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Record 1978/41



An Appraisal of petroleum exploration title area - Gippsland Basin
Vic/P8 March 1975

~~Restricted~~

by

W.J. McAvoy and P.R. Temple

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SUMMARY

This record is the result of a brief examination of data relevant to the title area. All available data have been used in its preparation including confidential company reports, but no original interpretation has been made.

Summaries are given of the geophysical activity and drilling results in the title area. An assessment has been made of the prospectivity of the title area and recommendations are made for further exploration.

The area under consideration consists of an eight-mile strip marginal to the coastline of Gippsland. It has been covered by a reconnaissance seismic grid with some detailed coverage around the Golden Beach location. Four wells have been drilled and a gas discovery has been made in Golden Beach - 1A. No other large structural leads are known and the major prospectivity is confined to stratigraphic trapping. The potential of the area cannot be rated highly.

INTRODUCTION

This record should be read in conjunction with BMR Record 76/22 which gives a detailed discussion of the regional geology and hydrocarbon prospects of the offshore Gippsland Basin.

Vic/P8 is located on the northern up-dip margins of the Gippsland Basin where the prospective Latrobe Group sediments are known to be thin. Apart from the Golden Beach structure no other large structural leads are known. The major prospectivity is therefore confined to stratigraphic traps. However their potential cannot be rated highly.

Geophysics Vic/P8

Aeromagnetic: BMR flew an aeromagnetic reconnaissance of the onshore area of the Gippsland Basin, Victoria, between July 1951 and April 1952. This coverage was extended forty (64 km) to fifty (80 km) miles seaward from the Gippsland coastline between March and June 1956. Basement depth estimates showed a basinal depression containing about 15 000 feet (4572 m) sediments extending offshore from the Golden Beach area.

Gravity: The onshore parts of the Gippsland Basin have been covered with regional and detailed gravity surveys carried out by BMR and the permittees. The only offshore coverage consists of widely spaced reconnaissance traverses recorded in the BMR Continental Margins Survey 1970-1973.

Seismic: Since 1952 numerous seismic reflection and refraction surveys have been carried out onshore. The first marine survey in Vic/P8 was the Ninety Mile Beach survey in which 462.5 miles (744 km) of 100% reconnaissance coverage was recorded along the length of Vic/P8. Results were poor to fair. Two horizons were contoured - a Miocene Phantom and the Latrobe Valley Coal Measures. A major structure was discovered at Golden Beach. This was detailed in 1967 in the Golden Beach Structure Marine Seismic Survey which mapped it as a northeasterly-trending structure approximately $4\frac{1}{3}$ miles (7.0 km) long and 2 miles (3.2 km) wide.

Most recent work in Vic/P8 was carried out in October 1969 (Offshore Lakes Entrance Marine Seismic Survey) and in November 1970 (Seaspray Marine Survey). The former produced data of fair quality and mapped the wedgeout of the Latrobe Valley Coal Measures. Some fifteen drilling locations were recommended within four salients where entrapment could result from a combination of wedge-out and dip. The Seaspray survey mapped a small closure south of the Golden Beach Structure but made no recommendation for further work. Record quality of this survey ranged from fair to good.

A problem has been encountered in obtaining seismic information from below the Latrobe Valley Coal Measures horizon.

Title Assessment Vic/P8

Title holder: Woodside Oil N.L.

No. of blocks: 89 blocks, 1185 sq. miles (approx)

Expiry date : 11.5.75

Farmount negotiations: Subject to an agreement between Woodside Oil N.L. and the following companies:

Australian Oil and Gas	10%
Planet Exploration Co. Pty Ltd	10%
BOC of Australia Ltd	20%
Continental Oil Co. of Aust. Ltd	20%

<u>Previous six year conditions:</u>	First year	\$20 000 (\$225 per block)
	Second year	\$70 000 (\$786 per block)
	Third/ Fourth years	\$850 000 (\$4773 per block/year)
	Fifth. Sixth years	\$850 000 (\$4773 per block/year)

Regional setting: Vic/P8 is an eight-mile coastal strip located between Vic/P1 and the coastline of Eastern Victoria. It stretches along the coastline for about 160 miles (257 km). Water depths throughout the title area are very shallow.

Wells drilled: Four wells have been drilled within Vic/P8 Golden Beach - 1A was the first well drilled by the consortium in Vic/P8. The well, drilled on a closed east-trending anticline, spudded in Miocene Gippsland Limestone which it drilled to 1702 ft, (519 m) Oligocene Lakes Entrance Formation to 2014 ft (614 m) Eocene Latrobe Valley Group to 5587 ft, (1703 m) Palaeocene to Upper Cretaceous Golden Beach Formation to 7536 ft (2297 m), and Cretaceous undifferentiated sediments to TD 9534 ft, (2906 m). A gas sand was tested in the top of the Latrobe Valley Group with a calculated open flow potential of 28 MMcf/d. Log analysis gave 58 ft (17.7 m) of gross and net pay thickness. Tests of four sands below 8600 ft (2621 m) yielded insignificant flows of gas and indicated very poor permeabilities. It is believed that the producing horizon includes the basal glauconitic sands of the Lakes Entrance Formation. The well was suspended as a gas discovery.

In 1970 a farmout agreement was signed with two companies for the exploration of parts of the offshore area in Vic/P8. One of them, Endeavour Oil, drilled two wells, albatross -1 and Gannet -1 near Lakes Entrance. The other, N.S.W. Oil and Gas Company, drilled one well Flying Fish -1 near Seaspray then decided not to drill a second well which would have given it further acreage rights.

Albatross -1 was drilled to test a stratigraphic/structural trap at the top of the Latrobe Group with wedgeout to the north and dip to the west, east, and south. Albatross -1 drilled Gippsland Formation to 2060 ft, (628 m) Lakes Entrance Formation to 2320 ft, (707 m) Latrobe Valley Group to 2434 ft (708 m) and Strzelecki Group to TD 4124 ft (1257 m). Only very minor shows were reported and the well was plugged and abandoned.

Gannet -1 was again drilled to test a stratigraphic/structural feature with wedgeout to the north. Gannet-1 drilled Gippsland Formation to 1777 ft, (542 m) Lakes Entrance Formation to 2215 ft, (675 m) Latrobe Valley Group to 2317 ft, (706 m) and Strzelecki Group to TD 4786 ft (1459 m). No significant shows were recorded and the well was plugged and abandoned.

Flying Fish-1, located on a closed anticline, drilled Gippsland Limestone to 3104 ft, (946 m) Lakes Entrance Formation to 3588 ft (1094 m) and Latrobe Valley Group to TD 6520 ft (1987 m). No significant shows of hydrocarbons were recorded and the well was plugged and abandoned.

Geophysical coverage: For geophysical coverage refer to maps, data sheets, and geophysical summary.

Prospectivity: The prospective section is the Latrobe Valley Complex. The title area can be conveniently divided into five separate areas: Bassian Rise High area, Southwest area, Golden Beach Declared Location, northeast area, and the northeastern extremity.

Bassian Rise High area: The only possibilities at present would appear to be stratigraphic pinching out of the Lakes Entrance Formation or the trapping of hydrocarbons within the Miocene. These are not rated optimistically.

The area has been covered by only a few reconnaissance lines in the 1963 Ninety Mile Beach Seismic Survey and no wells have been drilled.

Recommendation: No exploration is worthwhile.

Southwest area: This is the part of the title area between the Bassian Rise and the Golden Beach Declared Location. The Foster Fault which divides the area into two was most active during basin subsidence in the Upper Cretaceous and Palaeocene and effectively limits these sediments north of the fault. The only Latrobe Valley Complex sediments south of the Foster Fault are those younger than Palaeocene.

The Golden Beach Declared Location is situated in the centre of an embayment containing up to 9000 ft (2743 m) of Latrobe Valley Complex sediments within Vic/P8. Generally the Latrobe Valley Complex section thickens from zero at the Bassian Rise to 9000 ft (2743 m) at the Golden Beach Declared Location. The area appears fairly featureless at the top of the Latrobe Valley Complex and no structural leads are evident.

Recommendations: Further high effort modern seismic work will be necessary to locate any worthwhile intra-Latrobe Valley Complex structures or stratigraphic traps.

Golden Beach Declared Location: Eight Blocks around Golden Beach 1 and 1A have been declared a Location.

Northeast area: This area extends from the Golden Beach Declared Location along the coast to the northeastern extremity area. The prospective sediments are the Latrobe Valley Complex which thins away from the Golden Beach Declared Location. The area has been semi-detailed by seismic work and no structures of significance have been mapped at the top of Latrobe Valley Complex. Possibilities still exist for wedgeout and updip pinchout traps, although two wells Albatross -1 and Gannet-1 located on such stratigraphic traps failed to encounter any hydrocarbons.

Recommendation: Further high-effort modern seismic work will be necessary to locate any worthwhile intra-Latrobe Valley Complex structures or stratigraphic traps.

Northeast extremity area: Indications are that the Latrobe Valley Complex does not occur in this area. The area has only been covered by very limited early reconnaissance seismic work (1963 Ninety Mile Beach) and no wells have been drilled.

Recommendations: No further work is recommended.

Appendix

Details of Geophysical Surveys

SURVEY: SEASPRAY M/S NO: 70/9 MAP CODE: _____
 DATES: -19/11/70 COMPANY: ENDEAVOUR CONTRACTOR: TELEDYNE
 TENEMENTS: VIC/P8 OIL
 SEISMIC SOURCE: AIR GUN PROCESSING:
 CABLE: 1600 m RECORDER:
 MULTIPLE COVERAGE: 2400% and 4800%
 MILEAGE: 250
 REFRACTION: -
 GRAVITY: -
 MAGNETIC: -
 DATA QUALITY: F -G
 RESULTS: Mapped a small closure south of the Golden Beach structure.
 No further work recommended.

SURVEY: OFFSHORE LAKES ENTRANCE NO: 69/7 MAP CODE:
 DATES: 4/10/69 - 15/10/69 COMPANY: ENDEAVOUR CONTRACTOR: U.G.C.
 TENEMENTS: VIC/P8 OIL
 SEISMIC SOURCE: AIR GUN PROCESSING: GEOCOM
 CABLE: 2400 metre RECORDER:
 MULTIPLE COVERAGE: 1200%
 MILEAGE: 511.79
 REFRACTION: -
 GRAVITY: -
 MAGNETIC: -
 DATA QUALITY: F
 RESULTS: Mapped regional wedge-out of Latrobe Valley Coal Measures.
 Recommended 15 drill locations within four salients where
 entrapment could result from a combination of wedge-out and
 dip.

SURVEY: NINETY MILE BEACH S.S. NO: 62/1640 MAP CODE: _____
DATES: 21/11/62 - 4/1/63 COMPANY: ARCO CONTRACTOR: W.G.C.
TENEMENTS:
SEISMIC SOURCE: DYNAMITE PROCESSING:
CABLE: RECORDER:
MULTIPLE COVERAGE: 100%
MILEAGE: 462.5
REFRACTION:
GRAVITY:
MAGNETIC:
DATA QUALITY: P - G
RESULTS: Two horizons contoured - Miocene Phantom and Latrobe Valley
Coal Measures. Mapped the Golden Beach Structure.

SURVEY: GOLDEN BEACH STRUCTURE M.S. NO: 557 MAP CODE: _____
DATES: NOT KNOWN COMPANY: B.O.C. CONTRACTOR: G.S.I.
TENEMENTS: VIC/P8
SEISMIC SOURCE: EXPLOSIVES PROCESSING:
CABLE: RECORDER:
MULTIPLE COVERAGE: 600%
MILEAGE:
REFRACTION: -
GRAVITY: -
MAGNETIC: -
DATA QUALITY: P - F
RESULTS: East-northeasterly-trending structure with length of
approx $4\frac{1}{3}$ miles and maximum width of about 2 miles.

GIPPSLAND BASIN AIRBORNE
SURVEY: MAGNETIC SURVEYS NO: BMR RPT 95 MAP CODE: — — — — —
DATES: July 51 - Apr 52 COMPANY: BMR CONTRACTOR:
Mar 56 - June 56
TENEMENTS:
SEISMIC SOURCE: PROCESSING:
CABLE: RECORDER:
MULTIPLE COVERAGE:
MILEAGE:
REFRACTION:
GRAVITY:
MAGNETIC:
DATA QUALITY:
RESULTS: Basinal development offshore from the Golden Beach area
with an indicated maximum thickness of 15000 feet.

SURVEY: NO: MAP CODE:
DATES: COMPANY: CONTRACTOR:
TENEMENTS:
SEISMIC SOURCE: PROCESSING:
CABLE: RECORDER:
MULTIPLE COVERAGE:
MILEAGE:
REFRACTION:
GRAVITY:
MAGNETIC:
DATA QUALITY:
RESULTS:

Table 1. OFFSHORE WELLS VIC/P8 GENERAL DATA

Well	File No.	Title	Rig	Rig Release	T.D.	Deepest horizon
Golden Beach - 1A	-	Vic/P8	Investigator	29.8.67	9534'	Strzelecki
Albatross - 1	P(SL)A	Vic/P8	Glomar III	18.7.70	4124'	Strzelecki
Gannet - 1	P(SL)A	Vic/P8	Glomar III	29.7.70	4786'	Strzelecki
Flying Fish - 1	P(SL)A	Vic/P8	Glomar Conception	22.12.71	6520'	Latrobe

Trap	Top Latrobe	Latrobe thickness	wd/KB	Status
Anticline	-1981'	3573'*	127'/33'	Sand at top Latrobe 2014'-2076' Gas @ 28 MMcf/d (open flow potential). Gurnard present & at top of producing interval.
pinch-out	-2288'	114'	142'/32'	
pinch-out	-2183'	102'	128'/32'	
Anticline	-3556'	2932'+	86'/32'	

*does not include Golden Beach Formation

Table 2

OFFSHORE WELLS - VIC/PA - Stratigraphy

	Offshore	Basin Margins		Golden Beach 1A	Gannet-1	Albatross-1	Flying Fish-1	
Sea floor								
Quaternary								
Tertiary	Plio		Seaspray	Lake Wellington (Haunted Hill Gravels)				
	Mio	Gippsland Ls	Group	Jemmy's Point Formation				
	Cligo	Lakes Entrance Fm		Tambo River Formation				
				Gippsland Ls	above 525'			
	Es	Lalrobe Valley Coal Measures		LVCM	1702'	1777'	2060'	3104'
				Thorpdale Volcanics	2014'	2215'	2320'	3588'
Cretaceous	Paleo	Golden Beach Fm		Childers Fm	5587'			
	Upper							
					U. Cret.(undiff.) →	7536'		
Jurassic	Lower	Strzelecki Group				2317'	2434'	
	Upper							

Note: Thorpdale volcanics - basalt flows in Lalrobe Valley Coal Measures

Childers Fm. - sediments found between the Thorpdale volcanics and the Strzelecki Group.

where the Thorpdale volcanics are absent - they lie between the

Golden Beach Formation and the L.V.C.M. - it is not

definitely identifiable and is therefore part of the Golden Beach Formation.

9534'	4786'	4124'	6520'
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Note: Thorpdale volcanics - basalt flows in Lalrobe Valley Coal Measures

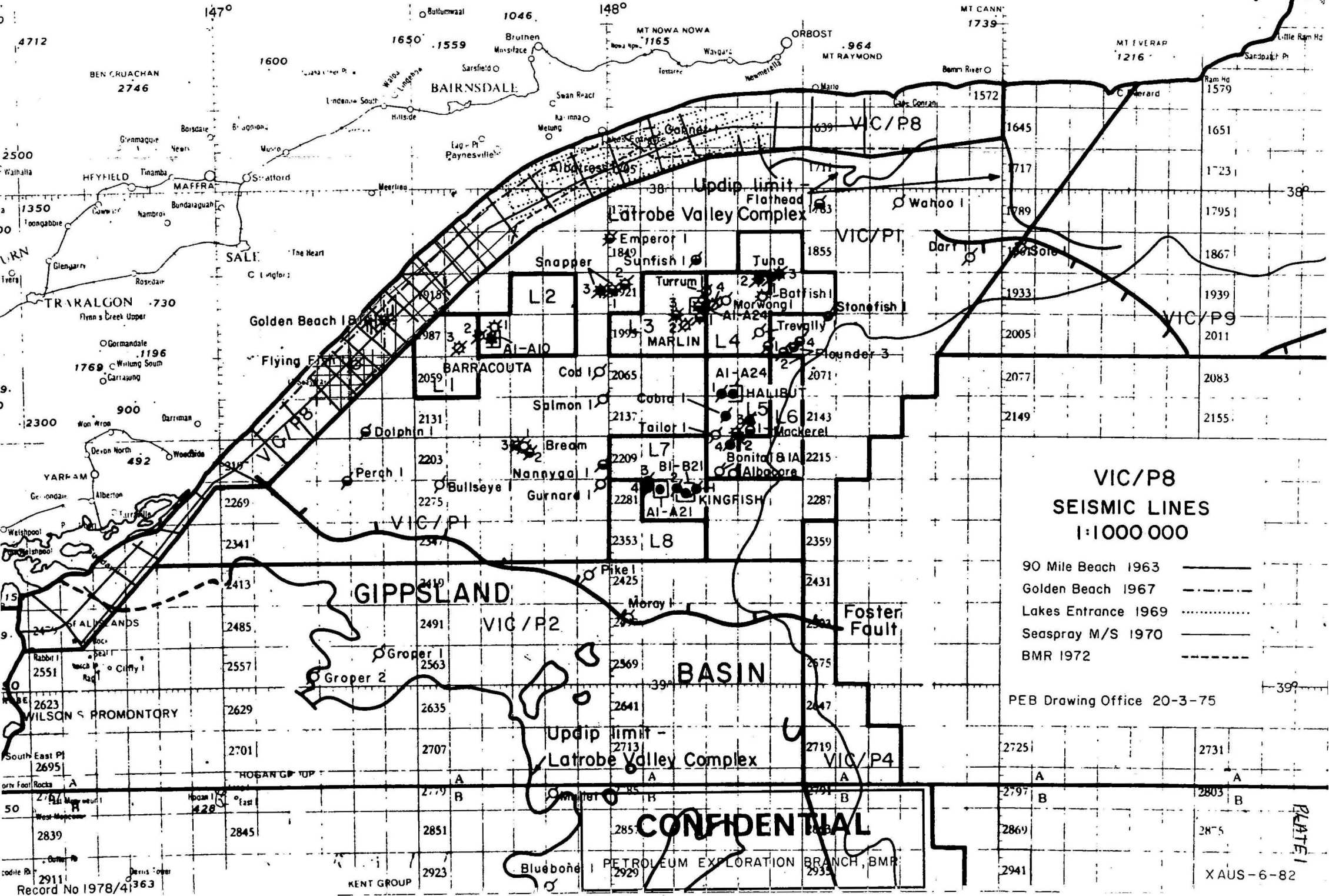
Childers Fm. - sediments found between the Thorpdale volcanics and the Strzelecki Group.
 where the Thorpdale volcanics are absent - they lie between the
 Golden Beach Formation and the L.V.C.M. - it is not
 definitely identifiable and is therefore part of the Golden Beach Formation.

9534'

4786'

4124'

6520'



VIC/P8
SEISMIC LINES
1:1000 000

- 90 Mile Beach 1963
- Golden Beach 1967
- Lakes Entrance 1969
- Seaspray M/S 1970
- BMR 1972

PEB Drawing Office 20-3-75

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PETROLEUM EXPLORATION BRANCH, BMR

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