DEPARTMENT OF MINERALS AND ENERGY

BUREAU OF MINERAL RESOURCES, GEOLOGY AND GEOPHYSICS

RECORD 1975/95

SUMMARY OF OIL SEARCH ACTIVITIES IN AUSTRALIA AND PAPUA NEW GUINEA DURING 1974

by

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CONTENTS

	Page
Introduction	1
Adavale Basin	1
Amadeus Basin	3
Bass Basin	5
Bonaparte Gulf Basin	7
Bowen Basin	7
Bremer Basin	15
Browse Basin	15
Canning Basin	15
Carnarvon Basin	16
Clarence-Moreton Basin	20
Cooper Basin	20
Eromanga Basin	22
Galilee Basin	22
Georgina Basin	25
Gippsland Basin	25
Otway Basin	25
Pedirka Basin	29
Perth Basin	30
Surat Basin	34
Sydney Basin	36
Morehead Basin	36
Northern New Guinea Basins	37
Papua Basin	37
Acknowledgement	39

PLATES

1. Australia and Papua New Guinea, petroleum exploration wells 1974.
2. Australia and Papua New Guinea, geophysical operations under Petroleum Search Subsidy Act 1959-1973, 1974

Page

TABLES

1. Stratigraphic table, Grey Range No. 1 2
2. Stratigraphic tables, Bass Basin 6
3. Stratigraphic tables, Bowen Basin 11
4. Stratigraphic table, Depuch No. 1 18
5. Stratigraphic table, Weston No. 1 24
6. Stratigraphic tables, Otway Basin 27
7. Stratigraphic tables, Perth Basin 32
8. Wells drilling in 1974
9. Subsidized geophysical operations during 1974

INTRODUCTION

This Record is the last in a series summarizing the results of oil search activities in Australia and Papua New Guinea since the beginning of 1968. These records have mainly summarized the results of subsidized drilling and geophysical operations carried out under the Petroleum Search Subsidy Act (1959-1973 (PSSA)) which was terminated on 30 June 1974, but they have also included brief details of unsubsidized drilling operations. Unsubsidized geophysical surveys have not been included because details of these operations are not consistently reported. The locations of those which are reported are not always available, and their titles are sometimes confusing with regard to the Bureau's nomenclature of subsidized surveys.

The present Record, in addition to summarizing the results of subsidized operations completed in 1974 also contains the results of a small number of operations completed in 1973 and released too late for inclusion in the previous Record in the series (Nicholas, Record 1975/78).

Except where indicated, the interpretation of the data is that of the author or authors of the Final Reports. Inconsistencies between stratigraphic nomenclature used by Companies and that in current usage have been indicated.

The Bureau of Mineral Resources (BMR) file numbers of the Final Reports of the subsidized 1974 operations are given in Tables 8 and 9. File numbers of earlier subsidized operations are given in the text.

ADAVALE BASIN

There were no subsidized geophysical operations in 1974. The subsidized well Grey Range No. 1 was drilled. There was no unsubsidized drilling.

Grey Range No. 1 was located in the western part of the basin, about 110 km southwest of Blackall, and 30 km northwest of the Gilmore gas field. The primary target was the sandstones of the D-2 Member of the Etonvale Formation. Sandstones in the Buckabie Formation were additional objectives.

The section penetrated (Table 1) through the Eromanga and Galilee Basins was as predicted, except that the Permian rocks of the Galilee Basin were intersected some 32 m deeper than expected. In the Adavale Basin, the Buckabie Formation was thicker than predicted, and the D-1 Member of the Etonvale Formation was intersected 148 m deeper than expected.

TABLE 1. STRATIGRAPHIC TABLE, GREY RANGE NO. 1

AGE	UNIT	DEPTH KB (m)	THICKNESS (m)	LITHOLOGY
	EROMANGA BASIN SEQUENCE			
	-Unconformity-			
EARLY PERMIAN	Galilee Basin Sequence	1943	290	Upper 20 m of grey to dark grey carbonaceous shale. 1963-2033 m : medium to coarse-grained sandstone with two coal seams. Bottom 200 m inter-bedded shale and siltstone
	-Unconformity-			
LATE DEVONIAN TO EARLY CARBONIFEROUS	Buckabie Formation	2233	926	Sequence of alternating thick sandstone and shale beds
MIDDLE DEVONIAN	Etonvale Fm.			
	'D-1 Member'	3159	88	Red to grey silt-stone with red, brown, and orange sandstone and minor carbonaceous shale
	'D-2 Member'	3247	68	Red, orange, green, coarse-grained sandstone. Silica cement
	'Unnamed Basal sandstone'	3315	45	Clear, milky, orange, grey green, coarse-grained sandstone. Well cemented with silica. Abundant kaolin
EARLY DEVONIAN	?Gumbardo Fm.	3360	131+	Granite
		3491 T.D.		

No hydrocarbons were indicated. Log evaluation shows that the sandstones of the D-2 Member have good porosity, but are mainly watersaturated. The flow rate from drill-stem testing of 220 kilolitres of water per day indicates good permeability. Sandstone beds in the Buckabie Formation have average porosity but are considered tight.

AMADEUS BASIN

Two subsidized geophysical surveys, Gardiner Range gravity and Central Amadeus seismic, which were started in 1973, were completed in 1974. There was no exploration drilling.

The Gardiner Range gravity survey covered an area about 430 km^2 west-southwest of Alice Springs. The objective of the survey was to provide gravity control on concealed faults located on the southern flank of the Gardiner Range Anticline, the northern flank of the Walker Creek Anticline, and the northern flank of the Mereenie Anticline. The original program was extended to cover an area at the northwest end of the Gardiner Range Anticline to assist in the interpretation of complex records obtained in the Central Amadeus seismic survey.

Bouguer anomaly profiles were obtained for all lines. Only limited contouring was possible, because although the individual gravity readings were close (300 m), the lines were widely spaced, particularly those perpendicular to the strike.

The line which runs north-northwest from the Mereenie Anticline indicates a strong northerly gravity gradient interpreted as a fault on the northern flank of the structure. The origin of the gradient is shallow, being apparently due to faulting in dense Parke Siltstone (base of Devonian to Permian Pertnjara Group) near the surface. The northern end of this line crosses the western extremity of the Gardiner Range Anticline where a gravity 'low' is indicated, rather than a 'high' as normally observed on anticlines. A possible wedge of low-density evaporites is postulated to explain this phenomenon. A line running parallel to the Mereenie Anticline in the north shows an easterly gravity gradient on its western end which is probably indicative of the western margin of the basin.

A long strike-line running south of and parallel to the Gardiner Range Anticline showed no significant gravity variations.

On the Walker Creek Anticline a line along the crest of the structure yielded no significant information, and a line running northwards from it showed no evidence of large-scale faulting on its northern flanks.

In the east of the survey area a northwest-southeast line showed the northerly regional gravity gradient observed elsewhere on the dip-lines. A gravity 'high' indicated near the southern end of the line is considered to warrant seismic investigation.

The Central Amadeus seismic survey was carried out in four areas lying to the south and west of Alice Springs. They are, from west to east Mereenie, Palm Valley, Waterhouse, and Ooraminna. The survey was designed to investigate structures indicated by previous geophysical surveys. Data quality was generally fair in the synclines but deteriorated markedly over the crests of the anticlines.

In the Mereenie area, only poor quality data were produced on a series of short dip-lines shot over the crest of the Mereenie Anticline. In the Palm Valley area the data quality was fair, except on one line across rugged country. The results were inconclusive and did not achieve the objective of investigating thickness changes in Cambrian-Ordovician sediments.

In the Waterhouse and Ooraminna areas the objectives of the survey were to investigate the Waterhouse thrust fault, the Alice anticline, the nose on the western side of the Ooraminna Anticline, and possible dip reversal on strike with the James Range 'A' structure. Several dip-lines and one strike-line were shot across the Waterhouse fault. The record quality was fair, and showed uniformly layered sediments overlying basement. Good quality data were obtained on one line over the crest showing no loss of continuity of seismic horizons. The improved data have resulted in reliable mapping but no significant structural closures have been matured.

Record quality was good on the southwest flank of the Alice structure but deteriorated sharply north of Alice No. 1. The records show no evidence of thinning of stratigraphic units. A well site is recommended on a fault-controlled closure to test the Lower Cambrian Arumbera Sandstone.

Fair quality data were obtained over the structural nose on the southwestern end of the Ooraminna Anticline. The records show good evidence for structural growth from the Upper Cambrian to the Devonian (Goyder Formation through Mereenie Sandstone).

The new data shed no further light on the possible dip reversal on strike with the James Range 'A' structure.

BASS BASIN

Two subsidized (Table 2) and two unsubsidized wells were drilled in 1974. There was no subsidized geophysical work.

Subsidized Drilling

Aroo No. 1 was drilled on a large seismically defined anticline located in the northwestern part of the basin over a northeast-trending basement ridge. The ridge separates the main basin on the southeast from a series of more isolated basement depressions on the northwest. Present evidence suggests that the ridge may consist of Palaeozoic rocks, and may have been an important structural and topographic feature of the Bass Basin since the beginning of the Upper Cretaceous.

The target zone in Aroo No. 1 lay within the Eastern View Group, and was correlated with rocks of Palaeocene to lower Eocene age which produced good gas/condensate shows in Pelican Nos 1 and 2 (unsubsidized, 1970) located some 70 km to the south-southeast in the main basin. However, the drilling proved the target zone to lie within an unpredicted sequence of volcanic rocks, interpreted from log character and sidewall cores as a series of basaltic flows interbedded with minor sandstone, siltstone, and shale. Attempts to date the sequence on radiometric or palynological evidence were unsuccessful.

There were indications of hydrocarbons below 2117 m, the most significant being in the interval 2774-3146 m in sandstones of Palaeocene age within the Lygistopollenites balmei spore-pollen zone. The overlying Eocene Malvacipollis diversus zone was thin (between 152 and 183 m) and yielded only very minor indications of hydrocarbons in contrast to the very thick M. diversus zone with good hydrocarbon shows encountered by the Pelican wells.

Nangkero No. 1 was located about 55 km southeast of Aroo No. 1 on the northeastern side of the northwest-trending main basin. It was drilled to test the hydrocarbon potential of sandstones in the upper part of the Eastern View Group in a large anticline mapped on the seismic Red Horizon which is the deepest level on which reliable regional mapping can be achieved and which in the Nangkero area corresponds approximately to the top of the M. diversus zone. Thick sandstone units with good reservoir characteristics, but no indication of hydrocarbons, were encountered in this section in Poonboon No. 1 (unsubsidized, 1972) drilled off-structure about 10 km to the southwest. Nangkero No. 1 penetrated a stratigraphic section essentially as predicted from the results of Poonboon No. 1, encountering sandstone with good reservoir potential

TABLE 2. STRATIGRAPHIC TABLES, BASS BASIN WELLS

AROO NO. 1

AGE	UNIT	DEPTH KB (m)	THICKNESS (m)	LITHOLOGY
OLIGOCENE-MIOCENE	Torquay Group	86	1,728	Bioclastic calcirudite overlying fossiliferous marl, calcareous siltstone
EOCENE-OLIGOCENE	Demons Bluff Formation	1814	235	Glauconitic, calcareous siltstone
PALAEOCENE-EOCENE	Eastern View Group	2049	1099	Sandstone, siltstone, shale, mudstone, coal, dolomite
PALAEOCENE OR pre-PALAEOCENE	Unnamed	3148	544+	Fresh and weathered volcanic rocks including amygdaloidal basalt; siltstone, sandstone
		3692 T.D.		

NANGKERO NO. 1

AGE	UNIT	DEPTH KB (m)	THICKNESS (m)	LITHOLOGY
OLIGOCENE-MIOCENE	Torquay Group	89	1662	Bioclastic calcirudite, overlying fossiliferous marl, calcareous siltstone, calcarenite, shale, siltstone, sandstone
EOCENE-OLIGOCENE	Demons Bluff Formation	1751	129	Carbonaceous, calcareous siltstone
PALAEOCENE-	Eastern View Group	1880	997+	Sandstone, siltstone, shale, mudstone, coal, dolomite
		2877 T.D.		

interbedded with siltstone, coal, and shale, but no hydrocarbon shows. Remapping of the Red Horizon, which was intersected 72 m lower than predicted, confirmed the existence of the structure.

Unsubsidized drilling

Toolka No. 1 was located about 40 km north of Aroo No. 1. It was abandoned prematurely because of a parted casing string and Toolka No. 1A was spudded-in 24 metres away. Toolka No. 1A was plugged and abandoned as a dry hole.

BONAPARTE GULF BASIN

The subsidized well, North Hibernia No. 1, and twelve unsubsidized wells, were completed or in progress during 1974, all offshore. There was no subsidized geophysical work. The results of North Hibernia which began drilling in 1973 are included in the previous record in this series (Nicholas, op. cit.).

Ten (unsubsidized) wells were drilled in Northern Territory waters. Puffin No. 2 encountered significant indications of hydrocarbons. A drill-stem test over a thin sandstone in the interval 2028-2036 m flowed 48° API gravity oil at a rate of 2700 BPD through a 3/8" choke. Troubadour No. 1, flowed gas on drill-stem testing at a rate of 9.84 MMcf/D plus 59.6° API condensate at a rate of 244 BPD over intervals 2228-2233 m and 2238-2244 m, through a 3/4" bottom hole choke. No indications of hydrocarbons were reported from the remaining eight wells.

Two wells, Whimbrel No. 1 and Plover No. 2, were drilled in Western Australian waters. No significant indications of hydrocarbons were reported.

BOWEN BASIN

Four wells (Table 3) and two seismic surveys were completed in 1974. All were subsidized. The operations were located southwest of Roma, where Permian and Triassic rocks of the Bowen Basin in the Taroom Trough onlap the eastern flank of the Roma Shelf, and underlie the Jurassic and Cretaceous sequence of the Surat Basin.

Subsidized Seismic Surveys

The Wunger seismic survey was located about 65 km northeast of St George. The primary drilling target in this area is the Middle Triassic Showgrounds Sandstone which produced gas in commercial quantity in Boxleigh No. 1 (unsubsidized, 1970).

The objectives of the survey were to increase seismic control on a number of small anticlines mapped by previous surveys, including the structure on which Boxleigh No. 1 was drilled, and to map the zero edge of the Permian and determine the areal extent offthe Showgrounds Sandstone. Two horizons, top Lower Jurassic Evergreen Shale, and basement were mapped in depth on generally fair to good-quality data, and an isopach of the intervening interval was produced. The general structural picture was not significantly changed by the new data. The basement horizon shows complex faulting and a number of high areas, two of which had not previously been mapped. The top Evergreen Shale horizon shows essentially the same structural configuration but with much less topographic relief and no faulting. The isopach map shows that the interval thins over the high areas. From well control, it is known that the variation in thickness is due to the presence or absence of the Showgrounds Sandstone and underlying Permian Kianga Formation (equivalent to Blackwater Group) and to variations in thickness within the Triassic Wandoan Formation and the Evergreen Shale. The well control, and to a lesser extent the seismic sections have been used to map areas where the Permian section and the Showgrounds Sandstone are absent. These areas are incorporated in the isopach map.

The Telgazli Creek seismic survey was located about 30 km southeast of Surat. The objective was to search for channel sands in the Permian Kianga Formation on the downthrown (northern) side of a northeast-trending fault which had been mapped by previous seismic surveys about 1 km northwest of the Weribone No. 1 well (BMR file, 63/1008). Weribone No. 1 and Redcap No. 1 (unsubsidized, 1970) also in the survey area, both produced hydrocarbon shows in the Kianga Formation. In the Weribone well gas was produced at the rate of 125 Mcf/D on drill-stem testing.

The record quality is fair to good, and better than that of the previously recorded single-fold data. Four horizons were mapped: basement (Devonian Timbury Hills Formation); Permian Kianga Formation; Triassic Wandoan Formation; and Jurassic Evergreen Shale. The structural picture on the basement and Permian horizons is very similar. The major feature is an east-trending fault in the southern half of the survey area with a downthrow to the north of about 330 m on the basement horizon, and about 180 m on the Permian horizon. The fault does not affect the Triassic and Jurassic horizons. There is no evidence of channel sands within the Kianga Formation north of the fault, and drilling is not recommended.

Subsidized Drilling

Silver Springs No. 1 was drilled on the eastern flank of a north-trending anticline, one of the two previously unmapped structures located by the Wunger seismic survey. The section penetrated was as predicted, and on drill-stem testing the Showgrounds Sandstone produced gas at a rate of 8 MMcf/D accompanied by some condensate, over the interval 1868-1899 m.

Silver Valley No. 1 and Apple Tree No. 1 were drilled as one subsidized operation. The Silver Valley well was located about 50 km east-southeast of Roma, and Apple Tree No. 1 about 30 km due south of Silver Valley.

The wells were drilled to test seismically defined stratigraphic traps produced by pinchout of the Lorelle Sandstone Member of the Lower Permian Muggleton Formation (Paton & Groves, 1974) on basement highs.

The sequence penetrated by the wells was typical for the eastern flank of the Roma Shelf. The Moolayember and Rewan Formations were considerably thicker than predicted because the formation velocity for the Triassic section is higher than in nearby wells. The Mantuan Productus Bed in each well contains abundant marine fossils.

In Apple Tree No. 1, drill-stem testing of the upper part of the Lorelle Sandstone Member and electric log interpretation of the lower part showed that the unit is water-filled and poorly permeable. The Lorelle Sandstone Member in Silver Valley No. 1 proved to be poorly permeable and gas-filled on drill-stem testing. No other zones in either well were prospective.

Monclova No. 1 was located about 20 km northwest of Surat, and some 80 km south of Roma. The nearest well is Yambugle No. 1 (unsubsidized 1969) about 10 km to the southeast. The well was drilled to test a stratigraphic trap of the Permian section delineated by the Yambugle seismic survey (BMR file 73/203). The survey showed that the Permian Blackwater Group subcrops on the western flank of the Yambugle basement low, and the Triassic Wandoan Formation thins rapidly up-dip from the Permian subcrop. Secondary drilling targets were sandstone units within the Wandoan Formation and the Jurassic Evergreen Formation.

Table 3 gives the section penetrated from the Evergreen Formation to basement. Drill-stem testing of sandstone units within the Evergreen Formation and at the base of the Triassic showed that although they had good reservoir characteristics they were flushed by fresh water. Within the Permian section, the predicted sandstone units were absent.

References

DICKINS, J.M., & MALONE, E.J., 1973 - Geology of the Bowen Basin, Queensland. Bur. Miner. Resour. Aust. Bull. 130.

PATEN, R.J., & GROVES, R.D., 1974 - Permian stratigraphic nomenclature and stratigraphy Roma area, Queensland. Qld Govt Min. J., 75 (876), 345-54.

TABLE 3. STRATIGRAPHIC TABLES, BOWEN BASIN WELLS

SILVER SPRINGS No. 1

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
		SURAT BASIN SEQUENCE		
		Unconformity		
TRIASSIC	Wandoan Fm.	1760	112	Interbedded sandstone and shale
	Showgrounds Sst.	1872	10	Quartz pebble conglomerate and medium to coarse-grained sandstone
		Unconformity		
PERMIAN	Kianga Fm.*	1882	6	White to grey, coarse to very coarse-grained sandstone. Siliceous matrix, slightly micaceous and carbonaceous
		Unconformity		
DEVONIAN	Timbury Hills Fm.	1888	13+	Schist
		1900.42 T.D.		

* Union Oil Development Corporation nomenclature, equivalent to Blackwater Group (Malone & Dickins, 1973).

APPLE TREE No. 1

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
		SURAT BASIN SEQUENCE		
		Unconformity		
TRIASSIC	Moolayember	1623	251	Siltstone shale and fine-grained, silty, quartzose sandstone
	Showgrounds Sst.	1874	9	Coarse to very coarse-grained quartzose sandstone

TABLE 3. APPLE TREE No. 1 (Contd.)

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
	Rewan Fm.	1883	200	Grey, green, brick red siltstone, shale and multicoloured sandstone
PERMIAN	Bandanna Fm.**	2083	84	Carbonaceous shale, siltstone, sandstone, black coal and tuff
	Black Alley Shale	2167	25	Hard grey siltstone, shale and white tuff
	Winnathoola Coal Mbr	2178	7	Dull black coal, carbonaceous shale
	Tinowon Fm.*	2192	83	Grey siltstone, shale, minor sandstone and coal
	Mantuan Productus Bed	2192	32	Grey, fossiliferous, pyritic siltstone
	Wallabella Coal Mbr*	2236	28	Shale, siltstone, dull black coal
	Muggleton Fm.*	2275	52	Pyritic siltstone, shale, sandstone. Medium to
	Lorelle Sandstone Mbr*	2292	35	coarse-grained quartzose sandstone with clay matrix
- - - - - - - - - - - -	-Unconformity-	- - - - - - - - - - - - - - - - - - - -		
CARBONIFEROUS	Roma Granite	2327 2343 T.D.	16+	Quartz fragments, abundant mica and feldspar

** Mines Administration nomenclature, equivalent to Blackwater Group (Malone & Dickins, 1973).
* New names (Paton & Groves, 1974).

SILVER VALLEY NO. 1

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
	SURAT BASIN SEQUENCE			
- - - - - - - - - - - - - - - -	-Unconformity-	- - - - - - - - - - - - - - - - - - - -		
TRIASSIC	Moolayember Fm.	1517	207	As in Apple Tree No. 1
	Showgrounds Sst.	1724	4	" " " " " "
	Rewan Fm.	1728	261	" " " " " "

TABLE 3. SILVER VALLEY No. 1 (Contd.)

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
	Bandanna Fm.	1989	92	As in Apple Tree No. 1
	Black Alley Shale	2081	36	" " " " " "
	Winnathoola Coal Mbr	2096	8	" " " " " "
	Tinowon Fm.	2117	98	" " " " " "
	Mantuan Productus Bed	2117	18	" " " " " "
PERMIAN				
	Wallabella Coal Mbr	2170	23	" " " " " "
	Muggleton Fm.	2215	110	Pyritic siltstone and shale, sandstone and limestone
	Lorelle Sst. Mbr	2253	25	As in Apple Tree No. 1
- - - - - - - - - - - - - -	-Unconformity-	- - - - - - - - - - - - - - - - - - - -		
CARBON-IFEROUS	Combargno Volcs	2325	14+	Pale green groundmass with dark green phenocrysts
		2339 T.D.		

MONCLOVA No. 1

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
EARLY JURASSIC	Evergreen Fm.	1436	144	Mainly thinly interbedded siltstone and shale with minor sandstone and coal. Well developed sandstone unit between 1493 and 1497m
- - - - - - - - - - - - - -	-Unconformity-	- - - - - - - - - - - - - - - - - - - -		
TRIASSIC	Moolayember Fm.	1580		Mainly thinly interbedded dirty sandstone, siltstone, and shale. Well developed sandstone unit between 1660 and 1662 m

TABLE 3. MONCLOVA No. 1 (Contd.)

AGE	UNIT	Depth KB (m)	Thickness (m)	LITHOLOGY
LATE PERMIAN	Blackwater Gp	1662	70	Coal and carbonaceous shale with interbedded siltstone and minor dirty sandstone. Interbedded tuff and chert below 1679 m
		-Unconformity-		
	Basement	1732	13+	White, cream, angular, platy fragments and splinters of milky quartz, chert or tuff
		1745 T.D.		

BREMER BASIN

Two unsubsidized wells were completed in 1974. They are the first petroleum exploration wells to be drilled in this area, regarded as one of low prospectivity. Published information indicates less than 100 m of Eocene sediments overlying Precambrian basement. Kendenup No. 1 was abandoned prematurely at 112 m as a result of unsuccessful fishing operations. In Sunday Swamp No. 1, traces of oil are reported to have been found in cores on chemical testing.

BROWSE BASIN

Three unsubsidized wells, Heywood No.1, Lombardina No. 1 and Prudhoe No. 1 were drilled during 1974. No indications of hydrocarbons were reported. Well locations and published details are given in Table 8. There were no subsidized geophysical operations.

CANNING BASIN

Two unsubsidized wells were drilled in 1974, one offshore and one onshore. Two seismic surveys were completed, one offshore and one onshore, both subsidized.

Unsubsidized Drilling

The offshore well, Minilya No. 1, was located on the northwestern margin of the Bedout Sub-basin. There were no reported indications of hydrocarbons.

The onshore well, Jones Range No. 1, was drilled on an anticline defined by the Jones Range - Hall Range seismic survey (BMR file, 73/255) between the Fitzroy Trough and the Gregory Sub-basin. More than 500 km^2 of areal, and up to 880 milliseconds of vertical closure was mapped on the 'near top Devonian' horizon, the Devonian carbonates being the prospective section. This well also proved to be dry.

Subsidized Geophysical Surveys

The results of the onshore Thornton seismic survey which was completed in January 1974 are included in the previous record in this series (Nicholas, op. cit.).

The Bedout North marine seismic and magnetic survey was carried out over part of the Bedout high - a large domal structure on the northern boundary of the Bedout Sub-basin. The objectives of the survey were to obtain more detail on areas of structural interest indicated by previous seismic work, to clarify the stratigraphic relations of the area, particularly of the Triassic section, and to define a well location. The survey was carried out by Hematite Petroleum Pty Ltd (operator) and three Japanese partners in a farm-in agreement with the B.O.C. Consortium, which holds the permit (W.A. 29P). The earlier seismic work indicated a number of possible fault-controlled closures on the 'near top Jurassic' seismic horizon in addition to the anticline on the eastern side of the Bedout high on which Bedout No. 1 (BMR file 71/435) was drilled.

The use of closer line-spacing and improved methods of data acquisition produced a marked improvement on previous data, both in event continuity and in resolution. Stratigraphic control was provided by Bedout No. 1. Two horizons were mapped in depth - a Middle Jurassic horizon, and a horizon near the top of the Palaeozoic. The upper horizon represents an intra-Jurassic marker closely correlated with the top of the Middle Jurassic section in Bedout No. 1. Lack of reflection continuity is probably related to the fact that the Middle to Upper Jurassic section in the well consists of thick sandstones with only thinly interbedded claystones and coals which are probably laterally discontinuous. The Palaeozoic horizon is the deepest seismic event recognizable over the survey area. It can be carried below the volcanics at total depth in Bedout No. 1 which are of suspected Palaeozoic (? Permian) age. An isopach map was prepared for the interval between the Middle Jurassic and Palaeozoic horizons. Magnetic intensity profiles were plotted on the seismic record sections and the data used to construct a total magnetic intensity map. From this, the volcanic sequence encountered in Bedout No. 1 is interpreted to thin towards the apex of the basement high and to be absent from both the apex and the northern flank.

The survey confirms the original interpretation of the Bedout high as a large dome on which early Mesozoic sediments are draped across a late Palaeozoic basement high. The apex of the dome is located approximately 10 km west northwest of Bedout No. 1 and 400 m structurally higher. The dome has been largely unaffected by faulting and very few secondary closures are indicated.

CARNARVON BASIN

One subsidized and seven unsubsidized offshore wells, and two unsubsidized onshore wells were drilled in 1974. There were no subsidized geophysical operations.

Subsidized Drilling

Depuch No. 1 (Table 4) was drilled in the Beagle Sub-basin on the Picard anticlinal trend which constitutes the northern flank of the main depositional trough. The well was drilled to test a Jurassic horst block first recognized from the results of the Trimouille-Dillon seismic survey (BMR file 70/976) and further detailed by the Montebello-Turtle (BMR file 72/509) and Steamboat Spit (BMR file 72/3253) seismic surveys. No significant hydrocarbon shows were recorded, and wireline-log interpretation indicates that the sandstones in the Tertiary, Cretaceous, and Jurassic sections are 100% water-saturated. The well penetrated the thickest (1038 m) Middle Jurassic sequence, and the thickest and most complete Upper Cretaceous sequence (497 m) yet penetrated in the sub-basin. The Albian/Aptian boundary is probably unconformable but the palaeontological evidence is insufficient to confirm this. Palaeontological and wireline-log evidence suggests a possible unconformity at the upper to middle Palaeocene boundary. The basal Tertiary unconformity is of minimal duration, with rocks of Danian age overlying an upper Maastrichtian interval.

Unsubsidized Drilling

Three offshore wells were completed in 1974 in the Dampier Sub-basin. Lambert No. 1 and Lowendal No. 1 were drilled on the Rankin Platform. Lowendal No. 1 was a dry well, but Lambert No. 1 which was spudded in 1973 was a new field oil discovery. 51° API gravity oil was produced at a rate of 374 BPD on drill-stem testing of the interval 3101-3106 m, accompanied by water and gas at rates of 382 BPD and 91 Mcf/D respectively.

The third well, Hampton No. 1 was drilled on the southeast margin of the sub-basin. The well encountered gas in non-commercial quantity, producing at an average of 3410 m^3 per day plus water at a rate of 7.4 m^3.

One well, Poissonier No. 1 was drilled in the Beagle Sub-basin. There were no significant indications of hydrocarbons.

Three offshore wells, Hilda Nos 1 and 1A, and West Tryal Rocks No. 2 were drilled in 1974 in the Barrow Sub-basin.

West Tryal Rocks No. 2 was located about 75 km northwest of the Barrow Island oilfield, and 3.6 km northeast of West Tryal Rocks No. 1 which encountered good hydrocarbon shows during drilling in the Upper Triassic to Lower Jurassic Mungaroo Beds. The drill-ship Dalmahoy which was originally intended to test West Tryal Rocks No. 1 was instead used to drill West Tryal

TABLE 4. STRATIGRAPHIC TABLE, DEPUCH NO. 1

AGE		Depth KB (m)	Thickness (m)	LITHOLOGY
Sea bed		153		
		486	333	No samples
	basal Pliocene to middle Miocene	923	437	Calcarenite, dolomite
	middle Miocene to Burdigalian	1211	288	Calcarenite, minor dolomite
	Aquitanian	1272	61	Dolomite, minor calcilutite and calcarenite
TERTIARY	Lower Aquit. to uppermost Olig.	1300	28	Marl
	Oligocene	1371	71	Marl, minor dolomite
	upper Eocene	1401	30	Calcilutite, minor chert
	middle Eocene	1544	143	Calcilutite, calcarenite
	lower Eocene	1580	36	Marl, siltstone, claystone
?	upper Palaeocene	1615	35	Siltstone, marl, claystone
?	middle to lower Palaeocene	1636	21	Marl, claystone ?
	Maastrichtian	1667	31	Marl, claystone
LATE	Campanian	1910	243	Claystone, marl, calcilutite
CRETACEOUS	Santonian to Coniacian	1985	75	Calcilutite
	Turonian	2008	23	Calcilutite
	upper to middle Cenomanian	2038	30	Calcilutite, marl

TABLE 4. (Contd.)

AGE		Depth KB (m)	Thickness (m)	LITHOLOGY
	basal Cenomanian to Albian		95	Calcilutite, limestone with minor claystone
?	?	2133	?	?
EARLY CRETACEOUS	Aptian	2164	31	Claystone
	Neocomian	2512	348	Claystone
JURASSIC	Middle Jurassic	3550	1038	Sandstone, claystone, siltstone with minor coal
	Lower Jurassic (Toarcian	4300T.D.	750+	Sandstone, claystone, siltstone

Rocks No. 2. This well proved to be a gas discovery. On drill-stem testing of the interval 3435-3450 m, gas was produced through a ½" surface choke at rates between 9 and 11 MMcf/D plus condensate at a rate of 150 BPD. A drill-stem test of the interval 3295-3308 m produced gas at a rate of 15.4 MMcf/D through a ½" surface choke, plus condensate at a rate of 221 BPD.

Hilda Nos 1 and 1A were located about 80 km west-southwest of Barrow Island on the southwestern flank of the Barrow Sub-basin. The first well was abandoned prematurely owing to mechanical difficulties. Hydrocarbon shows were reported from Hilda No. 1A during drilling at a depth of 2666 m. No testing was carried out.

Two coreholes, Mardie No. 1A and Windoo No. 1A were drilled in the onshore part of the Barrow sub-basin as part of a planned three-well shallow drilling program near the mouth of the Robe River between Onslow and Port Hedland. No significant indications of hydrocarbons were reported, and the partners in the project, West Australian Petroleum Pty Ltd and Hematite Petroleum, have announced that the third well will not be drilled.

CLARENCE-MORETON BASIN

Hogarth No. 4 which was spudded in 1973 was completed as an appraisal well in the Hogarth gas field. The first two wells in the field had good gas shows in the Triassic-Jurassic Marburg Formation. Information released to the press states that the well has confirmed the extension of the Hogarth gas field. Electric-log analysis has indicated a greater thickness of producing sands than in the first two wells. Plans to supply gas from Hogarth No. 2 to the Dairy Cooperative in Casino were announced in 1973.

No geophysical surveys were made.

COOPER BASIN

No petroleum exploration wells were drilled in 1974. However two subsidized seismic surveys were carried out. The results of the East Windorah Aeromagnetic Survey had not been released by July 4, 1975.

The Windula and Karmona seismic surveys were located in southwest Queensland. The prospectiveness of the Cooper Basin in this area had been considerably upgraded by the discovery of gas in Durham Downs No. 1, a subsidized well (BMR file, 73/229) drilled in 1973.

The Windula seismic survey was designed to extend regional reconnaissance coverage and also to provide further detail on two structures, Windula and Wareena, which were mapped by previous surveys. There was no previous seismic coverage in the southern part of the survey area where one east-west traverse was shot, whose eastern end crossed the Wareena structure. Five traverses were shot in the northern part of the area near the Mount Howitt No. 1 well (BMR file, 66/4195). The data were tied to the Mount Howitt well, and also to the Durham Downs well via the Karmona survey. The quality was generally good. Three horizons : horizon C - base Cretaceous; horizon P - top Permian; and horizon Z - base Permian were mapped and isochron maps presented of the intervening intervals. The Z horizon is discontinuous and considerably less reliable than horizons P and C.

No new structures were discovered but the interpretation of the Windula and Wareena structures has been modified as a result of the new data.

The Windula structure in the northwestern part of the survey area was originally mapped as a large closed anticline on the upthrown side of a normal fault. It is now interpreted as two anticlines separated by a further fault which truncates one of the structures.

The southern traverse showed turnover to the east of the Wareena anticline which could indicate that the structure is larger than previously thought. More seismic control was recommended for this area.

The Karmona seismic survey was carried out in the Durham Downs area, immediately to the southwest of the area covered by the Windula survey. The program was designed to confirm three structurally high trends, Karmona, Barrolka, and Little Hills, which were outlined by previous surveys, and to provide regional reconnaissance coverage over a part of the survey area where there was no previous seismic control.

The quality of the data obtained was generally good, and a considerable improvement on that obtained previously. The C, P, and Z horizons were mapped. As in the Windula Survey, the Z horizon lacked continuity.

The survey confirmed the existence of the Karmona, Barrolka, and Little Hills structures. The data over the Barrolka anticline indicate that the Permian section is quite thin over the crest of the structure, which is therefore downgraded as a petroleum prospect. The Karmona and Little Hills anticlines however appear to have substantial thicknesses of Permian section. No new structures were discovered.

EROMANGA BASIN

Two unsubsidized wells, Aramac No. 1 and Hexham No. 1 were drilled by the Queensland Mines Department. The wells were drilled as part of an announced three-well program of stratigraphic drilling. There were no subsidized geophysical operations other than those described in the sections on the Cooper and Galilee Basins.

GALILEE BASIN

Two subsidized seismic surveys were carried out and one subsidized well was drilled. There were no unsubsidized drilling operations.

Subsidized Seismic Surveys

The Albro seismic survey was carried out in the area to the east of Lake Galilee on the eastern side of the basin. It was a continuation of the Belyando seismic survey (BMR file, 72/2935), a regional survey which investigated the sedimentary section near the Belyando Feature, a major lineament which in the survey area is characterized by a steep gravity gradient coinciding with a roughly north-south stretch of the Belyando River. The Belyando survey showed the lineament to be a zone of major structural dislocation on the eastern margin of the Galilee Basin. The seismic evidence indicates that the Drummond Basin sequence does not extend west of the Belyando Feature, and palynological evidence shows that the pre-Permian sedimentary rocks encountered in Lake Galilee No. 1 (BMR file, 64/4076) are contemporaneous with the Devonian sediments of the Adavale Basin to the southwest.

The Albro survey was designed to complete the regional coverage by continuing a north-south line shot during the Belyando survey for 16 km to the north and 24 km to the south.

The quality of the data obtained was generally fair to good and four horizons were mapped: horizon A - a strong coal reflection from the top of the Permian section; horizon D - believed to represent the base of the Galilee Basin section; horizon C - believed to represent the base of the Drummond Basin section; and horizon E - probably representing the top of the non-prospective basement of Devonian age. An intra-basement horizon denoted 'F' was picked on the sections but not mapped.

The survey confirmed that a thick sedimentary sequence occurs to the west of the Belyando Feature and thickens towards the north. A stratigraphic test was recommended to determine

the nature of the section. The sequence between horizons C and E is of particular interest in view of its probable correlation with that in the Adavale Basin which has proven hydrocarbon potential (Gilmore gas field).

The Ayrshire seismic survey was carried out in a western sub-basin of the Galilee Basin which lies on the downthrown, northwestern side of the Cork Fault. It is designed to follow up the 1973 Wokingham Creek seismic survey (BMR file, 73/239) which defined a large low-relief anticline north of the Lovelle Downs No. 1 well (BMR file, 72/2669), the only well drilled in the sub-basin at that time, and indicated the possibility that two additional structures occur farther north in the Wetherby-Corfield area. The Ayrshire survey was designed to establish the existence of north dip on the anticline north of the Lovelle Downs well, and to delineate the structure sufficiently for a well to be sited. In the Wetherby-Corfield area the objective was to further investigate the structures indicated by the Wokingham Creek survey.

The two horizons mapped were a strong reflector at the interface between the Triassic and a thick coal seam at the top of the Permian, and basement. The basement horizon is a strong reflector in the northern part of the survey area where it is probably granite, but is less easily followed in the southern part where the basement consists of metasediments. The survey confirmed northward closure on the major structure, and the well Weston No. 1 was sited. In the northern area the Permian section is thinner, and although the additional work indicates that closures exist, they are considered too small to warrant further exploration effort.

Weston No. 1 (Table 5) was located 20 km northeast and up-dip from Lovelle Downs No. 1. The only indications of hydrocarbons were very minor gas shows associated with coals in the Permian section and minute traces of oil in some of the Permian sandstone units, as in the Lovelle Downs well. It would seem that the Weston structure was developed after migration, or that no migration of large volumes of oil and gas has ever taken place, and that only small quantities of hydrocarbons occur in this part of the basin in small lenses associated with coals. On the basis of palynological evidence and good electric-log correlations between the two wells the validity of the division into Upper and Lower Permian which was made in Lovelle Downs No. 1 is now considered doubtful, and has not been attempted in Weston No. 1. Palynological evidence from a core taken in the lower part of the Permian section gives a Permian Stage 2-3 age which is older than the oldest dated point in Lovelle Downs (Stage 3) but younger than the oldest rocks in the main basin.

TABLE 5. STRATIGRAPHIC TABLE, WESTON NO. 1

AGE	UNIT	Depth (m) K.B.	Thickness (m)	LITHOLOGY
	EROMANGA BASIN SEQUENCE			
		-unconformity-		
TRIASSIC	Undifferentiated	1248	194	Mainly medium to coarse-grained poorly consolidated sandstone with interbedded claystone and minor coal
PERMIAN	Undifferentiated	1442	522	Interbedded black coal and sandstone in upper part. Mainly sandstone below about 5800 m
		-unconformity-		
pre-PERMIAN	Basement	1964	19+	Phyllite, grey, silvery lustre

1983 T.D.

GEORGINA BASIN

Drilling of the subsidized well Ethabuka No. 1 which had been suspended because of flooding since December 1973, was resumed in September 1974. The well was plugged and abandoned prematurely when an attempt to deviate it failed after an unsuccessful fishing operation. There was no subsidized geophysical activity.

GIPPSLAND BASIN

There was no subsidized geophysical work, and no subsidized drilling activity in 1974. Three unsubsidized wells were drilled, Sunfish No. 1, Turrum No. 2, and Kingfish No. 5.

Sunfish No. 1 was located 10 km north of the Marlin Platform. Formation interval tests were carried out on a series of thin sandstone beds in an interbedded sandstone-shale sequence between 1713 and 2258 m. Oil was recovered from 1713 m, and gas and condensate from 1822, 1840, 1859, 1963, 1986, and 2004 m. In a press release, the Company stated that evaluation of the significance of the hydrocarbon shows must await the integration of the well results with geophysical data.

Kingfish No. 5 was drilled about 5 km northeast of the Kingfish B platform to test for a possible extension of the Kingfish Field to the east of the existing productive limits. After electric logging the well was plugged and abandoned as a dry hole.

Turrum No. 2 was located 2.9 km southeast of the Marlin Platform as a further investigation of the Turrum Field which underlies the Marlin Field and comprises the Palaeocene intra-Latrobe Group section of the Marlin Structure. The Marlin Field produces gas from sandstone reservoirs of Eocene age at the top of the Latrobe Group. In Turrum No. 2, wirelinelog evaluation of the section between 2128 and 2628 m indicates that the well penetrated several hydrocarbon-bearing horizons in the Turrum Field with four principal zones containing 58 m net total of gas-condensate-bearing sandstone beds.

OTWAY BASIN

Three petroleum exploration wells were completed in 1974, two of which were subsidized wells drilled onshore (Table 6), and the third an unsubsidized offshore well. Two onshore subsidized seismic surveys were completed.

Subsidized Seismic Surveys

The Tartwaup seismic survey was carried out south of Mount Gambier in the Gambier Trough - a structural subdivision of the Gambier Embayment. It was designed as a broad regional survey tied to the four wells drilled in the area: Lake Bonney No. 1 (BMR file, 67/4261), Caroline No. 1 (BMR file 66/4222), Douglas Point No. 2 (BMR file, 73/226), and Mount Salt No. 1 (BMR file, 62/1401). The two horizons of interest were the unconformities at the base of the Tertiary and at the base of the Upper Cretaceous. Vibroseis was used in an effort to overcome the recording problem in the area, and the survey was preceded by an experimental program to determine the most effective vibrating and recording parameters. Four problem zones were recognized, characterized by (1) surface volcanics, (2) an elevated sandy surface, (3) surface or near-surface limestone, and (4) underground caves. Noise test spreads and other experimentation were carried out in each of the four zones.

The survey produced reasonably reliable reflection data on the base of the Tertiary, and a contour map in feet below sea level was presented at 1:50 000 scale. A deeper horizon stated to be close to the base of the Upper Cretaceous is contoured in reflection time. However, it is based on poor quality reflection data.

The maps show a series of east-southeast-trending faults downthrown to the south. An east-trending anticline faulted on its northern flank was mapped in the northwestern part of the survey area a few kilometres northwest of Mount Gambier. The structure is some 5 km wide and 25 km long, with two separate culminations of which the western one is probably the more attractive drilling target. Several other structures were indicated, but will require further detailing.

The Lake Mundi seismic survey was located in western Victoria. Two traverses were surveyed about 43 km northwest and three traverses about 21 km west of Casterton. Geologically, the area lies in the Penola Trough, the northernmost structural subdivision of the Gambier Embayment. The objectives of the survey were to detail four possible structural traps which had been delineated by earlier surveys, and determine whether any others exist in the area. The recording technique employed was 6-fold analogue, and the main survey was preceded by an experimental program to determine optimum parameters.

Generally fair-quality data were produced and one horizon which was identified as the Lower Cretaceous Heathfield Sand was mapped. No closure was detected on the four structures previously mapped and no others were indicated.

TABLE 6. STRATIGRAPHIC TABLE, ROSS CREEK NO. 1

AGE	UNIT	Depth (K.B.) (m)	Thickness (m)	LITHOLOGY
	Heytesbury Gp			
PLIOCENE	Surface deposits	8	7 ?	Limestone?
MIOCENE?	Gellibrand Marl?	15?	70?	Marl
MIOCENE	Clifton Fm.	85?	61?	Marls, sandstone
	-Unconformity-			
LATE EOCENE	Nirranda Gp Mepunga Fm.	146?	156?	Quartz sandstone, light grey, medium to coarse-grained (fine-grained at base), porous, glauconitic, with fossil debris and foraminifera. Interbeds of clayey marl
	-Unconformity-			
EARLY EOCENE	Wangerrip Gp Dilwyn Fm.	302?	70?	Quartz sandstone, grey mainly medium to coarse-grained carbonaceous siltstone and shale
PALAEOCENE	Pebble Point Fm.	372	140	Siltstone, dark brown, dark grey to dark green, limonitic, common chloritic pebbles and oolites
	-Unconformity-			
LATE CRETACEOUS Santonian-Coniacian	Sherbrook Gp Curdies Fm.	512	265	Quartz sandstone, light grey, medium to very coarse-grained, interbedded coal. Rare siltstone and shale
	Paaratte Fm.	777	37	Lithic sandstone, mainly dark green, medium to coarse-grained, generall porous, chloritic pellet. Rare siltstone and shale
	-Unconformity-			

TABLE 6. (Contd.)

AGE	UNIT	Depth (K.B.) (m)	Thickness (m)	LITHOLOGY
EARLY CRETACEOUS Aptian-Albian	Otway Gp Eumeralla Fm.	814	2362	Interbedded sequence of:- claystones, mainly light green above 2440 m and grey below, carbonaceous, pyritic, siltstones, colour as above, carbonaceous, pyritic; lithic sandstone (mainly volcanic fragments), fine to very fine-grained, tight, carbonaceous pyritic; coal
- - - - - - - - - - - -Seismic unconformity- - - - - - - - - - - - - - - - - - - -				
Aptian	Eumeralla Fm.	3176	220	As above, below 2440 m
	Pretty Hill Sst.	3396	263+	Quartz sandstone, light grey, fine to medium-grained, and interbedded siltstone and claystone
		3659 T.D.		

Subsidized drilling

One of the two subsidized wells completed in 1974, North Eumeralla No. 1, was drilled largely in 1973 and the results are included in the previous Record in this series (Nicholas, op. cit.).

Ross Creek No. 1 was located some 15 km to the east of Port Campbell, in the Port Campbell Embayment. The well site was matured by the Ross Creek seismic survey (BMR file 73/264). It lies on an upthrown block with closure provided by the east-trending bounding fault. The basal Cretaceous Pretty Hill Sandstone was the target horizon. The sandstone units within the Pretty Hill Sandstone were tight owing to carbonate cement in the upper part of the section and secondary silification in the lower part. Fair to good gas shows were recorded below 2285 m from the Eumeralla Formation and the Pretty Hill Sandstone but these were related to carbonaceous beds and gas-filled fractures. Electric-log analysis indicated no hydrocarbon-bearing intervals.

Unsubsidized drilling

Neptune No. 1 was a dry hole drilled offshore at the western end of the basin about 60 km southwest of Capa Jaffa.

PEDIRKA BASIN

No wells were drilled in 1974. One subsidized seismic survey was carried out.

The Beal Hill seismic survey covered a large area in the southern part of the basin. Previous seismic data covered only the northwestern corner of the survey area, and adjacent areas to the north. Well control is also confined to the northwestern corner where Purni No. 1 (BMR file, 63/1209) and Mokari No. 1 (BMR file, 66/4194) are located. The survey was designed to extend reconnaissance coverage east of Mokari No. 1 toward the basin margin, and to determine the extent of Permian sediments.

Fair to good-quality data were obtained and a number of horizons identified by tie to Mokari No. 1. Horizon C is a strong reflection arising from the Lower Cretaceous 'Transition Beds' of the overlying Eromanga Basin. Horizon P is a very strong reflection from the upper part of a series of coal measures at the top of the Permian which in the Mokari well are of Lower Permian age. It should be noted that the well known P reflector mapped in the Cooper Basin arises from Upper Permian coals at the top of the Permian.

Contour maps were produced on the C and P horizons and on two others, one near the base of the Lower Permian Purni Formation, and one near the base of the Upper Member of this unit. An isochron map of the C-P interval was also prepared.

The survey has shown that Permian sediments about 550 m thick are present throughout the survey area. The processed record sections show a gradual change in character from west to east in the Permian reflection band. It is believed that this may indicate a change in the nature or extent of individual coal seams.

A number of mainly north-trending anticlines are indicated on horizon P, four of which in the northwestern part of the survey area have been mapped previously. These are named from west to east the Border Trend, Colson Trend, Macumba Trend, and East Border Trend. The P horizon reaches its maximum depth in the region 137° 20' to 137° 50'E.

Before this survey, a well site was proposed on the Colson Anticline. The new results indicate that additional seismic work is warranted to prove further closures on which wells could be located.

PERTH BASIN

Two subsidized wells (Table 7) were drilled and one subsidized seismic survey carried out in 1974, all onshore.

Subsidized seismic survey

The Erregulla 3 seismic survey was located about 350 km north of Perth over the northern part of the Dandaragan Trough. The main aim of the work was to improve the quality of seismic control on the horizon at the base of the Kockatea Shale by using a Vibroseis energy source and increased multiplicity recording to overcome the masking effect of the strongly reflecting Lower Jurassic Cattamarra Coal Measures Member. The survey area lies in a graben bounded by two major faults, the Urella on the east, and the Mountain Bridge on the west. The area within the graben is complexly faulted, and several closures have already been tested. One of the objectives of the survey was to obtain better structural control near Erregulla No. 1 (unsubsidized, 1966) in the east of the survey area, and Mondarra No. 1 (unsubsidized, 1968) in the west.

The Vibroseis technique produced generally better-quality data than previously obtained by the conventional dynamite method. The interpretation was based on integration

of all the data. In the Erregulla area time-contour maps were produced on the Donkey Creek Coal Measures horizon (within the Cattamarra Member), and on the underlying Eneabba Member of the Cockleshell Gully Formation, and an isochron map of the intervening interval was made. The Eneabba Member was mapped instead of the Kockatea Shale because of better reflection quality and because the two horizons are generally conformable. In the Mondarra area the one new traverse has provided further detail on three previously discovered closures, the largest of which has a vertical closure of 1100 m and areal extent of 5 km^2 mapped on the Donkey Creek Coal Measures horizon. The new data were insufficiently reliable for mapping on the deeper horizon in this area.

The survey has provided much greater control on the Erregulla structure. Ten separate fault-controlled closures have been located, the most promising of which is about 2 km northwest of Erregulla No. 1.

Subsidized drilling

Coomallo No. 1 was located on the west flank of the Dandaragan Trough, to test a small closure detailed by the Coomallo 2 seismic survey (BMR file, 73/206). The objective horizon was the Lower Jurassic Cattamarra Coal Measures Member of the Cockleshell Gully Formation. The well entered this formation about 900 m below the depth predicted from the poor-quality seismic records, and the interpretation of the east-west section across the Coomallo structure has had to be revised. There were no significant indications of hydrocarbons. This may be due to lack of closure at the objective horizon, inhibition of up-dip migration by structural or stratigraphic discontinuities, or palaeotemperatures too low for hydrocarbon generation. The present-day geothermal gradient in this area is low. In the well a gradient of approximately $2^{\circ}C/100$ m was estimated.

Barragoon No. 1, about 125 km south of Coomallo No. 1, was drilled as a stratigraphic test to investigate the possible onshore extension of the Mid-basin Arch, which is the dominant structural feature of the offshore Vlaming Sub-basin. The Barragoon area lies between the coast, 8 km to the west, and the Badaminna Fault 6 km to the east, between the western flank of the onshore Dandaragan Trough and the offshore Mid-basin Arch. The interpretation of the extension of the arch into the Barragoon area implied a major down-to-the-west throw on the Badaminna Fault of some 5000 m separating the Gingin-Badaminna area of the Dandaragan Trough from the Vlaming Sub-basin. The presence of Coastal Limestone at the surface in the area has prevented the acquisition of good-quality seismic data and the well was consequently located on a very poorly defined anticline. It was hoped that the well would encounter

TABLE 7. STRATIGRAPHIC TABLES, PERTH BASIN WELLS

COOMALLO NO. 1

AGE	UNIT	Depth K.B. (m)	Thickness (m)	LITHOLOGY
LATE-MIDDLE JURASSIC	Yarragadee Fm. (including laterite cap)	5	2967	Mainly sandstone, minor siltstone and coal
MIDDLE JURASSIC	Cadda Fm.	2972	235	Siltstone, sandstone, limestone, shale
MIDDLE-EARLY JURASSIC	Cockleshell Gully Fm. Cattamarra Coal Measures Member	3207	313+	Sandstone, siltstone coal
		T.D. 3520 m		

BARRAGOON NO. 1

AGE	UNIT	Depth K.B. (m)	Thickness (m)	LITHOLOGY
QUATERNARY	Surface sands	4	4	
"	Coastal Limestone	8?	67?	
	-Unconformity-			
LATE CRETACEOUS	Coolyena Gp ?Lancelin Beds	75?	25?	Calcareous and glauconitic siltstone?
	Osborne Fm.	100?	113?	Grey to black very argillaceous siltstone and minor sand
	-Disconformity-			
EARLY CRETACEOUS	Warnbro Gp Leederville Fm.	213	486	Mainly coarse-grained, often feldspathic sand. Common interbeds of dark grey siltstone
	South Perth Shale	699	104	Coarse-grained sand mainly between 718 and 752 m. Remaining section dark grey siltstone grading to claystone
	-Unconformity-			

TABLE 7. (Contd.)

AGE	UNIT	Depth K.B. (m)	Thickness (m)	LITHOLOGY
LATE JURASSIC	Yarragadee Fm.	803	1532+	Mainly medium to very coarse-grained sand above 1640 m. Siltstone interbeds common below this depth
		2335 T.D.		

an Upper Jurassic to Lower Cretaceous section similar to that penetrated by offshore wells drilled around the Mid-basin Arch some 50 to 70 km to the south (Quinns Rock No. 1, Charlotte No. 1, and Gage Roads Nos 1 and 2, BMR files 68/2046, 70/761, 68/2039, 1968 unsubsidized). In these wells the sands of the Upper Jurassic to Lower Cretaceous Yarragadee Formation had good reservoir characteristics and produced significant hydrocarbon shows. The Quinns Shale Member of the Yarragadee Formation, and a Neocomian shale which overlies the Yarragadee Formation are both proven source and cap rocks in these wells.

The section penetrated by Barragoon No. 1 below the Lower Cretaceous unconformity proved to be older than predicted, and did not include the Quinns Shale Member or the Neocomian shale. It more closely resembled that encountered in onshore wells such as Badaminna No. 1 (unsubsidized, 1967) drilled 8 km to the east in the Dandaragan Trough.

The drilling has therefore indicated that the throw on the Badaminna Fault is much less than predicted, and a large down-to-the-west fault is postulated along the coastline to the west of Barragoon. To the west of this fault, sediments of Neocomian age are preserved below the Lower Cretaceous unconformity.

SURAT BASIN

The only petroleum exploration wells drilled in 1974 were those with targets in the underlying Taroom Trough of the Bowen Basin. There were three subsidized geophysical surveys,

The Waggamba seismic survey was located about 80 km south-southeast of Surat and covered an area of the eastern flank of the Roma Shelf. Two horizons, the top of the Jurassic Hutton Sandstone and the top of the Permian Kianga Formation (equivalent to the Blackwater Group), were mapped by earlier surveys. The quality of the earlier single-fold data was poor and no mapping was possible at the level of the Evergreen Formation, the prospective unit which underlies the Hutton Sandstone. The general structural trend shown on the Jurassic horizon by the earlier surveys was northeast and two closed anticlines were mapped. The southern closure was drilled by Dalkeith No. 1 (unsubsidized, 1965). The Waggamba survey was designed to detail the northern closure (Waggamba anticline) located a few miles northeast of Dalkeith and provide a tie to the well. It was hoped that the new data would provide an isopach of the Evergreen Formation and a contour map on the basement.

The use of digital recording and multiple coverage produced an improvement in data quality but it was still only poor to fair, and no new horizons could be contoured. However a new structural picture has been revealed on the top Hutton Sandstone horizon. The earlier interpretation of the Dalkeith and Waggamba closures on a northeast-trending anticline has been revised. The new map shows northwesterly axial trends. The Waggamba anticline is no longer shown, but two parallel anticlines form a broad feature at the northern end of the survey area. The Dalkeith anticline is mapped as a northwest-trending structure with a pronounced syncline along the northeast flank.

The new data have not changed the general structural picture of the Permian horizon, which show a northward-trending and northward-plunging anticlinal nose whose eastern flank shows regional dips into the main basin. Features which are indicated in much greater detail by the new data are a pronounced north-trending syncline on the western flank of the anticline, and subcropping of the Kianga Formation on basement near Dalkeith No. 1 and farther north on the northern flank of the syncline. The report recommends further detailing of the two new closures mapped on the top Hutton Sandstone horizon and the syncline mapped at the Kianga Formation horizon.

The Gowrie seismic survey was located about 65 km northwest of St George, immediately to the northeast of the Maranoa River. Foyleview No. 1 (BMR file, 68/2004) and Balonne No. 1 (unsubsidized, 1965) lie to the west and east of the area respectively. In the Foyleview well the Lower Jurassic Hutton Sandstone rests directly on basement, but in Balonne No. 1 this unit is underlain by the Evergreen Formation and the Precipice Sandstone. These were hydrocarbon shows in all three units.

The objectives of the Gowrie survey were to provide further information on the onlapping relation of the Evergreen Formation and Hutton Sandstone on basement, and a possible prospective structure within the Evergreen Formation as outlined by the Maranoa seismic survey (BMR file, 67/11152).

Fair-quality data were obtained and three horizons mapped in depth: horizon F (Middle Jurassic Walloon Coal Measures); horizon G (near top of Lower Jurassic Evergreen Formation); and horizon X (metamorphic basement). The least reliable data were obtained from the basement horizon, which is interpreted as rising steadily towards the northwest as a low-relief northeast-trending ridge. This ridge is more pronounced on horizon G, and two small closures are indicated. A well site is recommended on the most north-easterly closure. A similar structural picture, although with less relief, is seen on the top horizon.

The survey failed to provide any further information on the relations of the Hutton Sandstone and Evergreen Formation to basement because of the unreliability of the basement reflector, owing to the close proximity of the overlying Evergreen horizon.

The Niminbah seismic survey covered an area south of St George, a few kilometres southwest of the Queensland/NSW border. The Thallon seismic and gravity survey (BMR file 69/3087) mapped two horizons tentatively identified as top of Walloon Coal Measures and economic basement. The contours indicated a gentle regional dip to the north. Several anticlines were indicated - the most promising located about 3 km west of Thallon with closure proved in all directions except to the southeast. The aims of the Niminbah survey were to obtain more detailed information about this anticline and define a well location.

The digitally processed three-fold CDP data were better than the single-fold analogue data obtained on the Thallon survey. Three horizons were mapped: base of Cretaceous, base of Jurassic, and economic basement. The Jurassic horizon, which is the most reliable, shows a north-trending syncline in the eastern part of the survey area, faulted on the western flank and rising steeply on the eastern. Structural deformation is much greater on the western side of the syncline than on the eastern, and is particularly marked on the economic basement horizon. The anticline interpreted from the earlier data was not confirmed as a significant structure. Several small anticlines were mapped, but only those west of the fault are considered worth following up.

SYDNEY BASIN

The unsubsidized well Cape Three Points No. 1 was drilled near Terrigal as a step-out from Terrigal No. 1 (unsubsidized, 1966). No significant hydrocarbons were recorded.

There was no subsidized drilling or geophysical activity.

MOREHEAD BASIN

One subsidized seismic survey was carried out in 1974. No wells were drilled.

The Weam seismic survey was a sequel to the Morehead reconnaissance seismic survey (BMR file, 73/284) and was designed to extend the reconnaissance coverage of the permit area (P 55).

Fair to good quality record sections were obtained, and maps were produced for two horizons: near base of Mesozoic, and base of Tertiary. An isochron map of the intervening interval was also compiled.

The survey extended seismic control to the north, northwest and south of the central part of the basin. Many east-trending normal faults, mainly upthrown to the north, were mapped. Five faulted anticlines are thought worthy of further investigation, so also is a feature interpreted as an old topographic high against which the Mesozoic sediments onlap.

NORTHERN NEW GUINEA BASINS

One subsidized aeromagnetic survey and one subsidized well were completed in 1974. The well, Keram No. 1, was completed at the beginning of the year and the detailed results were included in the previous Record in this series.

The Nopan aeromagnetic survey was flown over two separate areas in the Sepik Plains, one immediately west of Angoram and the other about 80 km farther west. The survey was designed to delineate possible sedimentary troughs.

The results have shown that in each area the basement is cut by two intersecting fault systems, one trending northeast, and the other northwest. Basement depressions containing up to 4 km of sediments have been interpreted. The presence of several relatively small local basement highs suggests that structural traps may exist in the overlying sedimentary section.

PAPUAN BASIN

Three subsidized geophysical surveys were completed in 1974. The unsubsidized offshore well, Dibiri No. 1 was begun in December, and was still in progress at the time of writing.

The Lavani seismic and gravity survey was designed to determine whether basement is involved in the Lavani Anticline, a surface structure located on the southeast-trending axis of the Muller Range in the northern Papuan Basin. The anticline forms a ridge along the length of the Lavani Valley and extending beyond it to the northwest through the Kelero inlier, 15 km from Lavani. In the southeast it curves to the east and disappears in the structurally complex Harimu Valley area. Gravity values were read along the seismic lines and tied to the BMR gravity station at Tari, and four new base stations were established, three in the Lavani Valley and one at Koroba. In the northwest, limestone cliffs prevented seismic exploration.

The quality of the seismic data obtained was no better than fair, and in some areas the results were unusable. One horizon (horizon C), interpreted as possible basement, was contoured in time and depth. In parts of the sections two shallower horizons were picked. Four refractors with velocities from 2300 to 5660 m/s were indicated by the refraction records. The deepest was found to correspond closely to horizon C. The refraction data also revealed many faults.

On horizon C the anticline is well defined. A fault has been tentatively interpreted along the southwestern flank of the structure and a series of parallel faults interpreted on the northeastern flank. The map also shows a number of smaller faults crossing the structure and two small culminations. The northern culmination has been recommended for drilling provided that study of the regional geology confirms that the entire structure has closure to the northwest. It is predicted that the well would encounter a maximum of 2500 m of Mesozoic sediments before entering igneous basement.

The Aworra River/Ok Tedi seismic and gravity survey was located in two separate areas in the western part of the Papuan Basin. The Aworra River area lies in the southeastern part of the permit area (P-51), and the Ok Tedi in the northwestern part bordering Irian Jaya. Previous geological and geophysical work has shown that the Jurassic and Cretaceous section may contain structural traps. The main objective of the survey was to extend reconnaissance seismic and gravity coverage in the hope of locating structural traps. A secondary objective was to establish the limits of Upper Cretaceous, Eocene, and Oligocene sedimentation to the south and southwest.

In the Aworra River area three horizons were mapped: pre-Mesozoic basement, a representative intra-Mesozoic horizon, and one at the base of the Miocene limestone. The three horizons were tied to Komewu No. 2 well (unsubsidized 1957/58). The quality of the data on the upper one is mainly fair to good, but the quality of the lower two is generally poor.

In the Ok Tedi area the same three horizons were mapped, plus a limestone at the top of the Miocene which was a fair to good reflector over most of the area.

No definite structural closures were located in either area. The survey has demonstrated the difficulty of obtaining good-quality seismic data from below the thick Miocene limestone section, although the results from the deeper horizons have contributed to the understanding of the permit area. In the southeast the results suggest that an Eocene and/or Palaeocene section exists between the base of the Miocene limestone and a

Cretaceous/Lower Tertiary unconformity lower in the section. This sequence was previously thought to be absent in the permit area. A deep southeast-plunging basement downwarp occupies most of the Aworra River area. Structural closures may occur on the northern flank of the downwarp immediately south of the Hawoi River. These are recommended for further seismic investigation. In the Ok Tedi area a number of small fault-controlled highs have been mapped at basement level, and a possible reef structure is indicated within the Miocene limestone section.

The results of the gravity survey indicate that a gravity high which may have structural significance, is present along the Irian Jaya Border.

The Bamu gravity and magnetic survey was carried out over two separate areas in western Papua, one at the mouth of the Fly River, and the other to the north over the area traversed by the lower reaches of the Bamu, Wamar, and Aramia Rivers. The overall area is near the southwestern flank of the Papuan Basin where Mesozoic and Tertiary sediments thin against the Cape York/Oriomo basement high. The quality of seismic data previously obtained in the area is generally poor although a number of northwest-trending intra-Mesozoic anticlines were indicated, one of which, in the Fly River delta was tested by Magobu No. 1 (BMR file, 70/581). This well confirmed the hypothesis that the anticlinal trend coincides with massive barrier sand complexes. It penetrated two such complexes, one Lower Cretaceous and the other Middle Jurassic. The 1974 survey was designed to produce results that would aid in the interpretation of the poor-quality seismic data, and to establish new leads for further seismic exploration, particularly in the northern, relatively unknown area.

The Bouguer anomaly map shows that the northern survey area lies on the northern flank of a large positive gravity anomaly with a number of smaller positive anomalies superimposed. The large anomaly is thought to be due to a variation in the density of the basement, but the smaller superimposed anomalies may be related to structure in the overlying sedimentary section. In the Fly River area the Bouguer anomaly values increase to the south, west, and northwest. A number of small distinct positive anomalies are indicated, one of which corresponds to the Magobu Island structure. The magnetic data are not inconsistent with the view that the smaller gravity anomalies are caused by structure in the sedimentary section.

ACKNOWLEDGEMENT

The author thanks L.K. Rixon for his help in preparing the tables.

TABLE 8

PETROLEUM EXPLORATION WELLS DRILLING IN 1974

BASIN / COMPANY / Well name / BMR file no. if subsidized	Latitude South / Longitude East (° ' ")	1:250 000 Sheet / Area	Elevation (metres) GL/MD / DF/KB/RT	Date Spudded / TD Reached	TD (metres) or depth at 31.12.74	Status at 31.12.74 / Remarks
ADAVALE						
HARTOGEN EXPLORATION PTY LTD						
Grey Range No. 1	25 06 33	G55/5	GL 348	19 4 74	3491.5	PA
BMR file 74/215	144 37 22		KB 352	19 5 74		
BASS						
ESSO EXPLORATION AND PRODUCTION AUSTRALIA INC.						
Toolka No. 1	39 24 37	J55/13	MD 79	14 1 74	229.9	PA
	145 23 45		KB 10	5 2 74		
Toolka No. 1A	39 24 36	J55/13	MD 79	15 1 74	2714.9	PA
	145 23 45		KB 10.0	5 2 74		
HEMATITE PETROLEUM PTY LTD						
Aroo No. 1	39 47 30	J55/13	MD 76.2	4 3 74	3691.7	PA
BMR file 74/208	145 26 48		KB 10.0	19 4 74		
Nangkero No. 1	40 04 24	K55/2	MD 79.5	24 4 74	2877.3	PA
BMR file 74/211	145 58 42		KB 10.0	12 5 74		
BONAPARTE GULF						
ARCO AUSTRALIA LTD						
Curlew No. 1	11 46 19	C52/14	MD 77.7	6 11 74	1748	In progress
	128 15 48		KB 25			

TABLE 8 (contd)

Plover No. 2	12 57 29 126 10 28	D52/1	WD 60 KB 22	10 5 74 19 5 74	1524	PA
Prion No. 1	12 24 16 124 09 07	D51/3	WD 69 KB 25	10 7 74 12 8 74	2960.5	PA
Puffin No. 2	12 21 47 124 16 31	D51/3	WD 78 KB 25	27 5 74 25 6 74	2460.9	PA
Shearwater No. 1	10 30 49 128 18 37	C52/10	WD 69.8 KB 25	19 9 74 2 11 74	3178	PA
Skua No. 1	12 30 19 124 25 58	D51/3	WD 80.5 KB 29.6	14 11 74 20 12 74	3048	PA
Sunrise No. 1	9 35 24 128 09 14	C52/6	WD 159 KB 30	31 12 74	225	In progress
Turnstone No. 1	11 44 13 125 17 45	C51/16	WD 117.9 KB 25	19 8 74 13 9 74	2019.3	PA
Whimbrel No. 1	12 26 59 125 22 41	D51/4	WD 74.9 KB 25	5 4 74 4 5 74	2059	PA
AUSTRALIAN AQUITAINE PETROLEUM LTD						
Kimmore No. 1	14 02 01 129 15 45	C52/15	WD 29 KB 10	17 7 74 30 8 74	3250	PA
B.O.C. OF AUSTRALIA LTD						
Dillion Shoals No. 1	11 14 21 125 26 49	C51/16	WD 125 KB 12	4 2 74 26 5 74	3970	PA
North Hibernia No. 1 BMR file 73/262	11 40 19 123 19 29	C51/15	WD 33 RT 13	10 10 73 26 1 74	4000	PA

TABLE 8 (contd)

Troubadour No. 1	9	44	04	C52/6	WD	96	3	6	74	3459	PA
	128	07	26		KB	12.5	15	8	74		
BOWEN / Surat											
ASSOCIATED AUSTRALIAN RESOURCES N.L.											
Appletree No. 1	26	54	17	655/12	GL	277	17	1	74	2343.3	PA
BMR file 73/261	149	16	03		KB	282	14	2	74		
Silver Valley No. 1	26	43	36	655/12	GL	329	24	2	74	2339	PA
BMR file 73/261	149	15	51		KB	334	20	3	74		
BRIDGE OIL N.L.											
Silver Springs No. 1	27	36	00	655/16	GL	261	6	6	74	1900.4	Suspended gas well
BMR file 74/224	149	06	12		KB	265	29	6	74		
HARTOGEN EXPLORATIONS PTY LTD											
Nonclova No. 1	27	00	35	655/16	GL	278	26	5	74	1744.9	PA
BMR file 74/216	148	57	12		KB	282	10	6	74		
BREMER											
SILFAR OIL AND GAS SEARCH											
Kondenup No. 1	34	29	36	150/11	GL	159	19	12	73	111.6	PA
	117	45	22		KB	162	20	1	74		
Sunday Swamp No. 1	34	45	07	150/11	GL	99	7	2	74	174.9	PA
	118	17	37		KB	?	14	3	74		
BROWSE											
B.O.C. OF AUSTRALIA LTD											
Heywood No. 1	13	27	46	D51/7	WD	35	7	4	74	4572	PA
	124	04	00		KB	10	27	6	74		
Lombardina No. 1	15	17	20	D51/77	WD	175	15	5	74	2855	PA
	121	32	14		KB	30	16	7	74		
Prudhoe No. 1	13	44	56	D51/7	WD	175	13	9	74	3322	PA
	123	51	51		RT	30	1	11	74		

TABLE 8 (contd)

CANNING											
B.O.C. OF AUSTRALIA LTD											
Minilya No. 1	18	19	29	E50/12	WD	146	4	8	74	2400	PA
	118	43	57		KB	30	30	8	74		
WEST AUSTRALIAN PETROLEUM PTY LTD											
Jones Range No. 1	19	21	40	E51/16	GL	228.5	30	8	74	2540	PA
	125	40	13		RT	232	4	11	74		
CARNARVON											
B.O.C. OF AUSTRALIA LTD											
Depuch No. 1	18	50	07	E50/11	WD	143	4	2	74	4300	PA
BMR file 73/283	117	55	19		KB	10	30	3	74		
Hampton No. 1	20	07	05	F50/2	WD	53	22	3	74	2584	PA
	116	32	47		RT	30	17	4	74		
Lambert No. 1	19	27	23	E50/14	WD	125	13	11	73	3700	Oil discovery
	116	29	23				23	1	74		
Lowendal No. 1	19	52	48	E50/14	WD	85	31	1	74	3642	PA
	115	38	02		RT	30	15	3	74		
Poissonnier No. 1	19	18	31	E50/15	WD	83	20	12	73	1962	PA
	118	09	20		RT	30	19	1	74		
WEST AUSTRALIAN PETROLEUM PTY LTD											
Hilda No. 1	21	12	01	F50/5	WD	144	5	3	74	1546	PA
	114	38	12		KB	12	22	3	74		
Hilda No. 1A	21	12	00	F50/5	WD	145	29	4	74	3466	PA
	114	38	13		KB	12	19	9	74		Hydrocarbon show
Mardie No. 1A	21	21	19	F50/6	GL	6.7	21	11	74	164.3	Suspended
	115	42	30		RT	9.4	5	12	74		Gas show

TABLE 8 (contd)

West Tyral Rocks No. 2	20	12	55	F50/1	WD	126	1	10	74	3825	PA
	115	03	58		RT	12	23	11	74		Gas discovery
Windoo No. 1A	21	21	18	F50/6	GL	5.8	8	12	74	174.3	Suspended
	115	40	55		RT	7.9	14	12	74		Gas show
CLARENCE - MORETON											
CLARENCE OIL AND MINERALS COMPANY N.L.											
Hogarth No. 4	28	54	45	H56/2	GL	257.6	6	8	73	1173.5	Completed as future gas producer
	152	51	26		RT	?	17	5	74		
EROMANGA											
QUEENSLAND MINES DEPT											
Aramac No. 1	22	57		F55/9	GL	220.7	19	3	74	1824.8	Plugged and converted to a water bore
	145	17			KB	224.0	19	4	74		
Hexham No. 1	22	48	00	F55/9	GL		11	7	74	1829	PA
	145	57	00				4	8	74		
GALILEE											
HEMATITE PETROLEUM PTY LTD											
Weston No. 1	22	02	20	F54/12	GL	183	5	6	74	1983	PA
BMR file 74/221	142	36	38		KB	187	22	6	74		
GEORGINA											
ALLIANCE OIL DEVELOPMENT AUSTRALIA N.L.											
Ethabuka No. 1	23	41	20	F54/13	GL	120	22	9	73	*1960	PA
							* 2	11	73		
BMR file 73/224	138	25	30		KB	126	**22	10	74		
GIPPSLAND											
ESSO EXPLORATION AND PRODUCTION INC.											
Kingfish No. 5	38	34	47	J55/11	WD	79	16	5	74	2512.8	PA
	148	14	29		KB	10	2	6	74		

* Maximum depth reached
** Sidetrack well completed

TABLE 8 (contd)

Sunfish No. 1	38	08	26	J55/11	WD	56	7	2	74	2492	PA
	148	13	38		KB	10	28	2	74		
Turrum No. 2	38	14	39	J55/11	WD	61	5	6	74	2633	PA
	148	14	56		KB	10	12	7	74		Oil and gas show
OTWAY											
ESSO EXPLORATION AND PRODUCTION INC.											
Neptune No. 1	37	18	13	J54/6	WD	35.4	27	12	73	2438	PA
	139	44	09		RT	9.8	12	1	74		
SHELL DEVELOPMENT (AUSTRALIA) PTY LTD											
North Eumeralla No. 1	38	09	51	J54/11	GL	54.9	30	11	73	2967.8	PA
BMR file 73/275	141	53	30		KB	63.4	21	1	74		
Ross Creek No. 1	38	31	57	J54/12	GL	152	18	2	74	3661	PA
BMR file 74/200	143	08	34		KB	161	29	4	74		
PERTH											
WEST AUSTRALIAN PETROLEUM PTY LTD											
Barragoon No. 1	31	21	40	H50/14	GL	36	31	3	74	2335	PA
BMR file 74/210	115	35	09		RT	40	20	4	74		
Ceomalle No. 1	30	14	55	H50/9	GL	253	17	1	74	3526	PA
BMR file 73/285	115	24	57		KB	258	25	2	74		
SYDNEY											
JOHN STREVENS (TERRIGAL)											
Cape Three Points No. 1	33	28	00	I56/5	GL	30.5	6	3	74	610	PA
	151	26	00				12	8	74		
NORTHERN NEW GUINEA BASINS											
GENERAL CRUDE OIL CO.											
Keram No. 1	4	23	06	B55/1	GL	11.9	28	12	73	1995.2	PA
BMR file 73/254	144	09	23		KB	15.8	21	1	74		

TABLE 8 (contd)

PAPUAN													
PHILLIPS AUSTRALIAN OIL CO.													
Dibiri No. 1	08 144	16 40	59 18		C55/1		WD	70.1		7	12	74	In progress

TABLE 9. SUBSIDIZED GEOPHYSICAL OPERATIONS DURING 1974

BASIN Operating Company name BMR file no.	Permit 1:250 000 sheet area	Duration	Extent
AMADEUS BASIN			
MAGELLAN PETROLEUM (N.T.) PTY LTD			
Central Amadeus seismic BMR file 73/215	OP 175, 178 F52-16 F53-13/14 G52-4 G53-1/2	3. 7.73 25. 4.74	893 km 12-fold CDP
Gardiner Range gravity BMR file 73/242	OP 175, 178 F52-16 F53-13 G52-4 G53-1	1.10.73 11. 1.74	970 stations on 262.6 km of line. Stations every 280 m
BOWEN BASIN			
BRIDGE OIL N.L.			
Wunger seismic BMR file 74/206	ATO 145P G55-16	14. 2.74 10. 3.74	134.6 km of 4 and 5-fold CDP
INTERNATIONAL OIL LTD			
Telgazli Creek seismic BMR file 74/204	ATP 145P G55-16	19. 3.74 31. 3.74	56.3 km of 4-fold CDP
CANNING BASIN			
ASSOCIATED AUSTRALIAN OILFIELDS N.L.			
Thornton seismic BMR file 72/3362	EP 58, 59 E52-13 F52-1/5/9	29. 7.73 31. 1.74	671.7 km 24-fold data
HEMATITE PETROLEUM PTY LTD			
Bedout North marine seismic and magnetometer survey BMR file 74/225	WA-29-P E50-11, 12	25. 6.74 29. 6.74	683.4 km of 24-fold data
COOPER BASIN			
AUSTRALIAN AQUITAINE PETROLEUM PTY LTD			
Karmona seismic BMR file 74/202	ATP 66, 67 P G54-11, 15 H54-3	30. 5.74 29. 6.74	191 km of 6 and 4-fold CDP reflection
Windula seismic BMR file 74/213	ATP 66, 67 P G54-11/15	13. 5.74 30. 6.74	161.3 km of 12-fold CDP reflection using weight drop method

XLX N.L. East Windorah (High sensitivity) aeromagnetic BMR file 74/220	ATP 197,204 P G54-7/8/11/12	2. 5.74 25. 5.74	4026 km
GALILEE BASIN AMERICAN AUSTRALIAN ENERGY LTD Albro seismic BMR file 74/218	ATP 207 P F55-10	8. 4.74 19. 4.74	35.1 km 6-fold CDP
HEMATITE PETROLEUM PTY LTD Ayrshire seismic BMR file 74/217	ATP 166 P F54-8,11,12	20. 4.74 22. 5.47	49.9 km of 6- fold and 185.0 km of 3-fold digital reflection
OTWAY BASIN ALLIANCE OIL DEVELOPMENT AUSTRALIA N.L. Tartwaup seismic BMR file 73/245	PEL 8 J54-6	14.10.73 22. 1.74	302.3 km 12-fold CDP and 58 km of 24-fold CDP
PLANET EXPLORATION COMPANY PTY LTD Lake Mundi seismic BMR file 74/214	PEP 26 J54-7	2. 5.74 16. 5.74	43 km of 6-fold CDP reflection
PEDIRKA BASIN DELHI INTERNATIONAL OIL CORPORATION Beal Hill seismic BMR file 74/212	PEL 5,6 G53-11/12 G54-9	5. 4.74 30. 6.74	289.72 km of 12-fold CDP reflection
PERTH BASIN WEST AUSTRALIAN PETROLEUM PTY LTD Erregulla 3 seismic BMR file 74/219	EP 21,23 H50-5	23. 5.74 21. 6.74	104.3 km of 24-fold CDP reflection
SURAT BASIN Waggamba seismic BMR file 74/203	ATP 145P G55-16	14. 3.74 18. 3.74	18.5 km of 4 and 6-fold digital CDP
PECOS-WESTERN AUSTRALIA INC. Gowrie seismic BMR file 74/222	ATP 185P G55-15	16. 5.74 19. 5.74	4.4 km of 4- fold and 11.8 km of 6-fold analogue CDP reflection

TRICENTROL AUSTRALIA LTD			
Niminbah seismic	ATP 200P	19.3.74	134.7 km of 3-fold CDP
BMR file 73/268	H55-4	12.4.76	
MOREHEAD BASIN			
TEXACA OVERSEAS PETROLEUM COMPANY			
Weam seismic	P55	10. 1.74	345.6 km of 12-fold CDP
BMR file 73/284	G54-3/7	30. 6.74	reflection
NORTHERN NEW GUINEA BASINS			
AUSTRALIAN AQUITAINE PETROLEUM PTY LTD			
Nopan aeromagnetic	P 45A, B	10. 6.74	3796 km on a 3 x 10 km
survey	P 41B	30. 6.74	grid at a height of
BMR file 74/223	A54-15/16		600 m
	B54-3/4		
	A55-13		
	B55-1		
PAPUAN BASIN			
BP PETROLEUM DEVELOPMENT AUSTRALIA PTY LTD			
Lavani seismic and	P 46	30.12.73	70.6 km of 12-fold CDP
gravity	B54-7	28. 3.74	reflection, 674
BMR file 73/279			refraction shots, and
			437 gravity stations
ENDEAVOUR OIL COMPANY N.L.			
Bamu gravity and	L 6, 7	13.12.73	1586 new gravity stations
magnetic survey	B54-16	16. 5.74	and 135 new magnetic
BMR file 73/276	C54-4		stations
UNION OIL DEVELOPMENT CORPORATION			
Aworra River-Ok Tedi	P 51	16.12.73	40 km 12-fold and 119.1
seismic and gravity	B54-6/7/8	30. 6.74	km of 6-fold CDP
BMR file 73/280	10/11/12		reflection. 134 km
	14/15/16		(246 stations) of grav-
			ity profiling

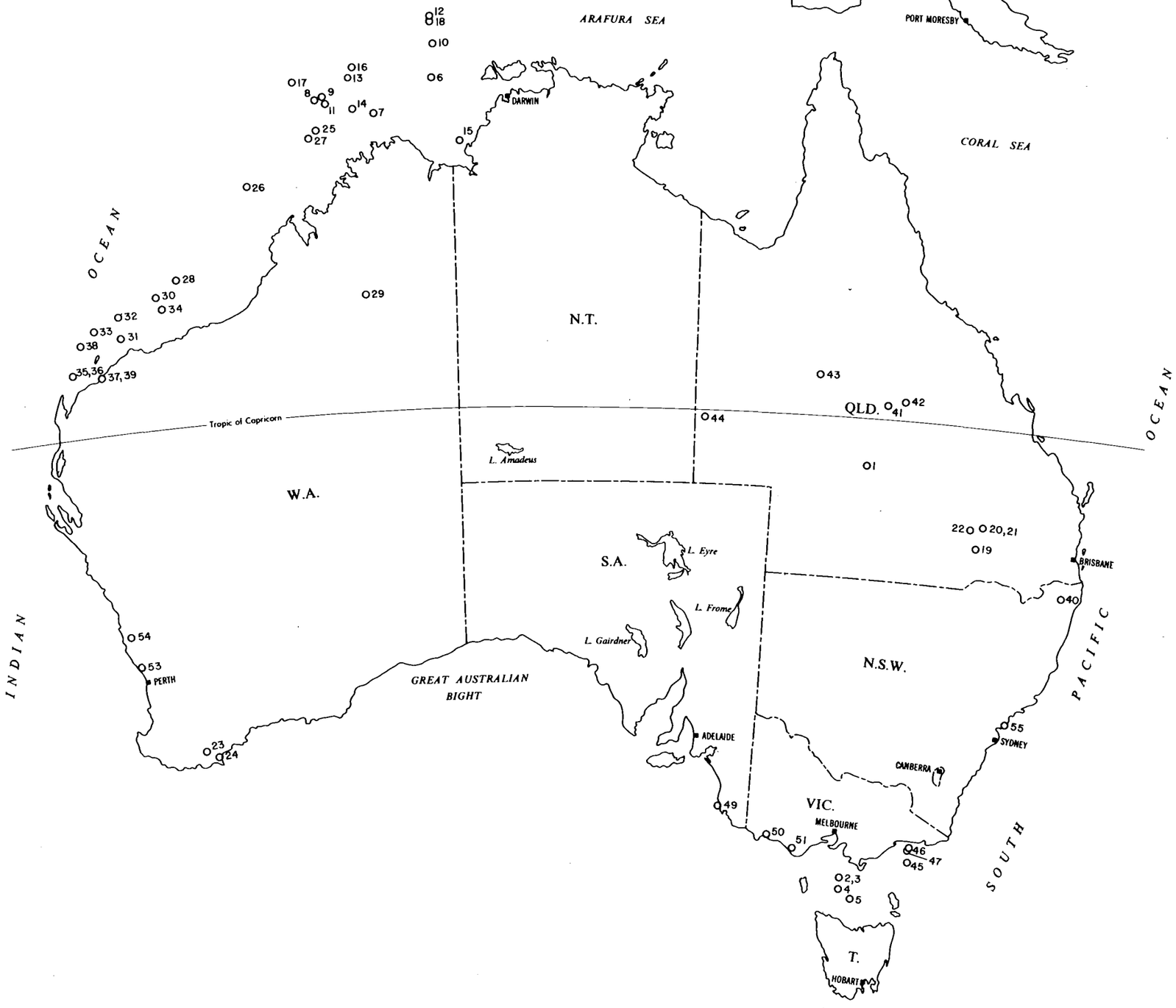
AUSTRALIA AND PAPUA NEW GUINEA

PETROLEUM EXPLORATION WELLS

1974

200 0 200 400 600 800 KILOMETRES

200 0 200 400 600 MILES



Note: Unless otherwise stated, well location refers to No. 1 well

1	Grey Range, Qld	29	Jones Range, W.A.
2	Toolka, Tas.	30	Depuch, W.A.
3	Toolka-1A, Tas.	31	Hampton, W.A.
4	Aroo, Tas.	32	Lambert, W.A.
5	Nangkero, Tas.	33	Lowendal, W.A.
6	Curlew, N.T.	34	Poissonnier, W.A.
7	Plover-2, W.A.	35	Hilda, W.A.
8	Prion, N.T.	36	Hilda-1A, W.A.
9	Puffin-2, N.T.	37	Mardie-1A, W.A.
10	Shearwater, N.T.	38	West Tryal Rocks-2, W.A.
11	Skua, N.T.	39	Windoo-1A, W.A.
12	Sunrise, N.T.	40	Hogarth-4, N.S.W.
13	Turnstone, N.T.	41	Aramac, Qld
14	Whimbrel, W.A.	42	Hexham, Qld
15	Kinmore, N.T.	43	Weston, Qld
16	Dillon Shoals, N.T.	44	Ethabuka, Qld
17	North Hibernia, N.T.	45	Kingfish-5, Vic.
18	Troubadour, N.T.	46	Sunfish, Vic.
19	Silver Springs, Qld	47	Turrum-2, Vic.
20	Apple Tree, Qld	48	Keram, PNG
21	Silver Valley, Qld	49	Neptune, S.A.
22	Monclova, Qld	50	North Eumeralla, Vic.
23	Kendenup, W.A.	51	Ross Creek, Vic.
24	Sunday Swamp, W.A.	52	Dibiri, PNG
25	Heywood, W.A.	53	Barragoon, W.A.
26	Lombardina, W.A.	54	Coomallo, W.A.
27	Prudhoe, W.A.	55	Cape Three Points, N.S.W.
28	Minilya, W.A.		

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Record No. 1975/95

X AUS-1-15U

AUSTRALIA AND PAPUA NEW GUINEA

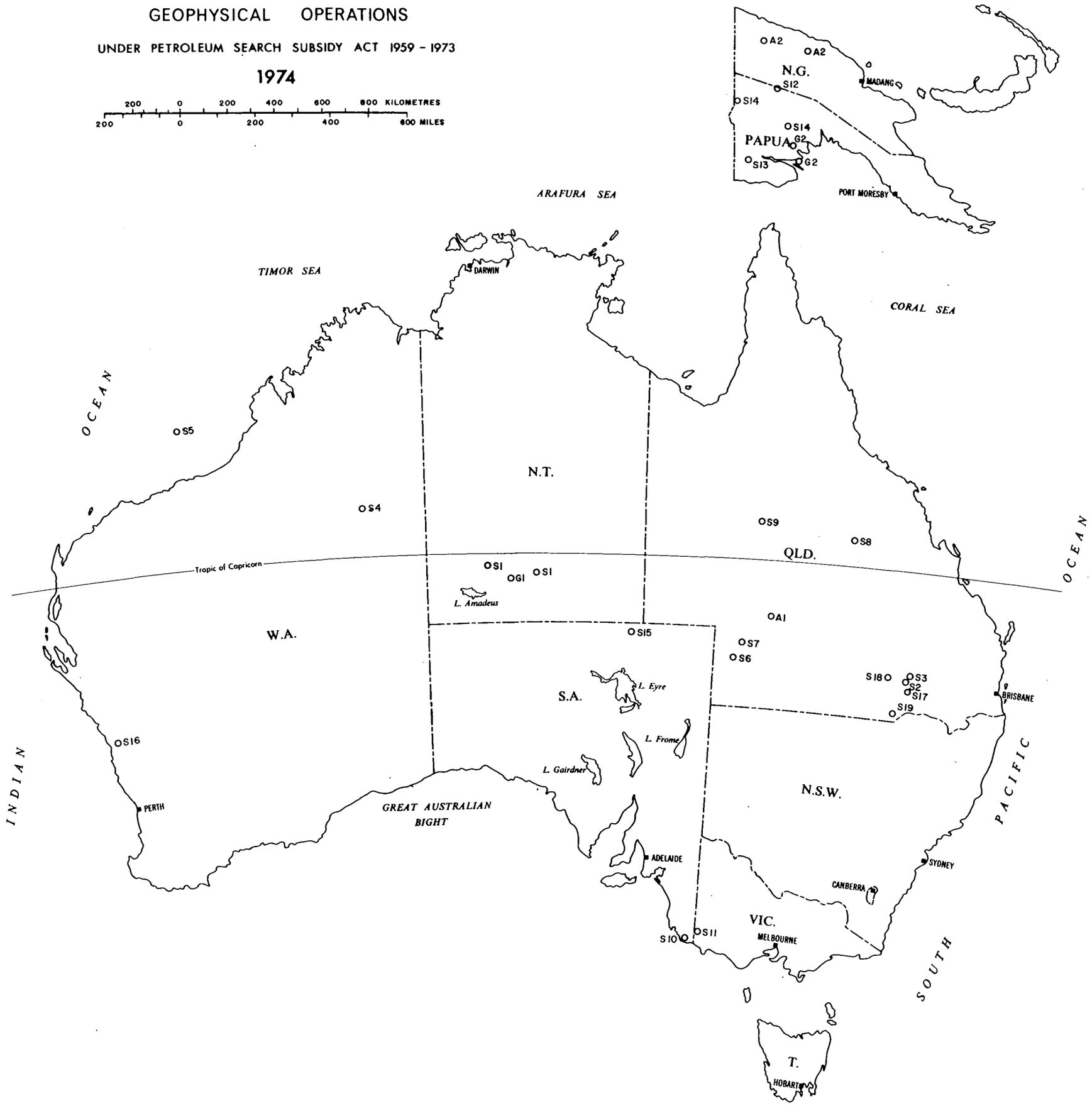
GEOPHYSICAL OPERATIONS

UNDER PETROLEUM SEARCH SUBSIDY ACT 1959 - 1973

1974

200 0 200 400 600 800 KILOMETRES

200 0 200 400 600 MILES



S	**SEISMIC**
S1	**Central Amadeus, N.T.**
S2	**Wunger, Qld**
S3	**Telgazli Creek, Qld**
S4	**Thornton, W.A.**
S5	**Bedout North, W.A. (& Magnetic)**
S6	**Karmona, Qld**
S7	**Windula, Qld**
S8	**Albro, Qld**
S9	**Ayrshire, Qld**
S10	**Tartwaup, S.A.**
S11	**Lake Mundi, Vic.**
S12	**Lavani, PNG (& Gravity)**
S13	**Weam, PNG**
S14	**Aworra River-Ok Tedi, PNG (& Gravity)**
S15	**Beal Hill, S.A.**
S16	**Erregulla-3, W.A.**
S17	**Waggamba, Qld**
S18	**Gowrie, Qld**
S19	**Niminbah, Qld**
G	**GRAVITY**
G1	**Gardiner Range, N.T.**
G2	**Bamu, PNG (& Magnetic)**
A	**AEROMAGNETIC**
A1	**East Windorah, Qld**
A2	**Nopan, PNG**

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