WELL COMPLETION REPORT
ARCO - WOODSIDE
CARR'S CREEK NO. 1
BY
Frank T. Ingram

476

COMPILATION COPY

CARRS CREEK No 1

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ARCO LIMITED / WOODSIDE (LAKES ENTRANCE) OIL CO. N. L.

CARR'S CREEK NO. 1 WELL

FINAL WELL REPORT

by

Frank T. Ingram
Arco Limited

and

N. Meyers
Consulting Geologist

CARR'S CREEK-1. 2/50

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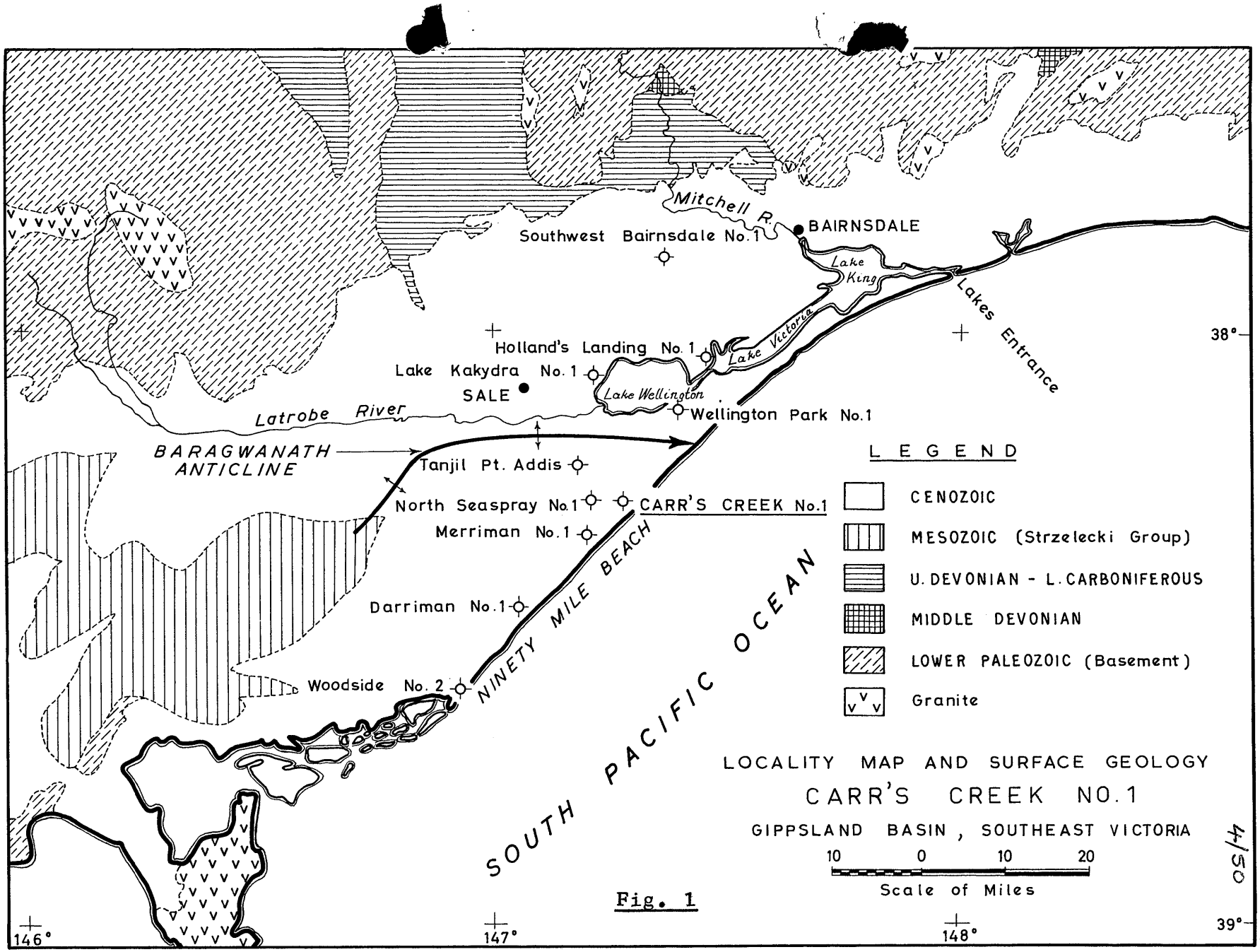
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Fig. 1

CARR'S CREEK-1. 5/50

SUMMARY

The Carr's Creek No. 1 was spudded on March 23, 1963, and completed as a dry hole on April 10, 1963. The well was drilled to a total depth of 5507 feet without finding any significant shows of hydrocarbons. The sandstone that produced petroliferous gas in the North Seaspray No. 1 well was not present in the Carr's Creek No. 1.

The well was located on the North Seaspray structure, but down dip 3.3 miles east of the North Seaspray No. 1 well. The well was "off structure" in the Mesozoic section, and apparently was drilled on the north flank of an asymmetrical anticline developed in Mesozoic sediments.

A conglomerate in the Strzelecki Group composed of fragments of volcanic rock and red-brown shale was encountered in the interval 5271 - 5340 feet. The conglomerate has not been seen in other wells in the Gippsland Basin.

INTRODUCTION

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After the encouraging show of petroliferous gas in the North Seaspray No. 1 well, it was decided to drill two additional wells in the same area. The first of these, Merriman No. 1, was drilled on a structure similar to the North Seaspray No. 1, but entirely separate.

The second well, the Carr's Creek No. 1, was located on the North Seaspray structure, but down dip, 3.3 miles east of the North Seaspray No. 1 well. It was hoped at this location the porosities and permeabilities in the Strzelecki Group sediments would be better than in the North Seaspray No. 1, and that gas or oil would be present in commercial quantities.

The well was scheduled to a depth of 5500 feet in order to test the upper 1000 to 1200 feet of the Strzelecki Group, and the sands of the Latrobe Valley Coal Measures.

The structure was defined by the seismic reflection survey conducted by Austral Geo-Prospectors Pty. Ltd. in early 1962. The structural maps resulting from this survey reflected only the structure in Tertiary sediments as no continuous reflections were obtained from Mesozoic or older sediments.

WELL HISTORY

GENERAL DATA

Well Name and Number	:	Carr's Creek No. 1
Location	:	Latitude 38°17'32" S Longitude 147°15'55" E 7 miles northeast of Seaspray townsite.
Name and Address of Tenement Holder	:	Lakes Oil Ltd. 792 Elizabeth Street, Melbourne, Victoria.
Details of Petroleum Tenement	:	PPL. 160, Victoria
District	:	Gippsland
Total Depth	:	5507' Driller
Date Drilling Commenced	:	March 23, 1963
Date Drilling Completed	:	April 9, 1963

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Date Well Abandoned	:	April 10, 1963
Date Rig Released	:	April 10, 1963
Drilling Time in Days to Total Depth	:	17 days
Elevation :		
Ground	:	78 feet
Kelly Bushing	:	89 "
Status	:	Dry, plugged and abandoned
Cost	:	£43,007

DRILLING DATA

Name and Address of Drilling Contractor	:	Reading and Bates (Australia) Pty. Ltd. 2 City Road Melbourne, S.C.4. Victoria	
Drilling Plant	:	Make	National
		Type	50
		Rated Capacity	7000 feet with 4-1/2 inch drill pipe
		Rated capacity	10,000 feet with 3-1/2 inch drill pipe
		Motors	(2) General Motors 6-71 twin model diesel, 504 BHP each
Mast	:	Make	Lee C. Moore
		Type	131 feet Cantilever
		Rated capacity	550,000 pounds
Pumps	:	Make	National
		Type	1 - C250
			1 - C150-B
		Size	7-1/4" x 12"
		Pump Motors	Make General Motors
			Type 6-71 twin diesel
			BHP 312
Blowout Preventer Equipment	:	Make	Cameron (2)
		Size	12"
		Series	900
		Make	Hydril
		Size	12"
		Series	900
Hole Sizes and Depths	:	24"	0' - 30'
	:	17-1/2"	30' - 526'
		8-3/4"	526' - 5507'

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Casing Details	:	Size	18-5/8"
		Weight	78 lbs/ft
		Range	2
		Setting depth	30'
		Size	13-5/8"
		Weight	48 lbs/ft
		Grade	H-40 and J-55
		Range	2
		Setting depth	520'
Casing Cementing Details	:	Size	18-5/8"
	:	Setting depth	30'
		Quantity cement used	35 sacks
		Cemented to	Surface
		Method used	Poured by hand
		Size	13-3/8"
		Setting depth	520'
		Quantity cement used	380 sacks
		Cemented to	Surface
		Method used	Plug
Drilling Fluid	:	Type	Water base, bentonite, low pH
		Average weight	30' - 526' 8.5 lbs/gal
			526'- 1000' 9.0 "
			1000'-2000' 9.5 "
			2000'-3000' 9.6 "
			3000'-4000' 9.6 "
			4000'-5000' 10.0 "
			5000'-5507' 10.1 "

The spud mud used to drill the surface hole was a low weight, low viscosity fresh water, bentonite mud. After drilling out below the surface casing at 520 feet the viscosity was gradually built up to about 50 sec/qt., and the water loss was decreased to about 6 cc/30 min. The viscosity and water loss were controlled by the use of bentonite, Lo-Vis and C.M.C. (Tylose B77). The small amount of contamination by calcium ions was controlled by additions of bicarbonate of soda, soda ash and calgon. The pH of the mud system was maintained by the use of caustic soda.

No lost circulation problems or other unusual conditions affecting the drilling fluid, were encountered.

The average weekly analysis of the drilling mud is listed below : 9/50

Week ending	Viscosity sec/qt.	Weight lbs/gal.	W.L. cc/30 min.	F.C.	pH
30/5/63	52	9.4	5.7	2/32"	9.5
6/4/63	63	10.1	6.7	2/32"	9.0
9/4/63	62	10.1	7.2	2/32"	9.0

The following mud and chemicals were used during the drilling operation :

Bentonite	..	22,200 lbs.
Lo-Vis	..	10,450 "
CMC	..	5,390 "
Bicarbonate of Soda	..	175 "
Soda Ash	..	100 "
Calgon	..	50 "
Lime	..	100 "
Caustic	..	2,470 "

Water Supply :

A water bore was drilled to 113 feet with a percussion type water boring rig. A string of 6" casing was driven to 96 feet and 12 feet of screen was set below the casing. A Pomona pump assembly was installed in the bore and set at approximately 90 feet.

The capacity of the bore was in excess of 600 barrels (25,200 gal.) per day.

Perforations and Shooting Record :

No perforations or shooting operations were performed.

Plugging Back :

The only plugs set were for the purpose of abandonment. The first plug was set at 4400 - 4500 feet with 45 sacks of cement, the second at 3210-3310 feet with 45 sacks of cement, and the third at 470 to 570 feet with 65 sacks of cement. A surface plug was set in the 13-3/8" casing from the surface to 25 feet with 20 sacks of cement.

A 1/4" steel plate was welded over the 13-3/8" casing, and a 2" stand pipe projecting 3 feet above ground was welded to the side of the casing.

Fishing Operations :

No fishing operations were performed.

Side-Tracked Hole :

The hole was not side-tracked.

LOGGING AND TESTING

Ditch Cuttings :

Cuttings were collected after passing over the shale shaker, then washed and placed in marked bags. The cuttings were collected each 10 feet while drilling, and each 5 feet while coring.

Coring :

A total of 5 cores were planned, 3 in the Tertiary and 2 in the Mesozoic. This program was adhered to as closely as possible, and 3 cores were taken in the Tertiary, but because of lithological considerations 5 cores were cut in the Mesozoic. Core Number 8 was a continuation of core number 7, and was taken after there was no recovery from core number 7.

A Hughes type "J" barrel with Hughes hard or soft formation core heads was used for all cores. The total footage cored was 110 feet. The total recovery was 72.5 feet, or 66%.

A brief resumé of the coring is presented in the following table :

Core No.	Interval	Length	Recovery
1	3250' - 3270'	20'	10'
2	3308' - 3328'	20'	16'
3	3480' - 3500'	20'	0.5'
4	4522' - 4532'	10'	10'
5	5327' - 5330'	3'	2'
6	5360' - 5380'	20'	20'
7	5490' - 5500'	10'	10'
8	5500' - 5507'	7'	14' *

* Recovered 10' of core No. 7 and 4' of core No. 8

See Appendix 4 for the detailed descriptions of the cores.

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Side-Wall Sampling :

A total of 21 side-wall cores were attempted and 18 were recovered. Recovery of individual cores was fair to good.

A Schlumberger 30 shot side-wall coring gun was used for all side-wall coring.

See Appendix 4 for description of side-wall cores.

Electrical and Other Logging :

The well was logged from 520 feet to a depth of 5482 feet by a Schlumberger truck-mounted logging unit. The electrical log, microlog and sonic log were run over the above interval. In addition the continuous dipmeter was run from 1000 to 5291 feet.

A Core Laboratories Inc. mud logging unit was in operation while drilling from 30 feet to total depth.

Geologists Frank T. Ingram (Arco), N. Meyers (consulting geologist) and J. Blummer (Core Lab) were in charge of logging the well and operating the mud logging unit.

See Appendix 1 for details of logging.

Formation Testing :

Only one open hole formation test was made, and this was in the Latrobe Valley Coal Measures. A Halliburton testing

tool with a duel closed-in pressure valve was used for this test.

Below is a brief description of this test :

DST. No. 1, 3400-3500 feet, recovered 450 feet of drilling mud and 2780 feet of fresh water. Also 130 feet of fine sand was recovered above the tool. At the end of the test it was necessary to work the jars on the testing assembly for 3 hours in order to free the packer.

See Appendix 2 for the complete details of this formation test.

Drilling Time and Gas Log :

A geolograph drilling rate recorder was located on the rig floor, and two drilling rate recorders were located in the Core Lab mud logging unit. A close check of the drilling rate recorders with the pipe tally minimized the possibility of errors in depth while drilling.

The gas content of the drilling fluid was logged continuously from 30 feet to total depth. The gas curve shown on the composite log is the result of this logging.

Deviation Surveys :

The degree of deviation of the hole from vertical was determined by dropping a "Totco" device down the drill pipe before starting out of the hole, or by running the instrument on a wire line inside the drill pipe. Surveys were made at intervals of 500 feet or less, depending on the frequency of trips.

The deviation increased from 1/4° at 220 feet to 2° at 3480 feet. From 3480 to about 4500 feet the deviation varied from 1-1/4° to 1-3/4°. From 4500 to 5271 feet the deviation increased to 6°, and from there to total depth varied from 6° to 6-1/4°.

No crooked hole problems were encountered.

Temperature Surveys : CARR'S CREEK 13/50

No temperature surveys were made, but the bottom hole temperatures were recorded by Schlumberger during the two logging runs. The temperatures recorded were 118° at 4521 feet and 122° at 5482 feet. This corresponds to a temperature gradient of about .8° per 100 feet.

Other Well Surveys :

No surveys other than those listed above were conducted.

GEOLOGY

SUMMARY OF PREVIOUS WORK

Geological and Drilling :

Before the drilling of the Carr's Creek No. 1 well logs, cores and cuttings of wells were studied in order to anticipate the lithology and thickness of the sediments in the Seaspray area. The most significant of these were the North Seaspray No. 1, Wellington Park No. 1, Darriman No. 1, Tanjil Point Addis No. 1, Holland's Landing bore and Lake Kakydra bore. The Merriman No. 1 was drilled immediately before the Carr's Creek No. 1, and yielded additional useful information.

The deepest well (12,011 feet) in the area, the Arco - Woodside Wellington Park No. 1, penetrated a total of 8,226 feet of the Strzelecki Group, without reaching the base of the unit. This well, completed early in 1962, holds the record as the deepest well in the State of Victoria.

No field geological work was done in the Seaspray area and the surface is covered with late Pliocene and Quaternary sand, gravel and clay which do not sufficiently reflect the sub-surface structural conditions to warrant surface mapping.

Various reports on the geology of the Tertiary sediments and the Strzelecki Group, as exposed in the Carrajung uplift, were used to better understand the regional geology of the Gippsland Basin.

Because of the numerous wells and reliability of seismic reflections in the Tertiary section, the structural and stratigraphic conditions of the Tertiary sequence in the basin

can usually be predicted with a fair to good degree of accuracy.

Geophysical :

In 1962 a seismic reflection survey consisting of 191 miles of traverse was made from the Lake Wellington area south-west to the Woodside No. 2 well. This survey was conducted by Austral Geo Prospectors Pty. Ltd. and tied into a previous survey by the same company in the Lake Wellington area.

During this survey the North Seaspray structure was located, and several lines were shot across the structure to definitely establish closure along this east-west trending anticline.

Seismic methods yield reliable results in the Tertiary section; but, because of the lack of good reflecting horizons in the thick homogenous Strzelecki Group, the pre-Tertiary structural framework is still not known. The only source of positive information in this section is from well logs and outcrops.

See appendix 1 for velocity survey of the Carr's Creek No. 1.

MARY OF THE REGIONAL GEOLOGY

The Gippsland Basin is one of several small basins along the south coast of Australia. The basin is defined and delineated by the presence of Tertiary coal measures and marine sediments. The basin proper can be considered as that area west of the Lakes Entrance granite high, south of the Tertiary - Paleozoic contact on the north side of the basin and east of a line between the Wilson's Promontory granite and the town of Warragul. The position of the south boundary of the basin is not known as it lies in the area of Bass Strait.

The Paleozoic subsurface is probably very much like the area of Paleozoic outcrops on the north side of the basin. Ordovician and Silurian sediments, altered by dynamic metamorphism and intruded by granite, probably underlie Mesozoic strata over most of the basin. Preserved, highly folded marine strata of Middle Devonian age occur as erosional remnants, or down-faulted blocks, north of the eastern half of the basin. Isolated occurrences of Middle Devonian rocks could be expected in the

subsurface in the eastern half of the basin. Overlying these altered and highly folded older Paleozoic rocks on the northern side of the basin is a thick continental sequence of red shales, sandstones, conglomerates and volcanics of Upper Devonian - Lower Carboniferous age. These beds are slightly to moderately folded and probably extend south at least as far as the Lake Wellington area.

No Permian sediments are known in the subsurface of the basin. However, conglomerate, exposed along a major fault on the south side of the Carrajung uplift, is thought to be glacial tillite of Permian age.

The major structural trend in the Tasman geosyncline is north-south, and as the Paleozoic rocks in the subsurface of the Gippsland Basin are an extension of this geosyncline, then the same trend is thought to persist.

No sediments of Triassic age are known in the Gippsland Basin.

The Upper Jurassic and Lower Cretaceous times are represented by the Strzelecki Group, a thick sequence of non-marine sediments deposited in an east-west trending trough, or graben. The thickness of this sequence is not known, but the Wellington Park No. 1 well penetrated 8,226 feet with no indication of reaching the base. Estimates of the thickness in the outcrop area of the Strzelecki Ranges varies from 10,000 to 20,000 feet.

In the Merriman No. 1, the section from 4695 to 5512 feet, although of Lower Cretaceous age, is not represented in other wells in the Gippsland Basin. Whether this section represents a facies within the Strzelecki Group or overlies the Strzelecki Group is not known. This section was not found in Carr's Creek No. 1.

The grain size of the graywackes and subgraywackes in the Strzelecki Group increase towards the south indicating that the source area for these sediments was south of the present coast line.

During Eocene time, when the Latrobe Valley Coal Measures was deposited, the Gippsland Basin acquired, in general,

its present size and shape. In the Latrobe Valley and coastal area, between Lake Wellington and Welshpool, swampy conditions resulted in very thick accumulations of brown coal. Towards the east coal becomes a minor constituent and clastic material predominates within the coal measures. In the Carr's Creek No. 1 well brown coal accounts for approximately 25% of the total thickness of the coal measures.

In Oligocene time the first widespread marine invasion occurred in the Gippsland Basin resulting in the deposition of the Lakes Entrance Formation.

In Miocene time, as the sea gradually encroached over the basin, limestone and marl was deposited over a large area. This sequence of sediments consists of several members, but usually is referred to as the Gippsland Limestone.

A marine environment continued into Pliocene time but then gradual retreat of the sea ended marine deposition in the Gippsland area of the Gippsland basin. From Upper Pliocene to recent time non-marine conditions prevailed, and a cover of sand, gravel and clay was deposited over most of the basin.

STRATIGRAPHIC TABLE

The following is the stratigraphic table of the sediments penetrated in the Carr's Creek No. 1 :

CARR'S CREEK 17/50

TABLE I

Age		Name	Depth (ref. KB)	Thickness	Lithology
TERTIARY	M.-U. Pliocene	Lake Wellington Fm. and/or Haunted Hills Gravels	220'	209'	Sand, Gravel and Clay.
	L. Pliocene	Jemmy's Point Formation	400'	180'	Sand, Shells and Marl
	U. Miocene	Tambo River Formation	530'	130'	Marl, silty
	Miocene	Gippsland Limestone	2000'	1470'	Marl and Limestone
	Oligocene	Lakes Entrance Formation	2265'	265'	Calcareous Shale, Marl, and minor Limestone
	L. Oligocene to U. Eocene	Latrobe Valley Coal Measures	4462'	2197'	Sand, Coal and Clay
					Unconformity
MESOZOIC	Lower Cretaceous	Strzelecki Group	5507'	1045'	Graywacke, Subgraywacke, Shale, Siltstone, Sandstone and minor conglomerate, non-marine

STRATIGRAPHY

0 - 220 feet

Lake Wellington and/or Haunted Hills Gravels

Middle and Upper Pliocene and possibly Pleistocene

Sand, white to yellow, medium to coarse grained, with some very coarse grains, mostly quartz with occasional gray, red and black rock fragments, angular to subrounded, abundant limonite, in part clayey, traces of soft lignite.

220 - 400 feet

Jemmy's Point Formation

Lower Pliocene

Sand, light gray to yellow-green, very fine to very coarse

grained, mostly quartz with traces of red, black and green rock fragments, angular to subangular, very abundant shell fragments. Grading into Marl, below 358 feet, gray, soft to friable, silty, fossiliferous, glauconitic.

The Lake Wellington Formation is younger in age than the Haunted Hills Gravels, but both are non-marine and very similar in lithology. Because of these similarities the two units are impossible to distinguish from one another in cuttings.

Further south, in the Merriman No. 1, these non-marine sediments appear to thin at the expense of underlying shelly sands of the Jemmy's Point Formation. Thus, the lower part of the non-marine sediments, the Lake Wellington Formation, is probably the on-shore facies of the upper part of the Jemmy's Point Formation. In general, it appears that the lithologic rock units of Upper Miocene - Pliocene age become younger toward the south, and were deposited during a slow regression of the sea from the basin.

400 - 530 feet

Tambo River Formation

Upper Miocene

Marl, medium gray, soft to firm and friable, silty, and sandy, fossiliferous, traces of glauconite.

This lithologic unit appears to have been deposited in moderate depth waters (deeper than for Jemmy's Point Formation) in the Seaspray area. To the north, however, sediments of the same age were deposited in a progressively shallow water environment. Thus, in the Southwest Bairnsdale No. 1 well, 34 miles north of the Carr's Creek No. 1, sediments of the same age consist of near shore shelly sands.

The top of the Tambo River Formation could not be detected by lithology alone, but there is a faunal break at 400 feet and the top of the formation has been placed at this depth.

530 - 2000 feet

Gippsland Limestone

Miocene

Marl, light to medium gray and gray green, very fine to fine grained, soft to friable, fossiliferous, glauconitic;

Limestone, white to light brown, and light gray, fine

grained, fragmental, friable, often porous, slightly glauconitic; and minor Siltstone, gray-green, calcareous, argillaceous, fossiliferous, glauconitic, firm.

The limestone is confined mostly to the upper 500 feet, and grades downward into marl, which in turn grades downward into calcareous shale of the Lakes Entrance Formation.

The Gippsland Limestone is composed of three substages which are, from top to bottom, the Bairnsdale, Bateeford and Longford. But, since these substages cannot be recognized lithologically, and their boundaries can only be determined by microfossils in cuttings which are usually badly contaminated, the substage nomenclature has not been placed on the composite log.

2000 - 2265 feet

Lakes Entrance Formation

Oligocene

Shale, green-gray and green, soft and sticky, calcareous, silty, occasional floating sand grains, slightly to moderately glauconitic becoming very glauconitic at base, abundant fossils. Interbedded in bottom 30 feet with Sand, medium gray-green, fine to medium grained, very glauconitic, slightly argillaceous, poorly consolidated, slightly calcareous, and minor Dolomite, brown, finely crystalline, glauconitic.

In the Wellington Park No. 1, North Seaspray No. 1 and Merriman No. 1 wells calcareous shales of the Lakes Entrance Formation directly overlie sand or coal of the Latrobe Valley Coal Measures. In the Carr's Creek No. 1, however, glauconitic sand occurs at the base of the Lakes Entrance Formation, and appears to grade downward into ligneous sand in the top of the coal measures.

The top of the Lakes Entrance Formation is gradational into the Gippsland Limestone and the contact cannot be recognized on lithology alone.

2265 - 4462 feet

Latrobe Valley Coal Measures

Lower Oligocene to Upper Eocene

Sand, white, light to dark brown and light to medium gray, fine to coarse grained, often pebbly, quartzose, angular

to sub-angular, clean to moderately argillaceous and often very ligneous, poor to excellent porosity, poorly consolidated above 3815 feet, dolomitic and often hard below 3815 feet; Coal, brown to black, soft to brittle, often earthy, argillaceous and silty; Clay - Claystone, white-brown, soft, often ligneous and silty; Dolomite (2775 - 2783 feet and 3146 - 3155 feet), white to brown, very fine to finely crystalline and occasionally medium crystalline, argillaceous and ligneous, upper bed glauconitic, tight, hard.

The two dolomite beds may be correlated with the two dolomite beds in the Wellington Park No. 1 well. In the North Seaspray No. 1 and the Merriman No. 1 the upper dolomite bed is not present.

The major coal seam at 3200-3280 feet appears to correlate with the coal seam at 3479 - 3550 feet in the Merriman No. 1, at 2708 - 2780 feet in the North Seaspray No. 1 and at 3268 - 3370 feet in the Wellington Park No. 1.

In general the coal measures thicken rapidly in a south-westerly direction. The thickness increases from 763 feet in the Holland's Landing bore to 2387 feet in the Merriman No. 1 well.

There are also pronounced local variations in thickness. From 1701 feet in the North Seaspray No. 1, the thickness increases to 2197 feet in the Carr's Creek No. 1, a distance of only 3.3 miles. The thickening takes place throughout the coal measures, and probably by the addition of completely new section at the base. Individual beds, except for those mentioned above, are very hard to correlate between wells because of the irregular and discontinuous nature of the bedding.

Fresh water (less than 500 ppm NaCl) is present throughout the coal measure sequence in the Carr's Creek No. 1, and in all other wells thus far drilled in the Gippsland Basin. This signifies that the sands are all interconnected and subject to the flushing action of meteoric waters entering the coal measures in the area of outcrop.

The dolomitic cement in the sands below 3815 feet may indicate a nearness to a marine environment during deposition. However, no marine fossils were found in the sands.

The percentage of coal in the complete coal measures sequence amounts to about 25% in the Carr's Creek No. 1. This compares to about 21% in Merriman No. 1, 32% in North Seaspray No. 1, 21% in Wellington Park No. 1 and 9% in the Holland's Landing bore.

4462 - 5507 feet

Strzelecki Group

Lower Cretaceous

Shale, dark to medium gray and gray brown, fissile to blocky, partly silty, carbonaceous, plant fossils common, firm, laminated, and interbedded with Siltstone, light to medium gray, gray-green and gray-brown, argillaceous, carbonaceous; Graywacke and Subgraywacke, light to dark gray-green, fine to coarse grained with occasional pebbles, angular to subangular grains, mostly tight, carbonaceous; thin Coal laminations common. Conglomerate (5371 - 5340 feet), poorly consolidated, pebbles and cobbles up to 3" in diameter of volcanic rock, red and brown shale, gray siltstone, quartz, quartzite and chert, clayey matrix.

This is the typical Strzelecki Group lithology, except for the conglomerate and the increased grain size of the graywacke and subgraywacke.

The presence of shale and volcanic pebbles suggests a nearby source area for the Strzelecki Group sediments. The source area most likely was to the south in the area now covered by Bass Strait. This is suggested by the fact that of the 8,326 feet of Strzelecki Group penetrated in the Wellington Park No. 1 the grain size was confined mostly to the very fine to fine classification. In the Merriman No. 1 (southwest of Carr's Creek No. 1) conglomeratic graywacke and coarse sandstones were encountered in cores of the Strzelecki Group. As the pebbles of red shale could not have been transported long distances, and as the grain size of the sediments apparently decreases northward a source area to the south is postulated.

The petrology of the pebbles indicates that the source area was a red bed-volcanic sequence. The Avon River Group of Upper Devonian - Lower Carboniferous age, or the Snowy River Volcanics of Lower Devonian age could separately or collectively have supplied the vast quantity of clastic material which now composes the

Strzelecki Group. No other red bed-volcanic sequences, other than those previously mentioned are known to exist in the area.

The gas sand found in the Strzelecki Group in the North Seaspray No. 1 was not present in the Carr's Creek No. 1. The absence of this sand could be due to "shaling" or "pinching out", or to pre-Tertiary folding and erosion. Correlation of electric logs and cuttings is very poor within the Strzelecki Group, and it is difficult to determine where within the group the Carr's Creek No. 1 entered these sediments. The unconformity is well established in this well by the sharp change in resistivity and by palynological determinations.

The Lower Cretaceous non-marine section from 4675 to 5512 feet in the Merriman No. 1 was not recognized in the Carr's Creek No. 1.

STRUCTURE

The Carr's Creek No. 1 was drilled 3 miles east of the high developed in an east-west trending anticline. The anticline, about 8 miles long, is developed in Tertiary sediments, and was mapped during a seismic reflection survey in early 1962. A normal, east-west down to the north fault, with displacement on the order of 400 to 500 feet is present on the north side of the anticline.

Near the centre of the structure, seismic reflections indicate 100 feet of closure due solely to folding on top of the Latrobe Valley Coal Measures. Near the base of the major coal seam, however, there is about 375 feet of closure. This lower reflection was originally thought to be from the base of the Tertiary, but now is believed to be from the base of the major coal seam. The closure in the remainder of the structure is fault controlled (Plate 5).

The structure, as expressed in the Tertiary beds, is probably due to several causes - mainly differential sedimentation and compaction of the coal measures, draping of marine beds over an unevenly subsiding basin, followed by faulting, gentle uplift and warping in Pliocene time.

Dips, as indicated by the continuous dipmeter log, show that the dip magnitude in the coal measures decreases from

about 22° at the base, 4462 ft., to about 3° at 2600 feet. The dip at this point suddenly starts to increase, reaching a maximum of 30° at 2200 feet. The dip then decreases to about 3° at 1600 feet and remains at this magnitude to 1000 feet (end of survey).

The sudden increase in dip between 2200 and 2600 feet probably marks the intersection of the bore hole with a fault. No displacement can be detected on the electric logs, and the fault seems to be of minor importance. The moderate dips in the lower part of the coal measures are probably due to draping of sediments over a Mesozoic topographic high, and by differential subsidence during deposition.

The structural framework of the Mesozoic sediments and their relationship with the overlying Tertiary sediments is not well known. No continuous reflections have been obtained by seismic surveys from the Mesozoic section, so that the only structural information available in the section is from wells.

In the Strzelecki Group the average dip direction is N3°W and the average dip magnitude increases from 22° at 4500 feet to 35° at 5150 feet. The direction of dip is very similar to that of the North Seaspray No. 1, but instead of increasing, the dip magnitude in the North Seaspray No. 1 decreases with depth. Apparently the two wells are on the north flank of an east-west trending asymmetrical anticline. If this assumption is correct, and the north flank of the anticline has the steeper dips, then the Carr's Creek No. 1 is located nearer the structural axis than the North Seaspray No. 1.

The dips can also be explained by faulting. If an east-west fault were to pass between the two wells, and pronounced drag folding was produced on both sides of the fault, then one well would have dips increasing in magnitude downward, while the other would have dips decreasing in magnitude downward.

Until additional well information is obtained, or until some seismic method is discovered whereby pre-Tertiary information can be obtained, the structural framework of the Mesozoic section in the sub surface can only be assumed.

RELEVANCE TO OCCURRENCE OF PETROLEUM

It was hoped that Mesozoic sandstones or graywackes, with better developed porosity and permeability than in the North Seaspray No. 1 well, would be present in Carr's Creek No. 1, and that they would contain commercial quantities of petroliferous gas or oil. However, the sandstone that yielded the small flow of petroliferous gas in the North Seaspray No. 1 was absent in the Carr's Creek No. 1. No significant shows of hydrocarbons were encountered in the well.

As in the Merriman No. 1, a gas show was recorded from the limestones in the top of the Gippsland Limestone immediately after drilling out below the surface casing. Because of the low formation pressure at this shallow depth and the lack of any staining the show was considered insignificant.

Fluorescence was seen in the two dolomite beds in the Latrobe Valley Coal Measures. These dolomites are very thin and tight. They are also ligneous, and it seems possible that the

fluorescent substance was derived in situ from carbonaceous material.

The sands of the Latrobe Valley Coal Measures are completely flushed with fresh water.

The sandstone at 4554-4600 feet in the Strzelecki Group contains fresh water. This indicates that the porous bed comes into contact with the Latrobe Valley Coal Measures at the unconformity, at which point fresh water enters the sandstone. Formation waters in the remainder of the Strzelecki Group are brackish and contain between 6000 and 10,500 ppm NaCl, as calculated from the electrical log.

POROSITY AND PERMEABILITY OF SEDIMENTS PENETRATED

Sands, clean and porous for the most part are present from the surface to 358 feet. A water bore, drilled at the well site to a depth of 113 feet, produced water at the rate of approximately 600 barrels per day. A bore drilled to 358 feet would probably produce several times this amount of water.

The limestones in the top of the Gippsland Limestone from 530 feet to 900 feet are friable and porous. Visual porosities of the limestone are in the 15-25% range. The pore spaces appear to be interconnected and the permeabilities are probably good.

Sands in the Latrobe Valley Coal Measures are very porous and permeable from 2265 to 3815 feet. A formation test in the interval 3400-3500 feet produced 2780 feet of fresh water and 450 feet of drilling mud. The initial flowing pressure was 870 psi indicating good permeability.

From 3815 to 4462 feet the porosity and permeability of the sands are reduced because of dolomitic cement. Porosity is irregular in this interval and varies from 8 to 31%.

The porosities and permeability in the Strzelecki Group are, in general, poor. The best porosity is developed in the subgraywacke at 4558-4600 feet. Porosities in this zone have been calculated at 20-32%.

The next best porosity is in the subgraywacke at 4994-5028 feet. Porosities in this zone range from 12% to 28%.

CARR'S CREEK 26/5C

The lowest porous zone of any significance occurs at 5240 - 5252 feet where the porosity ranges from 18% to 28%.

No formation tests were made in the Strzelecki Group. and porosity and permeability measurements on cores from this section have not been received as yet. Therefore little can be said about the permeability of these porous beds. Except for the zone at 4558 - 4600 feet, the permeabilities from a visual examination, appear to be poor to fair. The zone at 4558 - 4600 feet probably has fair to good permeability.

In Table 3 below are porosity values as determined from the microlog and sonic log.

TABLE 2

DEPTH	POROSITY Microlog	POROSITY Sonic log	Side-wall cores	PERMEABILITY
2256'	30%	28%	None	Data not
2270'	33%	31%	analyzed	received
2355-2400'	28-30%	35-40%		
2642-2720'	20-36%	32-37%		
3463-3515'	18-26%	15-32%		
3856-3990'	8-22%	13-31%		
4418-4435'	7-19%	8-26%		
4558-4600'	28-32%	20-28%		
4994-5028'	25-27%	12-28%		
5240-5252'	18-26%	18-28%		

IBUTION TO GEOLOGICAL CONCEPTS RESULTING FROM DRILLING

1. The sandstone that produced petroliferous gas in the North Seaspray was not present in the Carr's Creek No. 1.
2. The Lower Cretaceous section from 4675 - 5512 feet in the Merriman No. 1 was not recognized in the Carr's Creek No. 1.
3. The conglomerate at 5271 - 5340 feet in the Carr's Creek No. 1 has not been seen in any other well in the Gippsland Basin. The petrology and grain size of the conglomerate suggests that the clastic material in the Strzelecki Group was derived from a land mass in the area of Bass Strait.

4. The average dip direction in the Strzelecki Group was N3°W. The average dip magnitude was about 22° at 4500 feet, and increased gradually to about 35° at 5150 feet. It is believed that the Carr's Creek No. 1 was drilled on the north flank of an asymmetrical anticline developed in Mesozoic sediments.

5. The Latrobe Valley Coal Measures thicken from 1701 feet in the North Seaspray No. 1 to 2197 feet in Carr's Creek No. 1. This is believed to be due to topographic irregularities at the beginning of the Tertiary deposition, and to differential subsidence during deposition.

6. No significant divergence in dip direction or magnitude was present at the Tertiary-Mesozoic unconformity. This is in contrast to the moderate angular unconformity present in the North Seaspray No. 1 and Merriman No. 1 wells.

Dips in the lower part of the Tertiary sequence decrease from about 22° at the unconformity to 3° at 2600 feet. This is possibly due to deposition over the north slope of a topographic high developed in Mesozoic sediments. Additional dip is probably the result of differential compaction within the coal measures.

REFERENCES

DUDLEY, Paul H. 1959 Oil Possibilities of the petroleum prospecting licence 212, in the South Gippsland Highlands, unpublished report for Victorian Oil N. L.

INGRAM, Frank T. 1962 Wellington Park No. 1 well, final well report, unpublished report for Arco Limited and Woodside (Lakes Entrance) Oil Co. N. L.

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INGRAM, Frank T. 1963 North Seaspray No. 1 well, final well report, unpublished report for Arco Limited and Woodside (Lakes Entrance) Oil Co. N. L.

INGRAM, Frank T. 1963 Southwest Bairnsdale No. 1, final well report, unpublished report for Arco Limited and Woodside (Lakes Entrance) Oil Co. N. L.

INGRAM, Frank T. 1963 Merriman No. 1 well, final well report, unpublished report for Arco Limited and Woodside (Lakes Entrance) Oil Co. N. L.

CARR'S CREEK 29/50

APPENDIX 1

LIST AND INTERPRETATION OF ELECTRICAL AND OTHER LOGS

	Run No. 1	Interval
Electrical log	1	520' - 4521'
	2	4200' - 5482'
Microlog - Microcaliper	1	520' - 4521'
	2	4400' - 5482'
Sonic log	1	520' - 5479'
Continuous Dipmeter	1	1000' - 5291'

For the most part the logs are self-explanatory. The SP curve on the electrical log is reversed through the Latrobe Valley Coal Measures, and in the porous zone at 4554 - 4600 feet, because of fresh formation waters.

Dolomitic cement in the sandstones between 3815 feet and 4462 feet has resulted in the higher than usual velocities shown on the sonic log.

A skid-mounted mud logging unit, supplied by Core Laboratories Inc. was in operation from 30 feet to total depth. This unit was equipped with a hot wire gas detector, drilling rate recorder, pit level indicator, ultra-violet light and accessory equipment used by the geologists while logging the well.

The gas curve on the composite log indicates total gas in the drilling mud, and is the result of the logging by the hot wire gas detector.

Electric logs were run after core number 7, 5490-5500 feet (no recovery), had been cut. The total depth marked by the electrical sonde was 5483 feet. After running logs core number 8, 5500-5507 feet, was cut, and when this core was pulled the full 10 feet of core number 7 were recovered along with 4 feet of core number 8. This explains the discrepancy between the drillers total depth - 5507 feet, and Schlumberger's depth of 5483 feet.

CarrCk.DO
Carrs Creek 1

Completed 10 April 1963
Loc 38 17 32 S
147 15 55 E
Total Depth 1678.5

Casing & Plugs

Casing 13 5/8"	0-158.5
Plugs	0-7.6
	143.2-173.7
	673.6-704.1
	1341.1-1371.5

Stratigraphy

Haunted Hills?	0
Jemmys Point	67.1
Tambo River	121.9
Gippsland Limestone	161.5
Lakes Entrance	609.6
Latrobe Group	690.3
Strzelecki Group	1360.0

Remarks

The short length of casing in the hole precludes the possibility of reentering this hole.
The prospective sand occurs betweeen 690m and 882.9.Beneath this is a shale and coal sequence to 1001.2m below which is another sand/coal sequence to 1160m.Beneath 1160m the Latrobe Group becomes more shaly and lithified with tighter dolomitized intervals.
Therefore it will be necessary to drill to about 950m to locate a satisfactory sand for the screeens.

CARR'S CREEK 30/50

APPENDIX I

VELOCITY SURVEY

of the

ARCO LIMITED - WOODSIDE (LAKES ENTRANCE) OIL CO. N.L.

CARR'S CREEK NO. 1

by

VICTOR BYCHOK

A Schlumberger Sonic log was run in the Arco-Woodside Carr's Creek No. 1 on 8th April, 1963, to a depth of 5479 feet. Surface pipe was set to a depth of 520 ft; therefore, the interval measured was from 520 ft. to 5479 ft. Total elapsed logging time was 3½ hours.

As surface casing had been set to 520 ft. prior to this survey, the sub-surface velocities for the interval from the surface to -441 (530*) was based on actual measured velocities from the Arco - Woodside - Wellington Park No. 1 located approximately 12 miles to the east. An asterisk is used to denote data obtained from the Arco - Woodside - Wellington Park No. 1.

LOCATION OF WELL

Latitude	38° 17' 32" S
Longitude	147° 15' 55" E
Total depth surveyed	5479 ft.
Casing Record	13-3/8" to 520 ft. (-431)

CARR'S CREEK 31/50

VELOCITY DATA

Dgd	Tgd	V_{AV}	Δ Dgd	Δ Tgd	V_i
			441*	0.078*	5654*
441	0.078*	5654*			
			570	0.076	7500
1011	0.154	6565			
			500	0.060	8333
1511	0.214	7061			
			670	0.090	7444
2181	0.304	7174			
			530	0.073	7247
2711	0.377	7191			
			480	0.069	7000
3191	0.446	7155			
			409	0.048	8521
3600	0.494	7287			
			361	0.035	13143
3961	0.529	7488			
			412	0.036	11444
4373	0.565	7738			
			538	0.054	9963
4911	0.619	7934			
			486	0.045	10800
5397	0.664	8128			

EXPLANATION OF ABBREVIATIONS

Dgd = measured depth of sonde from datum elevation

Tgd = measured vertical time from datum elevation

Δ Dgd = difference in depth between interval depths

Δ Tgd = difference in vertical time between interval times

V_{AV} = Average velocity = ft/sec = $\frac{Dgd}{Tgd}$

V_i = Interval velocity = ft/sec = $\frac{\Delta Dgd}{\Delta Tgd}$

CARR'S CREEK 32/50

Datum Plane = Sea level

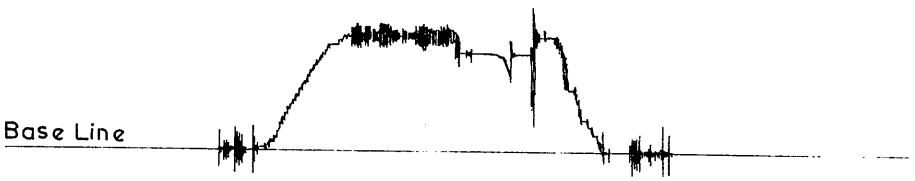
Victor Bychok
VICTOR BYCHOK

CARR'S CREEK 33/50

APPENDIX 2

FORMATION TESTING DETAILS

CARR'S CREEK №1



Top Pressure Recorder

DRILL STEM TEST №1, 3400' - 3500', 5/8" b.c., no water cushion, recovered 450' of drilling mud, 2780' of formation water (300 - 400 ppm Na Cl), also recovered 130' of fine sand above tool, unable to get closed-in pressure because tool plugged with sand, worked jars on test tool for 3 hours before freeing packer. Ps = 1500 psi, Rw = 16.0 at 75°F (measured by Schlumberger)

		IHP	1728 psi
IF	5 min.	IFP	870 psi
ISI	30 min.	ISIP	1500 psi
IF	1 hr.	IFP	1160 psi
FSI	none	FFP	1500 psi
		FHP	1728 psi

CARR'S CREEK 3450

	1st Min.	2nd Min.
Flow Time	5	60
Closed In Press. Time	30	Nil

Pressure Readings	Field	Office Corrected
Depth Top Gauge	3390 Ft.	No Blanked Off
BT. P.R.D. No.		24 Hour Clock
Initial Hydro Mud Pressure	1728	
Initial Closed in Pres.	1500	
Initial Flow Pres.	870 (1) / 1160 (2)	
Final Flow Pres.	1500 (1) / (2)	
Final Closed in Pres.	1728	
Final Hydro Mud Pressure		
Depth Cen. Gauge	Ft.	Blanked Off
BT. P.R.D. No.		Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres.	(1) / (2)	
Final Flow Pres.	(1) / (2)	
Final Closed in Pres.		
Final Hydro Mud Pres.		
Depth Bot. Gauge	3500 Ft.	Yes Blanked Off
BT. P.R.D. No.		24 Hour Clock
Initial Hydro Mud Pres.		
Initial Closed in Pres.		
Initial Flow Pres.	(1) / (2)	
Final Flow Pres.	(1) / (2)	
Final Closed in Pres.		
Final Hydro Mud Pres.		

Date March 28, 1963 — Ticket Number T 344005

Kind of Job Open Hole Test — Halliburton District Australia

Tester B. Martin — Witness

Drilling Contractor Reading and Bates

Elevation 89' K.B. — Top Packer

Total Depth 3500 — Bottom Packer 3400

Interval Tested 3400 - 3500 — Formation Tested

Casing or Hole Size $8\frac{3}{4}$ — Casing Perfs. Top / Bot.

Surface Choke 1" — Bottom Choke $\frac{5}{8}$

Size & Kind Drill Pipe $4\frac{1}{2}$ I.F. — Drill Collars Above Tester (I.D. - LENGTH)

Mud Weight 9.6 lbs/gal. — Mud Viscosity 50 sec/qt.

Temperature 110 °F Est. / °F Actual — Anchor Size & Length ID / OD x 100'

Depths Mea. From K.B. — Depth of Tester Valve 3388 Ft.

Cushion TYPE Nil AMOUNT Ft. — Depth Back Pres. Valve Ft.

Mea. From Tester Valve:

Recovered 450 Feet of Mud

Recovered 2780 Feet of Water 300-400 ppm NaCl.

Recovered 130 Feet of Sand above tool

Recovered Feet of

Oil A.P.I. Gravity — Water Spec. Gravity

Gas Gravity — Surface Pressure psi

Tool Opened A.M. P.M. — Tool Closed A.M. P.M.

Remarks Unable to take closed in pressure - tool plugged with sand Jarred 3 hrs. getting packer loose.

Legal Location Sec. - Twp. - Rng.: Carrs Creek

Lease Name: No. 1

Well No.: No. 1

Test No.: Field Area Wildcat

Lease Owner/Company Name: Anco

County: Seaspray

State: Victoria

Owner's District

FORM 1294-R2--SANDEFER

FORMATION TEST DATA

CARR'S CREEK 35/50

APPENDIX 3

REPORT ON TERTIARY STRATIGRAPHY IN CARR'S CREEK NO. 1 WELL

by D. J. Taylor

Cores 1 to 5, side wall cores and rotary cuttings (to 4000 feet) have been examined from Arco - Woodside's Carr's Creek No. 1 Well.

The stratigraphy, partially based on foraminiferal content is outlined in drilled order. All stratigraphic names applied are those used by Carter (1963).

50 - 220 feet :

Brown gravels in a clayey matrix are present to 110 feet. From 110 to 190 feet consists of coarse sand and a little gravel. From 190 to 230 feet mica and dark brown coal fragments are present with gravels. This entire gravel and sand interval is unfossiliferous. This interval probably represents the Haunted Hills Gravels.

220 - 400 feet :

The gravelly marls in this interval contain abundant shell fragments and shallow water foraminiferal fauna. Foraminifera present include Elphidium imperatrix, E. pseudonodosum, Guttulina regina, Nonion victoriensis, and Triloculina tricultrata. This is a typical Kalimnan Stage fauna (Pliocene age) and this lithological interval is an equivalent of the Jemmys Point Formation.

400 - 530 feet :

There is a faunal change at 400 feet, but there is no lithological change till 430 feet where grey marls are present. This fauna consists of Astrononion australe, Baggina philipensis, Cibicides cygnorum, Bolivina alata, Notorotalia clathrata, Rosalina mitchelli and Valvulineria kalimnensis. This fauna is typical of the Tambo River Formation.

530 - 2000 feet :

A series of calcareous siltstones, marls and limestones.

The fauna in a side-wall core at 530 feet is nondescript consisting of species of Elphidium and Notorotalia. Planktonic foraminifera, including Orbulina universa, appears 100 feet below. Operculina victoriensis and Amphistigina lessonii first appear at 930 feet, accompanied by Cibicides brevoralis, Eponides repandus, and Parrellina craticulatiformis. Lepidocyclina howchini and Gypsina globulus were first noted at 1400 feet. Astrononion centroplax, Cibicides perforatus and Gyroidina zealandica appeared at 1700 feet.

This interval represents the Gippsland Limestone. The vertical distribution of the Foraminifera suggests that the Bairnsdalian Stage is represented between 530 and 930 feet; Balcombian Stage from 930 and 1400 feet; and Batesfordian Stage from 1400 to 1700 feet; and the Longfordian Stage from 1700 feet to 2000 feet. It is not possible to subdivide the Gippsland Limestone into its lithological members as slight lithological changes within the Formation are not constant.

2000 - 2270 feet :

Victoriella conoidea first appears at 2000 feet and is associated with Globigerina ampliapertura. These species and the other fauna present indicates the Janjukian Stage. However the lithology between 2000 feet and 2200 feet is identical with that above 2000 feet and should be included within the Gippsland Limestone. Micaceous, glauconitic marls are present from 2200 feet to 2270 feet and are typical of the upper member of the Lakes Entrance Formation. Although there is correspondence between the Lakes Entrance Formation and the interval representing the Janjukian Stage in the Lakes Entrance area, this is not so in the central part of the basin where the Gippsland Limestone commenced within and not at the top of the Janjukian Stage.

2270 feet - :

A side wall core at 2270 feet was of a carbonaceous sand suggestive of the Latrobe Valley Formation, although the

rotary cuttings below this level were still of Lakes Entrance Formation lithology. No foraminifera were found below 2270 feet which suggest a pre-Janjukian age.

Depth	Australian Tertiary Stages (Carter, 1959)	Rock Units Formations (Carter, 1963)
50 - 230		Haunted Hills Gravels
230 - 400	Kalimnan	Jemmys Point
400 - 530	Mitchellian	Tambo River
530 - 930	Bairnsdalian	
930 - 1400	Balcombian	GIPPSLAND
1400 - 1700	Batesfordian	LIMESTONE
1700 - 2000	Longfordian	
2000 - 2200	Janjukian	
2200 - 2270	Janjukian	Lakes Entrance

REFERENCES

Carter, A. N., 1959 — Guide Foraminifera of the Tertiary Stages in Victoria. Vic. Min. & Geol. J., 6 (3), 48-54.

Carter, A. N., 1963 — Tertiary Foraminifera from the Gippsland, Victoria and their stratigraphic significance. Geol. Surv. Vic., Memoir 22, (in press).

D. J. Taylor

D. J. TAYLOR, M.Sc.,
Geologist.

POST-MESOZOIC STRATIGRAPHY IN

~~Ground~~ CARRS CK. No.1 WELL.

Location : Lat. 38° 17' 32" S, long 147° 15' 55" E, Parish of Wulla Wullock.
Elevation : 78 ft a.s.l (Gnd), 89 ft. a.s.l (K.B)
T.D. : 5507 ft. (Driller)
Data commenced : March, 1963.

LITHOLOGIC LOG. [Based largely on sample description]

0 – 50 : no samples

50 — 110 : brown med. to coarse grained sand and minor gravel, becoming clayey.

110 — 150 : lt. brown medium-grained sand.

150 – 225 : grey medium-grained, well rounded sand with traces of black carbonaceous material, partic. common at 190-210ft.

225 – 320 (approx): fine to coarse sand (coarser below 250ft.) with abundant shell material, also bryozoa, etc; traces of black carbon. material (could be contamination).

320 (approx) — 440 (approx) : as above, but appears to be more a calcareous sd. or sandy marl.

440 (approx) — 530 : light grey sandy marl / marly limestone ± glauconite traces and fine shelly material, also some Ditrupa and bryozoa.

530 — 990 : white bryozoal limestone, permeable down to abt. 620ft. becoming slightly sandy in the vicinity of 550 ft., very little marly limestone.

990 — 1610 (approx.) : light grey bryozoal marly limestone with traces of glauconite; thin hardened horizons of limestone over basal 100-odd feet (e-log).

1610 — 1960 (approx) : grey marl, and marly limestone, hard thin limestone horizons between approx. 1630 and 1680 ft. marls more puggy towards base.

1960 — 2075 : yellowish grey puggy foraminiferal marl.

2075 — 2260 (approx.) : lt. grey glauconitic slightly sandy marl, glauconite abundant towards base, sand/gravel (with abundant glauc. & pyrite) in basal 10-odd feet; brown sucrosic glauc. dolomite horizon at 2238 – 40 ft.

../2

2260 (approx.) – 2310 : light grey to brown, fine to coarse-grained, sli. micaceous clayey sand.
2310 — 2355 : brown coal.
2355 – 2405 : sand, as for 2265 – 2310.
2405 — 2425 : brown coal
2425 — 2450 : sand
2450 — 2460 : brown coal
2460 – 2510 : sand
2510 — 2530 : brown coal
2530 — 2590 : sand
2590 — 2600 : brown coal
2600 — 2700 : sand
2[redacted] — 2730 : predominantly brown ligneous clay, minor sand.
2730 — 2765 : predominantly sand
2765 – 2775 : clay
2775 — 2783 : hard brown glauconitic dolomite
2783 — 2820 : clay, minor sand
2820 — 2875 : predominantly brown coal, minor ligneous clay & sand
2875 — 3035 : ligneous clay, minor coal seams & sand horizons.
3035 — 3055 : brown coal
3055 – 3070 : sand
3070 — 3125 : brown coal
3125 – 3146 : sand, prob. clayey
3146 – 3155 : white to brown, tight, fine grained ? dolomite
3[redacted]55 – 3280 : brown coal, with minor horizons of gravelly sand.
3[redacted]80 — 3320 : sand, minor gravel.
3320 — 3330 : brown coal
3330 — 3380 : sand, minor gravel.
3380 – 3395 : brown coal
3395 — 3420 : sand, minor gravel
3420 — 3475 : ligneous clay & minor coal beds.
3475 — 3675 : white to lt. brown, fine to coarse grained sand, becoming more clayey - small coal beds below 3610ft; brassy mica flakes
3675 — 3700 : ligneous clay & minor coal beds.
3700 — 3795 : sand, with minor 5ft.-odd beds of clay & or coal @ 3730 & 3755ft; some brassy mica flakes

.../3

3795 — 3815 : Claystone
3815 — 3990 : clayey sand & minor gravel, with a bed of hard brittle coal @ 3840-60ft.
3990 — 4210 : sand, as above, with beds of claystone.
4210 — 4230 : claystone & brittle coal.
4230 — 4380 : clayey sand & minor gravel.
4380 — 4462 : grey gravelly sand.

STRATIGRAPHY.

50 — 225 feet : Upper Pliocene to Recent.

All the samples appear to belong to the Bushy Park beds, the boundary between the upper and lower units tentatively being placed at 150 ft.

225 — 530 feet : Jemmys Pt. / Tambo River Formations.

The uppermost shelly sands contain limited microfaunas of shallow water species, eg. Elphidium imperatrix, Nonion victoriense, and Triloculina tricultrata.

In the marly beds, other species to be found include Baggina phillipinensis Bolivina alata, Cibicides cygnorum, Astrononion australe, Massilina lapidigera, Rosalina mitchelli and Notorotalia clathrata. Globigerina bulloides gp. occurs to a minor extent.

The Jemmys Pt. / Tambo River boundary could be very tentatively placed at 440 feet.

530 — 1960 feet : Gippsland Limestone.

Can be broadly subdivided as follows :-

530 — 910 ft. : Bairnsdalian.

Poor faunas including Elphidium spp. Baggina phillipinensis, Notorotalia clathrata, and also Orbulina universa. The latter does not persist below 910 ft.

910 — 990 ft. Balcombian.

Faunas are again poor except for Operculina victoriensis which appears below 930 ft. at which depth it is particularly abundant. ~~Amphistegina lessonii occurs below 990 ft.~~

.../4

990 — 1610 ft. : Batesfordian.

Lepidocyclina howchini occurs throughout, accompanied by Amphistegina lessonii

1610 — 1960 ft. : Longfordian.

Marls and marly limestones containing Globigerina apertura, G. woodi, Astrononion centroplax, Cibicides perforatus, Gyroidina zealandica and Hoffenina semiornata, with common arenaceous species coming in at about 1950ft.

1960 — 2260 feet : Lakes Entrance Formation.

Good faunas belonging to F.U. 5, including Globigerina ampliapertura, Astrononion centroplax, Cibicides brevoralis, C. perforatus, "Cyclammina" incisa, Elphidium crespinae, Gyroidina zealandica, Vaginulina gippslandica, Victorella pecte, and relatively common arenaceous species, particularly "Cyclammina" incisa.

X side-wall core sample at 2248 ft, consisting of a slightly glauconitic sand, contained no foraminifera but occasional fish fragments and even a fragment of a ribbed pelecypod.

2260 — 4462 feet : Latrobe Valley Coal Measures

No foraminifera isolated.

Below 4462 feet : Strzelecki Group.

No foraminifera isolated.

NATURE OF LAKES ENTRANCE FORMATION.

Top of the formation very difficult to pick. Based on :

i. microfaunas

ii. slight fall in resistivity value.

Increase in resistivity at approx. 2075 ft. presumably indicates a tighter, more calcareous matrix.

Glauconite much more common below 2210 ft. and sub-rounded quartz appears more common.

Brown sucrosic partially glauconitic dolomite horizon occurs

../5

at 2238 – 40ft.

Beds below this ~~contain above~~ are very sandy and consist of ~~sandy glauconitic which disappears at approx 2265 ft (21)~~ partially calcareous to non-calcareous glauconitic clayey sands.

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APPENDIX 4

CORE DESCRIPTIONS

CONVENTIONAL CORES

CORE NO. 1, 2250' - 2270', recovered 10'.

(Core badly jammed in barrel, majority of core removed by auger.)

2250' - 2259.5' Shale, green-gray to green, soft and pliable moderately glauconitic, slightly fossiliferous, occasional pebbles of rounded quartz, finely crystalline pyrite nodules common.

2259.5' - 2260' Sand, medium gray, fine to medium grained with occasional coarse grains, very glauconitic (30% of total), slightly argillaceous, poor to fair porosity, slightly consolidated, slightly calcareous, no show. No dips visible. The interval 2250' - 2259.5' is probably partly or wholly compressed cavings.

CORE NO. 2, 2308' - 2328', recovered 16'.

2308' - 2309.5' Sand, medium gray, fine to medium grained with occasional coarse grains, subrounded to sub-angular, slightly argillaceous, micaceous, unconsolidated, good porosity, no shows.

2309.5' - 2324' Brown Coal, brittle, partly sandy.

CORE NO. 3, 3480' - 3500', recovered 0.5'.

3480' - 3480.5' Sand, white to light brown, fine to coaree grained, clean to argillaceous (kaolinite?), fair to good porosity, unconsolidated, angular to sub-angular, no fluorescence, no cut with CCl_4, good blue fluorescence with acetone.

CORE NO. 4, 4522' - 4532', recovered 10'.

4522' - 4528' Laminated and thin bedded Siltstone, light to medium gray and gray green, clean to very argillaceous, firm to slightly hard, carbon-

aceous, flakes common, slightly calcareous; Sandstone, gray-green, medium brown-gray and light gray, very fine grained, slightly calcareous, tight, feldspathic, carbonaceous; Shale, dark gray-brown, silty firm; and Coal, black, as laminations throughout 1-2 mm thick, slightly cross-bedded, plant fossils common, dips of 12° - 18°, no show.

4528' - 4532' Shale, dark gray, firm, brittle, slightly silty, carbonaceous flakes common, dips of 11° - 12°, no show.

CORE NO. 5, 5327' - 5330', recovered 2'.

5329' - 5330' Conglomerate, dark brown, poorly consolidated, pebbles and cobbles up to 3" in diameter consisting of volcanic rock, medium to dark green and reddish brown, often mottled dnd streaked (flow structures?), aphanitic to medium grained, in part breccia, slightly hard, fresh to badly weathered; Shale, dark red-brown; Quartz, light to medium gray, subrounded; Siltstone, medium gray, very argillaceous, finely micaceous, slightly carbonaceous; Diorite (?), light gray, finely crystalline, hard; and Shale, medium to dark gray, fissile, slightly hard; matrix of Clay, dark brown, silty, firm to soft, tight.

* Note: 3 core head rollers worn flat on bottom. Core in poor condition because of jamming in the core barrel. Core may be compressed cavings from bottom 50' of hole.

CORE NO. 6, 5360' - 5380', recoverdd 20'.

5360' - 5380' Graywacke, medium to dark gray-green, medium to coarse grained, angular to sub-angular, friable to hard, very slightly calcareous, occasional very calcareous bands up to 1 cm. thick, generally tight, grains consist of approximately 30% green

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volcanic rock, 30% quartz, 20% feldspar, 10% gray rock fragments and 10% carbonaceous fragments, mica and other minerals, matrix consists of kaolinite, chlorite and calcite.
Dips of 20° - 40°, most reliable 25° - 30°. No shows.

CORE NO. 7, 5490' - 5500', no recovery.
Core catcher arms broken off.

CORE NO. 8, 5500' - 5507', recovered 10' of Core No. 7 and 4' of Core No. 8.

5490' - 5501' Graywacke, green to gray-green, medium grained with fine and coarse grains common, occasional pebbles, angular to sub-angular, friable to slightly hard, very slightly calcareous, occasional very calcareous bands as in Core No. 6, generally tight, composition similar to core No. 6, poorly preserved plant fossils, vertical and steeply inclined fractures filled with calcite, poorly bedded, dips 25° - 30°, no show.

5501' - 5504' Shale, gray and gray-green, blocky, non-calcareous, poorly preserved plant fossils, partly slickensided and contorted, fair dips of 25° - 30°, no show.

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SIDE-WALL CORES

No.	Depth	Recovery	Description
1	530'	2"	Marl, cream to white, soft to friable, very sandy, very fossiliferous, slightly glauconitic, tight, no show.
2	552'	1"	Limestone, white to light gray, fine grained, fragmental, marly, soft to friable, slightly sandy, trace glauconite, tight, no show.
3	596'	1"	Limestone, same as Core No. 2, poor porosity, no show.
4	2248'	2"	Sand, dark green-brown, very fine to fine grained, moderately argillaceous, laminated, very glauconitic, calcareous, micaceous, slightly consolidated, poor to fair porosity, no show.
5	2256'	1/4"	Sand, dark brown-green, fine to coarse grained, ligneous, very glauconitic, unconsolidated, argillaceous, no show.
6	2270'	2"	Sand, dark brown, fine to very coarse grained, slightly consolidated, micaceous, argillaceous, poor to fair porosity, no show.
7	4456'	1/4"	Sandstone, white, fine to coarse grained, angular, quartzose, kaolinitic friable to firm, fair porosity, no show.
8	4556'	2"	Subgraywacke, light gray-green, fine to medium grained, angular, friable, very slightly calcareous, very kaolinitic, generally tight, no show.
9	4572'	2"	Subgraywacke, medium gray green, fine to medium grained, occasional coarse grains, kaolinitic, friable, slightly carbonaceous, poor porosity, no show.

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No.	Depth	Recovery	Description
10	4580'	1-1/2"	Subgraywacke, light gray-green, fine to medium grained, occasional carbonaceous laminations, very kaolinitic, poor porosity, slightly micaceous, non-calcareous, no show.
11.	4584'	1-1/4"	Subgraywacke, same as No. 10.
12	4761'	1-1/4"	Subgraywacke, medium gray-green, fine to medium grained, kaolinitic, friable, poor porosity, no show.
13	4771'	1"	Subgraywacke, medium gray-green, fine grained, kaolinitic, friable, tight, no show.
14	4790'	1"	Siltstone, medium gray-brown, very argillaceous, micaceous, carbonaceous, soft, no show.
15	4888'	1"	Shale, dark gray, soft to firm, finely micaceous, non-calcareous.
16	5006'	1"	Subgraywacke, light gray-green, fine to medium grained, very kaolinitic, friable, one quartz pebble well-rounded 1 cm. in diameter, poor porosity, no show.
17	5035'	1-1/2"	Subgraywacke, light gray-green, fine grained, angular, friable, very kaolinitic, carbonaceous fragments and laminations, poor porosity, no show.
18	5080'	1/2"	Shale, dark gray, firm, blocky, finely micaceous.

CARR'S CREEK 43/50

APPENDIX 5

PETROLOGICAL REPORT

by

Sylvia Whitehead

CARR'S CREEK NO. 1

	Depth (Ft.)	Thin section	
Core 5	5,328' - 5,330'	M.586	Conglomerate
Core 6	5,360' - 5,380'	M.587	Arkose
Core 7	5,490' - 5,500'	M.588	Arkose

Core 5 :

Core 5 is a conglomerate containing pebbles of the following :

Slightly micaceous quartzite (metamorphosed sandstone).

Chloritised basic igneous rock, some of which may have been dolerite, but this is uncertain. (coarser grained than volcanics).

Decomposed and chloritised finer grained volcanic rock.

Fine grained brown rock, possibly decomposed volcanic but indeterminate (contains scattered phenocrysts ? of quartz).

Decomposed grey shale or slate.

The matrix is largely composed of fine grained clay, chlorite, partly altered biotite and small fragments of decomposed volcanic rock with traces of very fine grained carbonate, and grains of quartz in places.

Core 6 :

An arkose generally similar to other specimens of arkose but differing in that many of the rock fragments are semi-rounded and some are cloudy and stained probably due to predepositional weathering or slower sedimentation. A few feldspar grains are also cloudy.

CARR'S CREEK 44/5C

Grain size is commonly 0.2 - 0.4 mm.

The rock is unusual in that thin films (0.05 mm thick) of a neutral to pale orange brown mineral occur along many grain boundaries and line all interstices. In interstices, this film is covered by a film or layer of green chlorite of similar thickness, the whole giving the appearance of colloform banding (chlorite has the higher R.I.). Colourless clay is present in the centre of some interstices.

There are no bedding planes, and only a slight tendency for elongated fragments to be sub-parallel. Most have random orientation.

Core 7 :

A slightly coarser grained (0.3 - 0.5 mm) arkose composed predominantly of fragments of volcanic rock. It differs from the previous specimen (Core 6) in that the rock fragments show less evidence of rounding and weathering, interstitial chlorite is more abundant and there are only extremely thin films of some other mineral with low R.I. along some grain boundaries of detrital fragments.

Chlorite has also partly replaced some rock fragments.

Very small cavities occur in some interstices lined with chlorite.

Some plagioclase feldspar grains show patch replacement similar to that described in arkose from Wellington Park Well, but this does not extend beyond grain boundaries.

Fine grained magnetite appears to be rather more abundant in some fragments of volcanic rock.

Cloudy apatite grains were also noted in some fragments of volcanic rock indicating that this is probably the source of much of the apatite noted in heavy mineral assemblages from many specimens of arkose.

Minor opaque material in some interstices appears to be

CARR'S CREEK 45|50

largely leucoxene.

Heavy minerals separated in bromoform from samples of Core 6 and Core 7 are very similar, except that magnetite is more abundant in Core 7.

Opaque grains	- magnetite, ilmenite, leucoxene
Magnetite is common in 6, abundant in 7.	
biotite	- brown flakes, common
apatite	- prismatic and partly rounded crystals, mostly clear but some cloudy and pleochroic.
sphene	- common in both as angular fragments of crystals, many showing fresh crystal faces.
chlorite	- flakes, some of which may have replaced biotite.
epidote	- irregular grains present in both
garnet	- rare, semi-rounded to angular, some brown.
zircon	- rare in both, prismatic crystals generally not rounded, inclusions common. Very rare rounded grains.
tourmaline	- very rare to absent

An unusual feature of these two heavy mineral assemblages is the presence of a considerable amount of sphene in the form of angular fragments of crystals generally showing little or no evidence of rounding. This suggests a local source of origin with relatively little transport.

CARR'S CREEK 46/50

APPENDIX 6

WATER ANALYSIS

by

VICTORIA STATE LABORATORY

Report on Sample No. 584/65

U.W.R.S. 2989

Sample : Water from Oil Bore

Locality : Parish of Wulla Wullock

Sender : Dr. D.E. Thomas,
Director of Geological Survey
Mines Department

Particulars	
No.	584
U.W.R.S.	2989
Bore	Carr's Creek No. 1
Sample	Drill Stem Test No. 1
Depth (feet)	3400 - 3500
Remarks	3000 feet down from top of fluid Recovery 3,360 feet of fluid. Arco-Woodside (Lakes Entrance) Oil Co. N. L.

Results		Parts per million
Total solids in solution		450
Chloride	(Cl)	90
Carbonate	(CO_3)	1
Bicarbonate	(HCO_3)	220
Sulphate	(SO_4)	8
Nitrate	(NO_3)	Nil
Calcium	(Ca)	40
Magnesium	(Mg)	15
Sodium	(Na)	70
Iron-Soluble	(Fe)	1.2
Silica-Soluble	(SiO_2)	5
Total hardness (as $CaCO_3$)		163

CARR'S CREEK 47/50

APPENDIX 6

WATER ANALYSIS

pH 8.1

A hypothetical combination is given as follows :

		p.p.m.
Calcium bicarbonate	$Ca(HCO_3)_2$	162
Magnesium bicarbonate	$Mg(HCO_3)_2$	90
Ferrous bicarbonate	$Fe(HCO_3)_2$	4
Sodium bicarbonate	$NaHCO_3$	27
Sodium carbonate	Na_2CO_3	2
Sodium sulphate	Na_2SO_4	12
Sodium chloride	NaCl	148

Rw = 16.0 phms at 75^0F

CARR'S CREEK 48/50

APPENDIX 7

PLANT REMAINS FROM THE CARR'S CREEK NO. 1 WELL

by

John Douglas

Core from the Arco-Woodside Carr's Creek No. 1 Well was examined and plant remains recorded as follows :

Core 4 (4522-4532 feet)

Very imperfectly preserved plant remains were noted throughout this core, but at 4523 feet carbonaceous impressions of the conifer Pagiophyllum were examined.

These consist of branched stems about 6 cms. long with recurved appressed leaves about 3 mm. long, and too poorly preserved to allow reliable specific determination, but appear to be closely related to the Pagiophyllum sp. recorded from the Merriman No. 1 Well (Douglas 1963).

As discussed in this report Pagiophyllum sp. have been recorded elsewhere in Victoria from Mesozoic beds high in the sequence and hence these Carr's Creek beds with Pagiophyllum are probably included in the uppermost beds of the non marine Mesozoic sequence.

Reference

Douglas, J.G. 1963

Plant remains from the Arco-Woodside Merriman No. 1 Bore.
Mines Department Unpub. Rept. 1963/26.

JOHN DOUGLAS.
Geologist.

CARR'S CREEK 4950

APPENDIX 8

PRELIMINARY PALYNOLOGICAL EXAMINATION

CARR'S CREEK NO. 1 BORE

by

JOHN DOUGLAS

Core from the Arco Woodside Carr's Creek No. 1 bore was treated by the hydrofluoric acid, Schulze's solution method, and acid insoluble microfossils isolated examined under the microscope.

Sample (Core) Depths	Acid insoluble Microfossils
2248 feet	Myrtaceidites sp. Nothofagus emarcida
2258 "	Tricolpites sp.
2322 "	None examined.
4530 "	(Cyathidites sp. lycopodiumsporites austroclavatidites cf. Nuskoisporites gondwanensis cf. Osmundacidites comaumensis, etc.
4790 "	Apiculatisporis wonthaggiensis
4888 "	Cirratriradites sp.
5500 "	Few microfossils present
5502 "	

REMARKS

A depauperate microfossil assemblage consisting of isolated pollen grains, and indicating a Lower Tertiary age was present in the samples from 2248 and 2258 feet. No microfossils were found in the 2322 feet sample.

At 4530 feet a number of forms regarded by Cookson and Dettman (1959) as Lower Cretaceous were isolated, along with Nuskoisporites gondwanensis, a Palaeozoic form described by Balme and Hennelly (1956). In this latter publication this form has been mentioned as occurring remanie in Victorian Tertiary sediments, and it is probable that this Carr's Creek No. 1 occurrence is also of a remanie type. Beds at 4790 and 4888 feet also yielded Lower Cretaceous forms, and the Tertiary - Lower Cretaceous contact appears to lie above the 4530 feet

sample. More precise location is difficult because of the great thickness of sediment unsampled between the 4530 and 2322 feet samples.

REFERENCES

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Cookson, Isabel C. and Dettman, Mary E. — Some trilete spores from Upper Mesozoic deposits in the eastern Australian region. Proc. Roy. Soc. Vic. 70, 2, p. 95-128.

JOHN DOUGLAS.
Geologist

10 Dettmann 1963. Upper Mesozoic Microfloras From S-E Australia, Proc. R. Soc. Vict. 77; Pt 1 : 1-21.

Great Artesian Basin. Santos Oodnadatta -1
" Cootabarlow -2
Otway Basin Penola -1
" Robe -1.

11 Dettmann 1961 Lower Mesozoic Megaspores from Tasmania + S.A. - Leigh Ck. Coalfield SA. Micropaleontology, Vol 7, No.1 : 71-8

12. Apthorpe 1969 Paleontological Report VMO Branxholme -1 .. S.D.A Report 26.

13. Taylor D.J. 1965. The Mid Tertiary Foraminiferal Sequence Esso Bass-1 Well Tasmania, G.S.V. Rept 1965.

14. Taylor D.J. 1965. Mid Tertiary Foraminiferal Sequence Esso Gippsland Shelf No.1 Well. GSV Rept 16/1965.

15. Dettmann 1966. Palynological Report on Esso Gippsland Shelf No 4 Well - Side wall cores.

16. Dettmann 1966. Palynological Report on Esso Gippsland Shef No 4 Well - core 12.

17. Dettmann 1981. The Cretaceous Flora, Ecological Biogeography of Australia. A. Keast (Ed.) Dr. W. Junk bv Publishers, The Hague - Boston - London.

18. Dettmann 1961. Palynological Report on Core Samples From wells sunk in the Gippsland Basin.

Woodside Carrs Ck No 1. Lake Reeve -1
" North Seaspray -1 Bellbird -1
Duck Bay -1 Woodside South -1.
Seaspray -1

Dettmann
14-1-66

Carrs Creek No.1 c.8 5500-07'	c.6 5360-80'	c.4 4522-32'	
			Punctatisporites gretensis
			Calamospora diversiformis
			Leiotriletes directus
			Acanthotriletes ramosus
			Cirratriradites splendens
			Laevigatosporites vulgaris
			Nuskoisporites gondwanensis
			Nuskoisporites rotatus
			Vestigisporites rudis
+			Aequitriradites spinulosus
		+	Dictyotosporites speciosus
+	—	+	Cicatricosisporites australiensis
			Cooksonites variabilis
+	+		Leptolepidites verrucatus
			Klukisporites scaberis
		+	Reticulatisporites pudens
			Foraminisporis wonthaggiensis
		+	Foraminisporis asymmetricus
		+	Rouseisporites reticulatus
			Crybelosporites striatus
			Coptospora paradoxa
		+	Laevigatosporites ovatus
			Trilites tuberculiformis
			Cyathidites splendens
			Verrucatosporites speciosus
			Dacrydiumites ellipticus
			Phyllocladidites mawsonii
			Nothofagidites emarcida
			Proteacidites subscabratus
			Proteacidites adenanthoides
			Tricolporites microreticulatus
			Tricolpites gillii
			Triorites edwardsii

PE903995

This is an enclosure indicator page.
The enclosure PE903995 is enclosed within the container PE903993 at this location in this document.

The enclosure PE903995 has the following characteristics:

ITEM_BARCODE	= PE903995
CONTAINER_BARCODE	= PE903993
NAME	= Geologic Cross Section
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= CROSS_SECTION
DESCRIPTION	= Geological Cross Section before & after drilling (from WCR) for Carrs Creek-1
REMARKS	=
DATE_CREATED	= 25/07/1963
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carr's Creek-1
CONTRACTOR	= Arco Ltd/Woodside
CLIENT_OP_CO	= Arco Ltd/Woodside

(Inserted by DNRE - Vic Govt Mines Dept)

PE903994

This is an enclosure indicator page.
The enclosure PE903994 is enclosed within the container PE903993 at this location in this document.

The enclosure PE903994 has the following characteristics:

ITEM_BARCODE	= PE903994
CONTAINER_BARCODE	= PE903993
NAME	= Reflection Seismograph Survey
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= CONTOUR_MAP
DESCRIPTION	= Reflection Seismograph survey of the Sale Area (from WCR) for Carrs Creek-1
REMARKS	=
DATE_CREATED	= 15/06/1962
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carr's Creek-1
CONTRACTOR	= Austral Geo Prospectors Pty Ltd
CLIENT_OP_CO	= Arco Ltd

(Inserted by DNRE - Vic Govt Mines Dept)

PE904795

This is an enclosure indicator page.
The enclosure PE904795 is enclosed within the container PE903993 at this location in this document.

The enclosure PE904795 has the following characteristics:

ITEM_BARCODE	= PE904795
CONTAINER_BARCODE	= PE903993
NAME	= Carr's Creek 1 Velocity Data
BASIN	= GIPPSLAND
PERMIT	= PPL 160
TYPE	= WELL
SUBTYPE	= VELOCITY_CHART
DESCRIPTION	= Carr's Creek 1 Velocity Data based on uncalibrated sonic logs. Plate 4 of WCR
REMARKS	=
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carrs Creek-1
CONTRACTOR	=
CLIENT_OP_CO	= ARCO Ltd. / Woodside (Lake Entrance) Oil Co. N.L.

(Inserted by DNRE - Vic Govt Mines Dept)

PE603162

This is an enclosure indicator page.
The enclosure PE603162 is enclosed within the container PE903993 at this location in this document.

The enclosure PE603162 has the following characteristics:

ITEM_BARCODE	= PE603162
CONTAINER_BARCODE	= PE903993
NAME	= Carr's Creek 1 Composite Well Log
BASIN	= GIPPSLAND
PERMIT	= PPL 160
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Carr's Creek 1 Composite well Log. Plate 1 of WCR
REMARKS	= Sheet 1 of 2. 1 of 2 copies.
DATE_CREATED	= 31/07/63
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carrs Creek-1
CONTRACTOR	= Geodrafting Services
CLIENT_OP_CO	= ARCO Ltd. / Woodside (Lake Entrance) Oil Co. N.L.

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PE602060

This is an enclosure indicator page.
The enclosure PE602060 is enclosed within the container PE903993 at this location in this document.

The enclosure PE602060 has the following characteristics:

ITEM_BARCODE	= PE602060
CONTAINER_BARCODE	= PE903993
NAME	= Composite Well Log
BASIN	= GIPPSLAND
PERMIT	=
TYPE	= WELL
SUBTYPE	= COMPOSITE_LOG
DESCRIPTION	= Composite Well Log (enclosure from WCR) for Carrs Creek-1
REMARKS	=
DATE_CREATED	= 31/07/1963
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carr's Creek-1
CONTRACTOR	= Arco Ltd/Woodside
CLIENT_OP_CO	= Arco Ltd/Woodside

(Inserted by DNRE - Vic Govt Mines Dept)

PE904794

This is an enclosure indicator page.
The enclosure PE904794 is enclosed within the container PE903993 at this location in this document.

The enclosure PE904794 has the following characteristics:

ITEM_BARCODE	= PE904794
CONTAINER_BARCODE	= PE903993
NAME	= Generalized Stratigraphic Column
BASIN	= GIPPSLAND
PERMIT	= PPL 160
TYPE	= WELL
SUBTYPE	= STRAT_COLUMN
DESCRIPTION	= Generalized Stratigraphic column Gippsland Basin. Plate 2 of WCR
REMARKS	= 1 of 2 copies.
DATE_CREATED	=
DATE_RECEIVED	=
W_NO	= W476
WELL_NAME	= Carrs Creek-1
CONTRACTOR	=
CLIENT_OP_CO	= ARCO Ltd. / Woodside (Lake Entrance) Oil Co. N.L.

(Inserted by DNRE - Vic Govt Mines Dept)