain circulation. The contractor then drilled ahead to 81.3m with no returns before pumping cement plug No.1 from 81.3m to 68.

Over the course of the next seven days a total of 11 cement plugs were pumped and LCM including stock feed, sodium bentonite, walnut shells and coarse sand was pumped down the hole. All attempts to regain circulation were unsuccessful and Banjo No. 1 was abandoned on the 13<sup>th</sup> of December 2005.

The Cable-tool rig moved back onto the site and preset 152mm surface casing at 86m, having drilled to 100m on a new site Banjo-1A, located 3m south-west of the Banjo-1 site. With the rotary drilling rig back on site, Banjo-1A was spudded at 100m at 1450hrs on the 11<sup>th</sup> of January, 2006. The well was spudded with 114mm hole and drilled to 198m with no problems before losing circulation and drilling with poor circulation to 200m before pulling out of the hole to run 101mm casing. 101mm casing was run to 199.5 and cemented in place.

Following the cementing job, the casing was moving freely and it was determined that the cement had washed away. A decision was made to pull the casing out of the hole and drill ahead with no returns. After running in the hole to 200m, the contractor drilled ahead in 114mm hole with full returns to 229.6m, before pulling out of the hole to run the 101mm casing and cement in place. After cementing the casing to 229.6m with no problems the contractor attempted to remove the 152mm casing but was unable to do so. After abandoning the 152mm casing down the hole, the 101mm casing was cemented to the surface. The contractor then dug out the cellar before installing and pressure testing the 101mm casing.

The contractor then picked up the 63.5mm wireline retrievable coring assembly and cored out the cement track, before cutting continuous core to 282m (total depth). After conditioning the hole SDI ran electric logs (GR-CCL-Pres-Temp(c)) on the expertest slickline from 275m to surface.

A fifty meter cement plug was then set across the casing shoe at 229.6m and a second fifty meter cement plug was set at the surface. Banjo No. 1A was plugged and abandoned on the 26<sup>th</sup> of January 2006.

#### **Hole sizes and depths:**

**TABLE 1**

<b>HOLE SIZE</b>	<b>INTERVAL</b>
200mm	Spud to 100m.
114mm	100-229.6m.
63.5mm	229.6-282m

#### **Casing:**

**TABLE 2**

<b>TYPE</b>	<b>CASING</b>	<b>CASING</b>
<b>Size</b>	152mm	101mm
<b>Grade</b>	K55	K55
<b>Connection</b>	BTC	BTC
<b>Length</b>	86m	229.6m
<b>Shoe</b>	No Shoe	229.6m

#### **Deviation Surveys:**

No deviation surveys were taken whilst drilling Banjo No.1 or Banjo No.1A

#### **Drilling Fluid:**

Spud – 282 m. Type: KCl/AMC PAK-L Polymer/ bentonite mud.

#### **Water Supply:**

Water was trucked by tanker from Orbost.

#### **Perforation:**

None.

#### **Completion**

Plugged and Abandoned

## 2.4 Logging and Testing

### Wellsite Geologist:

Ben Edwards

### Mudlogging:

Lakes Oil's hot-wire gas detector was used to monitor ditch gas, and was supervised by Dennis Sisely.

A mudlog recording lithology, penetration rate, mud gas and other data was prepared and is and enclosure 2 to this report

### Ditch Cutting Samples:

Cuttings were collected at 3m intervals from surface to 229.6m (Coring point). The cuttings samples and sets were:

<u>Sample Type</u>	<u>No. Sets</u>
Washed	2 (Operator, DPI)
Samplex Trays	1 (Operator)

### Coring:

Continuous coring was cut from 229.6m to 282m (TD)

### Sidewall Cores:

None.

### Testing:

None.

### Wireling Logs:

One Suite of logs were rund by Scientific Drilling

Run #1

<u>Log Type</u>	<u>Interval (m)</u>
GR-CCL-PRS-TMP	280.1m - surface

### Bottom Hole Temperature :

25.97<sup>0</sup> C

### Velocity Survey:

No velocity survey was conducted.

AGE		GROUP	ROCK UNIT	MAXIMUM THICKNESS ONSHORE	LITHOLOGY AND DEPOSITIONAL ENVIRONMENT	ONSHORE HYDROCARBON SHOWS
PLIOCENE						
LATE	EARLY	SALE	HAUNTED HILLS GRAVEL	110m	Gravels, sands and clays Non Marine	
			BOISDALE FORMATION	200m	Interbedded sand, silt and clay, with minor gravels and coals. Non Marine	
MIOCENE		SEASPRAY	JEMMY'S POINT FORMATION	110m	Calcareous sandstone with shell beds Marine	
EARLY-MID	LATE		TAMBO RIVER FORMATION	100m	Glauconitic marl with marly and shelly limestone Marine	
			GIPPSLAND LIMESTONE	800m	Fossiliferous limestone, marly limestone and marl Marine	
OLIGOCENE	LATE		SEACOMBE MARL MEMBER	225m	Fossiliferous calcareous mudstone and marl Marine	
			GIFFARD SANDST. MEMBER	15m	Muddy snadstone, marly snadstone and sandy mudstone with glauconite and pyr. Marine	● Lakes Entrance Field
PAL. EOCENE		LATROBE	TRARALGON FORMATION	1100m	Quartzose sandstone with minor coals, siltstone and claystone Non Marine	
LATE	GOLDEN BEACH		BARRACOUTA FORMATION	510m	Coarse grained quartzose sandstones with minor interbedded siltstone, claystone and coal. Non Marine	
			UPPER UNIT			
CRETACEOUS	STRZELECKI		KIPPER FORMATION	400m	Interbedded sandstone and shale with minor coal Non Marine	☀ Wombat Field
			JUDITH FORMATION			
		STRZELECKI GROUP	5000m	Interbedded sandstones, shales and minor coal Non Marine	☀ Wombat Field Trifon 1+2	
EARLY	TYERS <td>RINTOULS CREEK SANDSTONE</td> <td>600m</td> <td>Quartzose sandstone interbedded with mudstone and shales with minor coal. Non Marine</td> <td>● Megascolides-1 Outcrop</td>	RINTOULS CREEK SANDSTONE	600m	Quartzose sandstone interbedded with mudstone and shales with minor coal. Non Marine	● Megascolides-1 Outcrop	
		TYERS CONGLOMERATE		Conglomerate, quartzite, mudstone and shales Fluvial		
			PALAEOZOIC BASEMENT			

Figure 4) Generalised Onshore Gippsland Basin Stratigraphy

### **3. GEOLOGY**

#### **3.1 Regional Geology**

The Gippsland Basin is an early Cretaceous to Cainozoic basin occupying approximately 46,000 square kilometers of the southeastern margin of the Australian continent. The basin is flanked on the north, west and south-west by Palaeozoic rocks and confined between the structural uplifts of the Victorian Highlands in the north and the Bassian Rise in the south. The eastern margin of the basin is open to the Tasman sea. The Gippsland Basin is an east-west trending half graben feature with 70% of its area beneath Bass Strait and 30% onshore (Figure 5).

With the exception of occasional wildcat drilling in the boom of the 1980's, exploration of the onshore Gippsland Basin has been largely ignored since the 1970's.

The early exploration activities in the onshore part were aimed primarily at the Early Cretaceous Strzelecki Group and, and later on after successful drilling offshore, at the top of the Latrobe Group "coarse clastics", but a lack of understanding of the stratigraphy and the mechanism of hydrocarbon generation, migration and timing of structures, along with the poor quality of the seismic and well log data, resulted in a downgrading of the hydrocarbon potential of the onshore area.

#### **3.2 Tectonic History**

The Gippsland Basin is a rift basin, which originated in the Late Jurassic to Early Cretaceous and consists of alternating half graben structures along its east-west trend (Figure 5). It is characterised by a deep central basin, flanked by northern and southern terraces. In the onshore area, the Late Cretaceous movements were accompanied with volcanism in the western margin of the basin. Several phases of positive structural inversion occurred in the Gippsland Basin from Mid-Oligocene to the present time, creating the major hydrocarbon bearing structures seen in the offshore region. The main phase occurred during the Late Miocene, which resulted in inversion of existing features and the creation of anticlinal structures.

#### **3.3 Structural Elements**

The onshore area can be tectonically sub-divided into six major areas (Figure 5):

(A) Lakes Entrance Platform (Northern Platform): This lies immediately south of the Eastern Highlands, where the Palaeozoic Basement gently slopes southwards and is unconformably overlapped by Oligocene - Miocene marine sediments and thin Pliocene - Quaternary continental deposits. Permit 155 is located along the north-eastern margin of the Lakes Entrance Platform.

(B) Latrobe Valley Depression: This lies between the Palaeozoic Eastern Highlands to the north and the Early Cretaceous Balook Block to the south. Over 700 meters of continental Latrobe Valley sediments are present in this area.

(C) Lake Wellington Depression: This lies to the south of the Lakes Entrance Platform, where over 1200 meters of Eocene to Pliocene sediments unconformably overlie the Early Cretaceous rocks. This trough is offset from the Latrobe Valley Depression to the west, by left lateral displacement on the Yinnar Transfer Fault Zone which occurred during the Tertiary. The boundary also closely coincides with the western limit of marine Tertiary sediments. To the east it merges with the Strzelecki Terrace.

(D) Baragwanath Anticline: This is the eastern extension of the outcropping Balook High. It is an Early Cretaceous block, which was elevated during the Late Miocene time as a result of the renewed lateral strike slip wrenching along the Boundary Fault Systems. It separates the Lake Wellington Depression to the north from the Seaspray Depression to the south. On the crest of the structure, thin Miocene strata are succeeded unconformably by a veneer of Pliocene-Pleistocene sediments. On the flanks of the structure, however, the Miocene sediments wedge out towards the crest by onlap at the base and erosion at the top of the sequence.

(E) Seaspray Depression: This is the onshore extension of the Central Deep. It occupies the southern onshore part of the basin, where the most complete stratigraphic section is present.

(F) South Terrace: Wilson's Promontory is an erosional remnant of a broad shallow basement platform bounding the Gippsland Basin on its southern side. The Southern Terrace represents the edge of this platform. The Chitts Creek Conglomerate onlaps the South Terrace as a mirror image to the Tyers Conglomerate on the North Terrace.

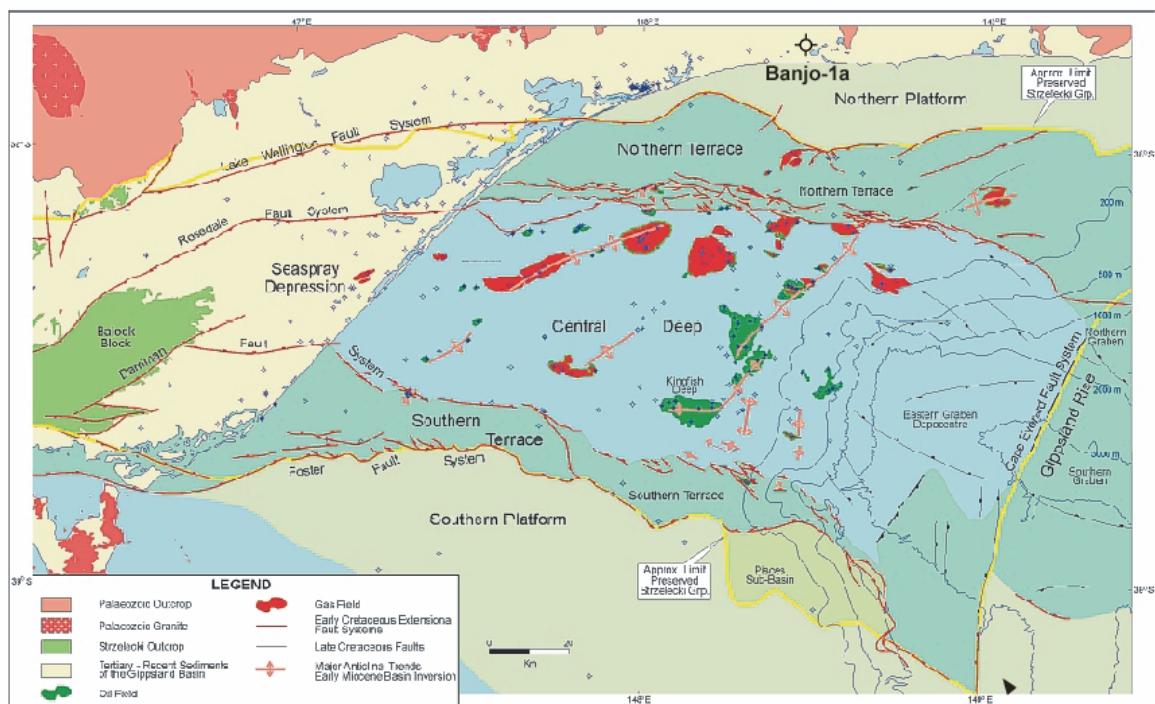


Figure 5) Major structural elements and oil and gas fields of the Gippsland Basin (from Petroleum Atlas of Victoria, 2001)

### 3.4 Exploration History

Hydrocarbon exploration commenced in the onshore region of the basin in the 1920's. In 1924 the Lake Bunga-1 well encountered traces of oil, starting a drilling run that ultimately resulted in the drilling of over 60 wells in the Lakes Entrance vicinity. The oil accumulation is found in a stratigraphic trap within a basal glauconitic sand member of the Oligocene age Lakes Entrance Formation. The field produced a total of 10,000 bbls of approximately 14° API gravity oil before production ceased in 1956.

Recently, Lakes Oil has drilled nineteen wells within their onshore Gippsland permits, five of them in PEP 155.

### **3.5 Permit PEP 155**

Lakes Oil N.L. acquired the PEP 135 permit in August 1997. The permit overlies the onshore portion of the Lakes Entrance (Northern) Platform of the Gippsland Basin (see below). It includes the Lakes Entrance oil field, discovered in 1924, which produced approximately 10,000 bbls of biodegraded oil (Approx 14° API) before production ceased in 1956. The reservoir was the Greensand Member of the Oligocene age Lakes Entrance Formation. The Lakes Entrance field has remained the main focus of Lakes' exploration effort since taking out the permit.

In 1997 Lakes drilled two wells within the field area:

Petro Tech-1 located in the central portion of the field near the Lakes Entrance oil shaft, and Hunters Lane-1 located in the western portion of the field. Bailing operations at Hunters Lane-1 produced approximately 1700 litres of oil/oil emulsion before the well was plugged and abandoned.

In July 2002 a Falcon airborne survey was acquired over the Lakes Entrance Field, measuring gravity gradient, magnetics, radiometrics and topography. Interpretation of this survey was used to locate the Bunga Creek-1 well. Bunga Creek-1 and Bunga Creek-2, drilled in 2002 and 2003 evaluated the economic potential of the field, concentrating at its eastern edge.

In 2004, the Falcon Airborne Gravity Survey was flown over the entire permit area, identifying a large gravity low extending onshore in the Marlo area.

In 2005, Lakes Oil drilled Patrobus-1, the first of a two well drilling program providing stratigraphic and reservoir information regarding the Giffard Sandstone in the far eastern onshore portion of the basin.

### **3.6 Reason for Drilling**

Banjo-1A stratigraphic corehole was designed to provide stratigraphic and reservoir information regarding the Giffard Sandstone at this location as there has been very little exploration in this portion of the basin. It was also designed to test the potential trapping of hydrocarbons along the southern edge of a E-W trending structural high running almost parallel to the coast. It was postulated that the well could test the extent of hydrocarbon migration from the offshore fields spilling up-dip towards the onshore portion of eastern Gippsland Basin.





Figure 6 Banjo 1A site location looking North from the coast line

### 3.7 Geological Summary

A summary of the lithology penetrated appears below. Refer to Appendix 1 for detailed cuttings descriptions and Appendix 2 for detailed core descriptions.

#### **0-57m**

Unconsolidated sand (90%) grading to and interbedded with Siltstone (10%)

**UNCONSOLIDATED SAND:** white-very light yellow grading to very light yellow-light yellowish orange, fine-medium and occasionally coarse dominantly medium, subangular-rounded dominantly subrounded, moderately-well sorted, dominant translucent-milky-opaque quartz, trace-common rounded-well rounded black lithics, trace shell fragments, common subangular-rounded ironstone lithics, occasional light yellow-orange silty matrix, weak ironstone cement, occasional weak calcareous cement, excellent inferred porosity, no oil fluorescence.

**SILTSTONE:** very light yellow-yellowish orange, soft, arenaceous, weakly calcareous, non-fissile

#### **57-66m**

Unconsolidated gravel (30%) grading to Unconsolidated sand (30%) and interbedded with Siltstone (40%)

**UNCONSOLIDATED GRAVEL:** very light yellow-bluish grey, medium sand- boulders dominantly pebbly, subangular-well rounded dominantly rounded, very poorly sorted, common pebbly basaltic lithics, trace white-milky granitic lithics, trace very light yellow- light yellowish brown sandstone lithics, silty matrix, no visible cement, very good visual porosity, no oil fluorescence.

UNCONSOLIDATED SAND: medium yellowish brown-yellowish orange, fine-coarse dominantly medium, subangular- subrounded dominantly subrounded, moderately sorted, abundant translucent-opaque quartz, common subangular-rounded black lithics, trace granitic lithics, trace micromica, silty matrix, weak ironstone cement, very good visual porosity, no oil fluorescence.

SILTSTONE: light yellow-light yellowish brown, soft, arenaceous, non-sticky, moderately dispersive, non-fissile.

#### **66-72m**

Unconsolidated gravel (30%) interbedded with Claystone (70%)

UNCONSOLIDATED GRAVEL: orange brown-reddish brown, fine-pebbly dominantly medium, rounded-well rounded occasionally angular-subangular, abundant orange-red ironstone lithics, common angular-subangular translucent-opaque quartz, common medium bluish grey-bluish grey basaltic lithics, trace fossiliferous material, claystone matrix, moderate ironstone cement, fair inferred porosity, no oil fluorescence.

CLAYSTONE: orange-brick red, soft, arenaceous, sticky, non-dispersive, non fissile.

#### **72-82m**

Fossiliferous sandstone (60%) interbedded with and grading to Calcarenite (40%)

FOSSILIFEROUS SANDSTONE: off white-light yellowish brown, fine-medium, angular-subangular, common limestone fragments, trace angular-subangular translucent-opaque quartz, common fossiliferous fragments, mainly bryozoa and shelly fragments, trace ironstone cement, abundant common calcareous cement, fair visual porosity, no oil fluorescence.

CALCARENITE: very light grey-medium grey, fine-medium dominantly fine, angular-subangular limestone fragments, rare subangular-rounded very fine quartz, trace dark green-black very rounded-well rounded very fine glauconite lithics, abundant coarse fossiliferous fragments mainly bryozoan and shelly fragments, minor gastropods, common medium bluish-dark bluish grey claystone matrix, common weak calcareous cement, fair visual porosity, no oil fluorescence.

#### **82-100m**

Calcarenite (90%) interbedded with minor claystone (10%)

CALCARENITE: very light grey-medium dark grey, very fine-fine dominantly fine becoming fine-coarse, angular-rounded limestone fragments, common subangular-rounded translucent-milky very fine quartz, trace dark green-black very rounded-well rounded very fine glauconite lithics, abundant coarse fossiliferous fragments mainly bryozoan and shelly fragments, minor gastropods, minor bluish grey-dark bluish grey claystone matrix, abundant weak calcareous cement, fair-good visual porosity, no oil fluorescence.

CLAYSTONE: medium bluish grey-dark bluish grey, very fine, moderately sticky, non-dispersive, calcareous.

#### **100-108m**

Calcarenite (80%) interbedded with claystone (20%)

CALCARENITE: off white-very light grey, moderately sorted, fine-very coarse dominantly fine, angular-subrounded, abundant off white-light grey subangular-subrounded fine-medium

crystalline limestone fragments, common translucent subrounded-rounded medium-coarse quartz with occasional iron staining, common dark green-black rounded-well rounded very fine glauconite, trace orange lithics, common fossiliferous material; bryozoan echinoid spines shelly fragments gastropod, common bluish grey-dark bluish grey claystone matrix, weak calcareous cement, trace ironstone cement, poor-fair visual porosity, no oil fluorescence.

CLAYSTONE: bluish grey-dark bluish grey, very fine, moderately sticky, calcareous, moderately dispersive, non-fissile.

#### **108-121m**

Calcarenite (80%) interbedded with claystone (20%)

CALCARENITE: very pale yellow-pale yellowish grey, moderately sorted, fine-medium dominantly fine, subangular-rounded, common very pale yellow-pale yellowish grey subangular-rounded fine-medium limestone fragments, trace translucent subrounded-rounded medium quartz, trace dark green-black rounded-well rounded very fine glauconite, dominant fossiliferous material; bryozoan echinoid spines shelly fragments gastropod, trace bluish grey-dark bluish grey claystone matrix, weak calcareous cement, fair visual porosity, pale yellow mineral fluorescence, no oil fluorescence.

CLAYSTONE: bluish grey-dark bluish grey, very fine, very sticky, calcareous, non-dispersive, non-fissile.

#### **121-133m**

Calcarenite (70%) interbedded with claystone (30%)

CALCARENITE: pale yellow-light yellowish brown, poorly sorted, fine-medium dominantly fine occasionally very coarse, angular-rounded, abundant occasionally very coarse off white-pale yellow subangular-subrounded fine-medium limestone fragments, trace translucent subrounded-rounded medium quartz with occasional iron staining, abundant occasionally very coarse fossil fragments; bryozoa echinoid spines shells gastropod, trace light bluish grey-bluish grey claystone matrix, weak-very strong calcite cement, fair visual porosity, pale yellow mineral fluorescence, no oil fluorescence.

CLAYSTONE: light bluish grey-bluish grey, very fine, very sticky, weakly calcareous, non-dispersive, non-fissile.

#### **133-150m**

Marlstone (80%) Limestone bands (20%)

MARLSTONE: light yellowish grey-light brownish grey, fine-very fine, very silty, rare translucent very fine- fine quartz, trace very fine-fine glauconite, common fossiliferous fragments; bryozoa echinoid spines shells gastropods, soft, very sticky, very dispersive, calcareous, non fissile.

LIMESTONE: very light grey-light bluish grey, moderately sorted, subangular-subrounded, fine-medium, dominant very light grey-light bluish grey crystalline limestone fragments, common fossiliferous fragments; bryozoa echinoid spines shells gastropods, strong calcite cement, clast supported, poor visual porosity, pale yellow mineral fluorescence, no oil fluorescence.

#### **150-164m**

Marlstone (60%) with Limestone bands (10%) interbedded with Sandstone (30%)

MARLSTONE: light yellowish grey-light brownish grey, fine-very fine, moderately silty, common translucent very fine- fine quartz, trace very fine-fine glauconite, common fossiliferous fragments; mainly bryozoa with shells gastropods, very soft, very sticky, very dispersive, calcareous, non fissile.

LIMESTONE: pale grey-light bluish grey, poorly sorted, very fine-medium, angular-subangular, dominantly crystalline limestone, common fossiliferous material mainly bryozoa with shells, bluish grey marlstone matrix, strong calcite cement in part, fair visual porosity, pale yellow mineral fluorescence, no oil fluorescence.

SANDSTONE: off white-pale yellow, well sorted, subangular-rounded becoming rounded-well rounded fine, dominant translucent-opaque subangular-rounded becoming rounded-well rounded fine quartz with occasional iron staining, common rounded-well rounded black lithics, trace orange lithics, brown silty matrix grading to no visible matrix, no visible cement, fair inferred porosity, no oil fluorescence.

#### **164-168m**

Marlstone (50%) with Limestone bands (40%) interbedded with Sandstone (10%)

MARLSTONE: light yellowish grey-light brownish grey, fine-very fine, moderately silty, common translucent very fine- fine quartz, trace very fine-fine glauconite, common fossiliferous fragments; mainly bryozoa with shells gastropods, very soft, very sticky, very dispersive, calcareous, non fissile.

LIMESTONE: pale grey-light bluish grey, poorly sorted, very fine-medium, angular-subangular, dominantly crystalline limestone, common fossiliferous material mainly bryozoa with shells, bluish grey marlstone matrix, strong calcite cement in part, fair visual porosity, pale yellow mineral fluorescence, no oil fluorescence.

SANDSTONE: off white-pale yellow, well sorted, subangular-rounded becoming rounded-well rounded fine, dominant translucent-opaque subangular-rounded becoming rounded-well rounded fine quartz with occasional iron staining, common rounded-well rounded black lithics, trace orange lithics, brown silty matrix grading to no visible matrix, no visible cement, fair inferred porosity, no oil fluorescence.

#### **168-189m**

Marlstone (50%) with Limestone bands (20%) interbedded with and grading to Siltstone (20%) and Sandstone (10%)

MARLSTONE: very light grey-medium light grey, very fine-fine, silty, common quartz, trace black lithics, common fossiliferous fragments; mainly bryozoa with shells gastropods, rare pyrite, very soft, arenaceous, very sticky, very dispersive, moderately calcareous, non fissile.

LIMESTONE: very light bluish green-light green, subrounded-rounded, very fine-fine, dominant crystalline limestone, rare fine-very fine translucent-opaque quartz, trace very fine orange and black lithics, no visible matrix, strong calcareous cement, poor visible porosity, pale yellow mineral fluorescence, no oil fluorescence.

SILTSTONE: very light yellow-light yellowish brown, very fine-fine, subrounded-rounded, common very-fine-fine quartz, trace black lithics, moderately arenaceous, no visible cement, poor inferred porosity, no oil fluorescence.

SANDSTONE: white-very light yellow, subrounded-well rounded, well sorted, fine, dominant translucent-opaque fine quartz with occasional iron staining, trace very fine well rounded black lithics, pale yellow-light yellowish brown silty matrix, trace weak calcareous cement, fair inferred porosity, no oil fluorescence.

**189-198m**

Marlstone (60%) interbedded with Siltstone (20%) and Sandstone (20%)

MARLSTONE: very light bluish grey-medium bluish grey, very fine-fine, common quartz, rare black lithics, abundant fossiliferous fragments; mainly bryozoa with shells gastropods, rare pyrite, very soft, arenaceous, moderately sticky, very dispersive, calcareous, non fissile.

SILTSTONE: very light yellow-light yellowish brown, very fine-fine, subrounded-rounded, common very-fine-fine quartz, trace rounded-well rounded dark green-black glauconite, moderately arenaceous, no visible cement, poor inferred porosity, no oil fluorescence.

SANDSTONE: white-very light yellow, subrounded-well rounded, well sorted, fine, dominant translucent-opaque fine quartz with occasional iron staining, common very fine rounded-well rounded dark green-black glauconite, trace pyrite, pale yellow-light yellowish brown silty matrix, trace weak calcareous cement, fair inferred porosity, no oil fluorescence.

**198-207m**

Marlstone (80%) interbedded with Sandstone (20%)

MARLSTONE: very light bluish grey-medium bluish grey, fine-very fine, silty, trace quartz, common fossiliferous fragments; bryozoa gastropod echinoid spines shells, soft, dispersive, moderately calcareous, sub-fissile.

SANDSTONE: white-very light yellow, subrounded-well rounded, well sorted, fine, dominant translucent-opaque subrounded-well rounded quartz, trace dark green-black very fine well rounded glauconitic nodules, rare pyrite, pale yellow-light yellowish brown silty matrix, trace weak calcite cement, fair inferred porosity, no oil fluorescence.

**207-222m**

Marlstone (90%) interbedded with Siltstone (10%)

MARLSTONE: very light bluish grey-medium bluish grey, fine-very fine, slightly silty, rare limestone lithics with strong calcite cement, rare pyrite, trace quartz, common fossiliferous fragments; bryozoa gastropod echinoid spines shells, soft, dispersive, moderately calcareous, sub-fissile.

SILTSTONE: medium brownish grey-medium brown, very fine-fine, moderately sorted, moderately arenaceous, rare translucent-opaque very fine-fine quartz, trace very fine black lithics, trace pyrite, poor inferred porosity, no oil fluorescence.

**222-225m**

Greensand: (100%)

GREENSAND: medium green-dark green, medium-coarse dominantly medium, subrounded-well rounded dominantly well rounded, common rounded-well rounded translucent-opaque medium-coarse quartz with occasional iron staining, abundant dark green-black rounded-well rounded medium-coarse glauconite nodules, trace fossiliferous material mainly bryozoa, trace pyrite, rare off white-very light grey claystone matrix, weak calcite cement, fair-good inferred porosity, dull yellow mineral fluorescence, no oil fluorescence.

**225-229.6m**

Greensand (10%) grading into Calcareous Sandstone (90%)

GREENSAND: medium green-dark green, medium-coarse dominantly medium, subrounded-well rounded dominantly well rounded, common rounded-well rounded translucent-opaque medium-coarse quartz with occasional iron staining, abundant dark green-black rounded-well rounded medium-coarse glauconite nodules, trace fossiliferous material mainly bryozoa, trace pyrite, rare off white-very light grey claystone matrix, weak calcite cement, fair-good inferred porosity, dull yellow mineral fluorescence, no oil fluorescence.

CALCAREOUS SANDSTONE: off white-very light yellow, fine-medium, well sorted, subrounded-rounded dominantly rounded, abundant rounded-well rounded fine translucent-opaque quartz, common dark green-black glauconite, common fossiliferous material mainly bryozoa, common white claystone matrix, trace pyrite, moderate calcite cement, fair visual porosity, bright yellow mineral fluorescence, no oil fluorescence.

**229.6-231m**

Calcareous Sandstone (100%)

CALCAREOUS SANDSTONE: off white-very light yellow, fine-medium, well sorted, subrounded-rounded dominantly rounded, abundant rounded-well rounded quartz, common dark green-black glauconite, common fossiliferous material; dominantly bryozoan, common white claystone matrix, trace pyrite, moderate calcite cement, fair visual porosity, bright yellow mineral fluorescence, no oil fluorescence.

**231-234m**

Marly Greensand (100%) grading to Clayey Greensand (100%)

MARLY GREENSAND: Medium green-medium dark green, well sorted, rounded-well rounded, fine, abundant translucent-opaque rounded-well rounded fine quartz, rare rounded-well rounded dark green-black glauconitic lithics, trace-common opaque-off white well rounded lithics, trace-common fossiliferous fragments; mainly shells, common pale green marly matrix, weak-strong calcareous cement, soft-hard, good visual porosity, no oil fluorescence.

CLAYEY GREENSAND: Very light green-medium green, very fine-fine, subangular-rounded dominantly subrounded, common translucent-opaque subangular-rounded fine quartz, common rounded dark green-black glauconitic lithics, rare off white lithics, common off white very fine claystone matrix, moderate-strong calcite cement, firm, fair visual porosity, no oil fluorescence.

**234-261m**

Greensand 90% with interbedded Limestone, Calcareous Sandstone, Shell beds and Occasional Coaly Laminae

**GREENSAND:** Very light green-medium dark green-very dark green, moderately-well sorted, subrounded-rounded becoming rounded-well rounded, very fine-fine dominantly fine, rare-abundant translucent-opaque rounded-well rounded fine quartz with occasional-common iron staining, trace-dominant rounded-well rounded dark green-black very fine-fine dominantly very fine glauconitic lithics, trace-rare opaque-off white well rounded lithics, rare-abundant fossiliferous material; mainly shells bryozoa, rare-common off white claystone matrix, no visible cement-strong calcareous cement, friable-firm, good-excellent visual porosity, no oil fluorescence.

**LIMESTONE:** Off white-very light grey, moderately-well sorted subrounded-rounded very fine-fine, common translucent-opaque subrounded-rounded quartz, trace subrounded-well rounded dark green-black glauconite, rare-common fossiliferous material; shells bryozoa, common off white claystone matrix, abundant strong calcite cement, poor visual porosity, no oil fluorescence.

**CALCAREOUS SANDSTONE:** Off white-very light grey, moderately-well sorted subrounded-rounded becoming rounded-well rounded, very fine-fine dominantly fine, dominant translucent-opaque subrounded-rounded quartz, trace-rare subrounded-well rounded dark green-black glauconite, rare-common fossiliferous material; shells bryozoa, rare-common off white claystone matrix, strong calcite cement, firm-hard, poor-good visual porosity, no oil fluorescence.

**SHELLBEDS:** White-very light grey, poorly sorted, subangular-rounded, very fine-coarse, rare fine quartz, trace dark green glauconite, abundant fossiliferous material; shells bryozoa, common off white claystone matrix, trace calcareous cement, hard, fair visual porosity, no oil fluorescence.

**COALY LAMINAE:** Occasional lignite laminae 1-2mm thick, black, very soft, dispersive, sub-fissile, poor visual porosity, no oil fluorescence.

#### **261-267m**

Sandstone (60%) interbedded with Calcareous Sandstone (20%) grading to Pebbly Sandstone (20%)

**SANDSTONE:** Off white-very light yellow, well sorted, rounded-well rounded, fine, dominant translucent-opaque subrounded-rounded fine quartz with occasional iron staining, trace very fine well rounded black lithics, trace-occasionally common fossiliferous material; mainly shells, occasional annelid burrows, no visible matrix, weak calcareous cement, friable-occasionally firm, excellent visual porosity, no oil fluorescence.

**CALCAREOUS SANDSTONE:** Very light greenish-grey-light grey, well sorted, rounded-well rounded, fine, dominant translucent-opaque rounded-well rounded fine quartz, trace off white lithics, trace fossiliferous material; bryozoa, no visible matrix, weak calcareous cement, moderately firm, excellent visual porosity, dull yellow mineral fluorescence, no oil fluorescence.

**PEBBLY SANDSTONE:** Very light grey-medium grey, poorly sorted, subangular-rounded, fine-pebbles, common translucent-opaque subangular-rounded fine-occasionally coarse quartz, rare subangular-subrounded coarse-very coarse off white-pale green lithics, rare brown subangular coaly fragments, common pyrite, abundant off white claystone matrix, weak calcareous cement, firm, fair visual porosity, no oil fluorescence.

#### **267-269m**

White claystone (70%) overlying Brown Claystone (25%) with Siltstone interval (5%)

#### CLAYSTONE

Off white-very light grey, well sorted, very fine, very soft, non-calcareous, amorphous, very sticky, sub-fissile, no visual porosity, no oil fluorescence.

#### SILTSTONE

Light grey-medium light grey, moderately sorted, very fine-fine, trace translucent-opaque very fine-fine quartz, medium grey-medium brownish grey siltstone matrix, weakly calcareous, poor visual porosity, no oil fluorescence.

#### CLAYSTONE

Very light brown-medium brownish grey, well sorted, very fine, very soft, non-calcareous, amorphous, very sticky, sub-fissile, no visual porosity, no oil fluorescence.

#### **270-276m**

Brown Claystone with interbedded Coal intervals (40%) grading to Grey and white Gravelly Claystone (60%)

BROWN CLAYSTONE with COALY LAMINAE: Very light brown-medium brownish grey, well sorted, very fine, very soft, non-calcareous, occasional interbedded very fine-coarse, very soft, very dispersive lignite, amorphous, very sticky, sub-fissile, no visual porosity, no oil fluorescence, dull yellow lignite cut.

GRAVELY CLAYSTONE-WHITE CLAYSTONE: Off white-medium grey becoming white-very light grey, very poorly sorted becoming well sorted, very fine-pebbly becoming very fine with occasional pebbles, common angular coarse-pebbly basaltic lithics, non-calcareous, very sticky, fissile, no visual porosity, no oil fluorescence.

#### **276-282m (TD)**

Weathered Phyllite (100%)

WEATHERED PHYLLITE: Off white-very light grey with medium bluish grey-medium grey and pale yellow-medium yellowish brown streaks, fine-coarse, common angular coarse quartz, trace angular medium blue-dark blue lithics, soft, fissile, sticky, abundant high angle foliations, slickensides, abundant very fine-fine talc, abundant pyrite mineralisation, no visual porosity, no oil fluorescence.

### **3.8 Hydrocarbon Shows**

No oil fluorescence was observed throughout the well.

No gas was observed during drilling the Pleistocene Sand dunes, Haunted Hills Gravels, Jemmy Point Formation or Gippsland Limestone.

Lakes Entrance Formation: 165-172m Trace-1 unit

Lakes Entrance Formation: 229.6-249m Trace-1 unit

Latrobe Group: 270-271 Trace-1 unit

No gas was observed during drilling the Palaeozoic Phyllite



**TABLE 3**  
**Banjo No.1A - STRATIGRAPHIC TABLE**

AGE	FORMATION	DEPTH GL	ELEVATION	THICKNESS
Quaternary	Pleistocene Sand Dunes	Surface	+ 69.8	60
Late Pliocene	Haunted Hills Gravels	60	+ 9.8	6
Early Pliocene	Jemmy's Point Formation	66	+ 3.8	16
Early-Middle Miocene	Gippsland Limestone	82	- 12.2	51
Late Oligocene-Early Miocene	Lakes Entrance Formation Seacombe Marl Member	133	- 63.2	91
Oligocene	Lakes Entrance Formation Giffard Sst. Member/ Cunningham Greensand Member)	224	- 154.2	43
Eocene	Latrobe Group	267	- 197.2	9
Palaeozoic	Phyllite	276	- 206.2	6+
	Total Depth	282	- 212.2	

- all depths are in metres.

#### 4.0 CONCLUSIONS

The results of the well may be summarized as follows.

- Banjo-1A corehole provided valuable stratigraphic and reservoir information of the Tertiary pinchout along the easternmost edge of the onshore Gippsland Basin
- Banjo-1A corehole intersected the Giffard Sandstone/Cunninghame Greensand containing excellent reservoir potential, however there were no hydrocarbon indications observed.
- Banjo-1A intersected a substantial section of Lakes Entrance Marl capable of providing a good seal
- Banjo-1A intersected a thin Latrobe Group section not present in Patrobus-1 to the east.

#### 5.0 COMPLETION

Banjo 1A was plugged and abandoned.