

Department of Primary Industries and Energy
Bureau of Resource Sciences

Australian Petroleum Accumulations Report 11

**BOWEN AND SURAT BASINS,
Clarence-Moreton Basin, Sydney Basin,
Gunnedah Basin and other minor
onshore basins, Qld, NSW and NT**

**S.J. Cadman, L. Pain and V. Vuckovic
Petroleum Resources Branch**

1998

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ISBN 0 642 26867 3

ISSN 0817-9263

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The Bureau's role is to support the sustainable development of Australia's agricultural, mineral, petroleum, forestry and fisheries industries by providing scientific and technical advice to governments, industry and the community.

Preferred way to cite this publication :

Cadman, S.J. and Pain, L., (1998) *Bowen and Surat Basins, Clarence-Moreton Basin, Gunnedah Basin, and other minor onshore basins, Queensland, NSW and NT*. Australian Petroleum Accumulations Report 11, Bureau of Resource Sciences, Canberra.

Cover : View looking north from Horseshoe Lookout, Blackdown Tableland, central Bowen Basin. The cliff-forming sandstones are early Middle Triassic in age. To the north and northwest of the Blackdown Tableland are some of the largest coal mines in the Bowen Basin. Further south, these Late Permian coal measures source much of the oil and gas found in the Bowen and Surat Basins.

Photograph : J. Totterdell

Other reports in the Australian Petroleum Accumulations series are :

1. Amadeus Basin, Northern Territory, 1986.
2. Bass Basin, Victoria and Tasmania, 1987.
3. Gippsland Basin, Victoria, 1987.
4. Adavale Basin, Queensland, 1988.
5. Bonaparte Basin, Northern Territory and Western Australia, 1989.
6. Otway Basin, Victoria and South Australia, 1990.
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10. Perth Basin, Western Australia, 1994.
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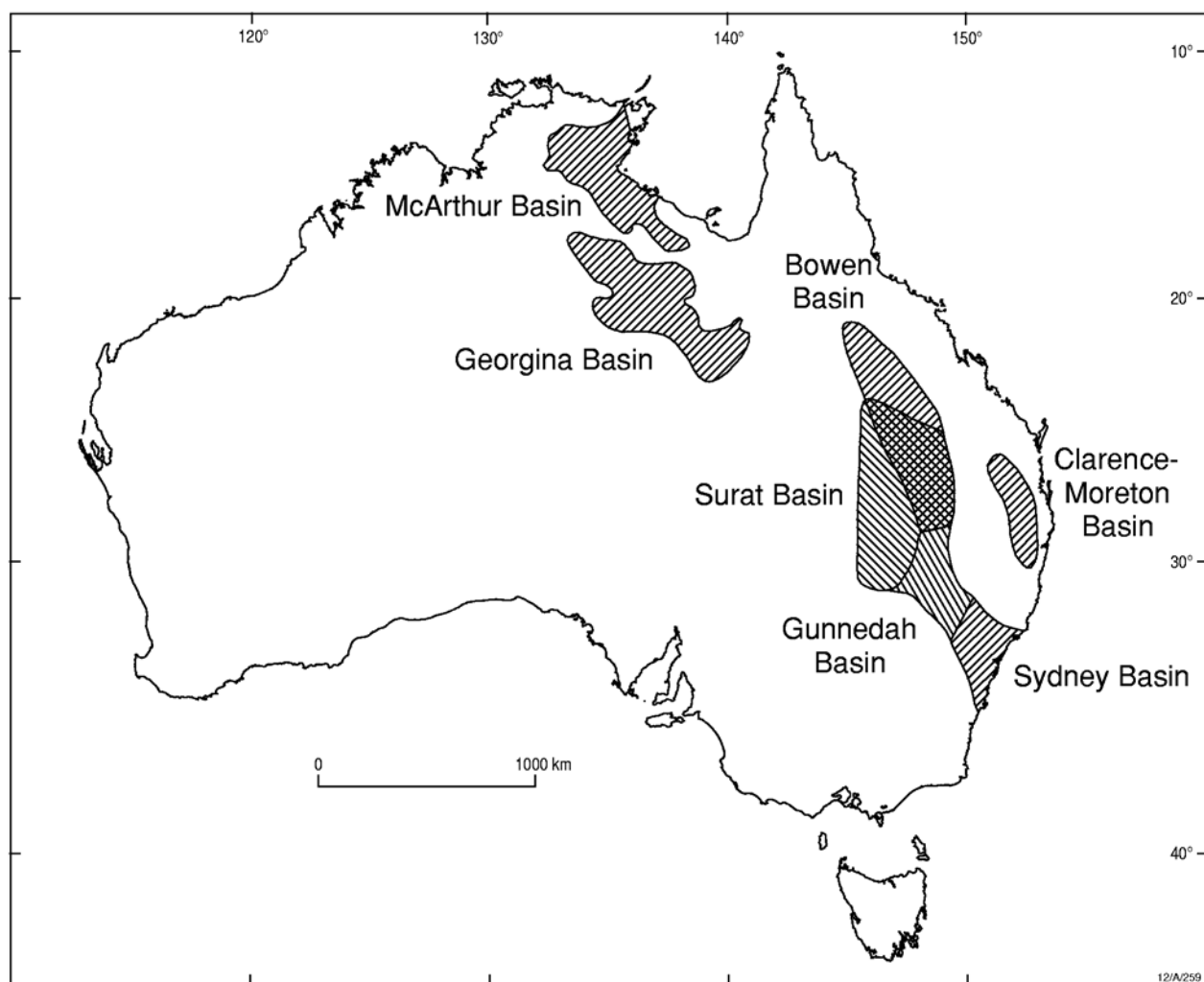
FOREWORD

This report on the Bowen and Surat Basins and other minor petroleum bearing basins in Queensland, New South Wales and the Northern Territory is the eleventh in the Australian Petroleum Accumulations series. The series presents data on Australia's identified petroleum resources, together with an appraisal of their geological setting, hydrocarbon habitat and character. In the case of the producing accumulations, details of their size, development and production history are included.

The APA database, on which this series is based, was developed in cooperation with petroleum companies and State and Northern Territory Mines Departments. It is linked to PEDIN, the petroleum exploration information database maintained jointly by the Bureau of Resource Sciences and the Australian Geological Survey Organisation.

Since exploration in the Bowen and Surat Basins began in earnest in the early 1960's, over 1600 exploration and development wells have been drilled, resulting in the discovery of more than 180 petroleum accumulations. Although both the Bowen and Surat Basins are now regarded as mature exploration provinces and the majority of the producing oil and gas fields are nearing depletion, considerable potential still exists for the discovery of small, commercial petroleum accumulations. The proximity of established infrastructure in the two basins enhances the prospectivity of many of the smaller, potential petroleum traps which otherwise may have been deemed uneconomic. The information compiled in this report makes valuable reading for petroleum explorers interested in evaluating these important petroleum producing basins.

Paul E. Williamson
Director
Petroleum Resources Branch
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Sedimentary basins included in this publication

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ABSTRACT

As at January 1997, one hundred and eighty seven petroleum accumulations had been discovered in the Bowen and Surat Basins. Commercial petroleum production has taken place from ninety nine of these accumulations. Both oil and gas has been recovered from Jurassic, Triassic, Permian and Devonian reservoirs in the Bowen/Surat sequence. Gas production takes place from accumulations lying on the western flank of the Taroom Trough via a gas gathering system and pipeline to Brisbane and from the Denison Trough, where gas is transported by pipeline to Gladstone. The most prolific petroleum producing units in the Taroom Trough are the Showgrounds Sandstone (Triassic), Precipice Sandstone (Jurassic) and Evergreen Formation (Jurassic). In the Denison Trough to the north, the most significant reservoir is the Aldebaran Sandstone, where over fifty percent of the remaining gas reserves in the Denison Trough are found.

Gas production from many of the gas accumulations on the western flank of the Taroom Trough is currently in decline. Total remaining gas reserves for the western flank of the Taroom Trough have been estimated at 2298 million cubic metres (as at 30/06/96, QDME), while in the Denison Trough, 2931 million cubic metres of recoverable gas is thought to remain in the identified accumulations in the Bowen Basin sequence.

Moonie, the largest oil accumulation found in the Bowen and Surat Basins to date, was discovered early in the exploration history of the two basins (1961) and provided the initial stimulus for an expanded exploration effort in the area. The oil at Moonie is trapped in a large, anticlinal closure on the upthrown side of a major, north-south trending thrust fault on the eastern margin of the Taroom Trough. 'Look-alike' plays to Moonie, (associated with the thrust faulting on the eastern basin margin), have been drilled with only limited success. A number of small oil accumulations have been identified, both to the north of Moonie on the same structural trend and on the western flank of the Taroom Trough. However, the Moonie accumulation appears to be unique and it is likely that future oil discoveries in the Bowen and Surat Basins will be small (less than 50 megalitres). The oil from Moonie is produced directly into the Jackson-Moonie oil pipeline while the oil from many of the small producing oil accumulations on the western flank of the basin is trucked to the Moonie facility.

The Moonie accumulation is nearing depletion, with only 173 megalitres of recoverable oil remaining from initial reserves of 3859 megalitres (as at 30/06/96, QDME). In spite of this, over sixty percent of the remaining, identified oil reserves in the Bowen and Surat Basins are reservoirised at Moonie.

1. INTRODUCTION

This report contains technical data on the 187 petroleum accumulations discovered in the Bowen and Surat Basins to January 1997. It summarises the stratigraphy, exploration history, hydrocarbon habitat and evolution of the basins together with the development of the producing accumulations. All reserves data used in this report have been provided by the Queensland Department of Mines and Energy and are current to 30 June 1994.

A discrete, measured recovery of petroleum during a well test qualifies an accumulation for inclusion in the Australian Petroleum Accumulations (APA) database. Where available on 'open file', test results for the discovery wells are listed in the database. A copy of the database accompanies this report (Appendix 1). Petroleum accumulations inferred from wireline log data but not tested are not included in this publication. The large number of exploration wells drilled in the Bowen and Surat Basins which encountered hydrocarbon shows (but not discoveries) precludes their inclusion in this report.

A petroleum accumulation is classed as a 'producer' if petroleum production is currently occurring, a 'past producer' if the accumulation has been depleted or as an 'other discovery' if no petroleum production has taken place.

2. BASIN SETTING

The Bowen Basin is an elongate, north-south trending basin, lying between latitudes 20 and 29 degrees south in east-central Queensland and northern New South Wales. The basin covers an area of approximately 200 000 square kilometers and contains a sedimentary sequence of Permo-Triassic clastics which attain a maximum thickness of 9000 m in the Taroom Trough (the easternmost of the two main depocentres within the Bowen Basin).

To the east, the Bowen Basin is bounded by a series of north-south oriented, Triassic thrust faults extending south of the Auburn Arch (Chinchilla-Goondiwindi Fault/Moonie Fault/Leichhardt-Burunga Fault). Although remnants of the Permian sequence are found to the east of these faults, erosion during the Triassic has largely restricted the occurrence of the Permo-Triassic clastics to the adjacent Taroom Trough

In the northwest, the Comet Platform separates the Taroom Trough from the Denison Trough - the second of two major depocentres within the basin. The southern extent of the Comet Platform is delineated by the north-northwest trending Hutton-Wallumbilla Fault, which downthrows to the southwest and separates the Comet Platform from the Roma Shelf. The east-dipping Merivale Fault and the southwest-dipping Arbroath Fault were originally extensional faults that were later reactivated as thrust faults. These two features form the western limit of the Roma Shelf.

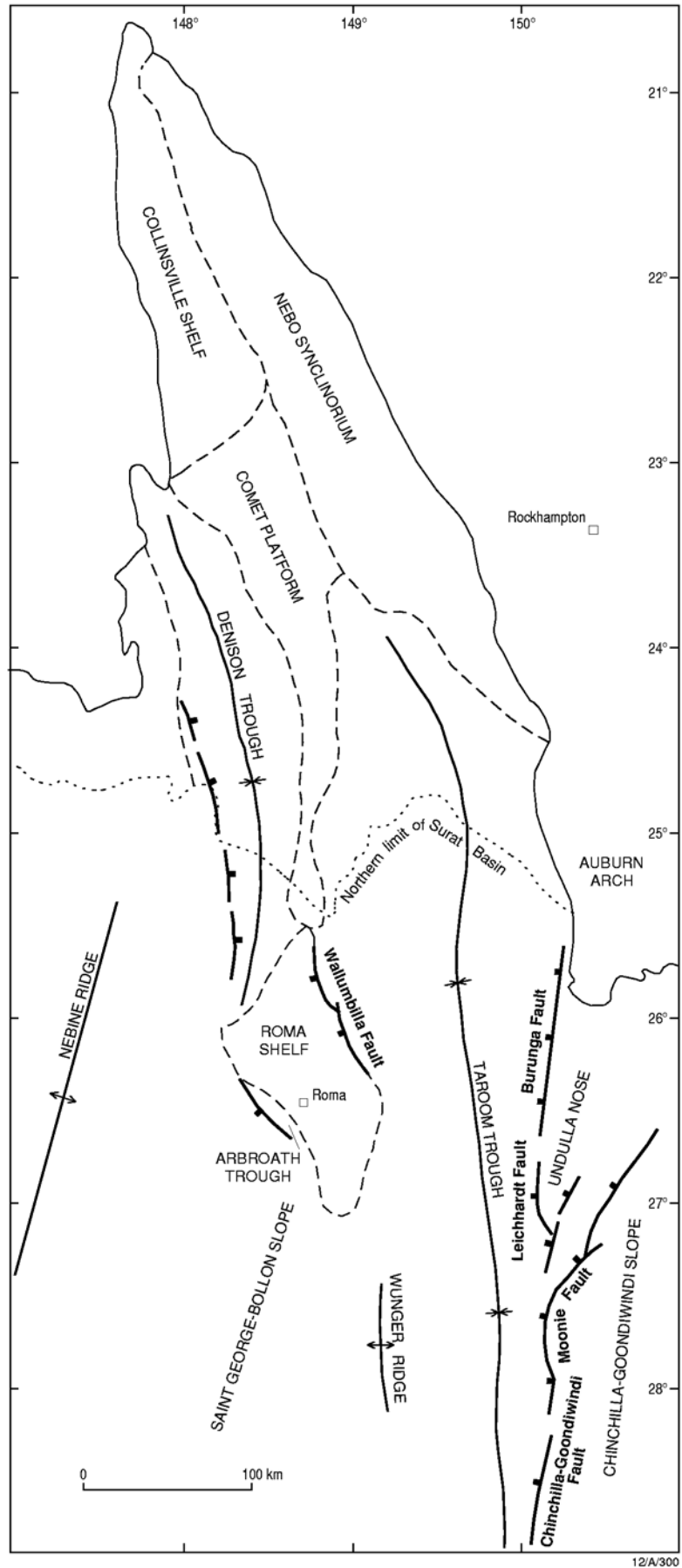
To the southwest, the margins of the Bowen basin are less well defined. Here, sediments deposited on the Saint George-Bollon Slope onlap and thin to the west and dip towards the Taroom Trough to the east at angles of less than one degree. Further to the west, Permo-Triassic clastics of the Bowen Basin sequence thin across the Nebine Ridge and interfinger with sediments of the Galilee Basin. To the south, deposition between the Bowen and Sydney Basins was probably continuous.

The structural elements and divisions present within the Bowen Basin are shown in Figure 1.

Sedimentation in the Bowen Basin ceased in the Late Triassic and was followed by a period of widespread erosion. From the Early Jurassic to Late Albian times, clastic sediments of the Surat basin sequence were deposited on this erosion surface.

North of latitude 25 degrees south, the Surat Basin sediments have been eroded and are replaced by outcropping units of the underlying Bowen Basin. The Surat Basin extends southwards to latitude 32 degrees south and covers an area of approximately 270 000 square kilometers. Surat Basin sediments attain their maximum thickness in the Mimosa Syncline, which overlies the Taroom Trough. To the west, they thin over the Nebine ridge and extend into the Eromanga Basin. While erosion has largely removed the Bowen Basin sequence east of the Burunga/Leichhardt Faults and Chinchilla-Goondiwindi/Moonie Faults, Surat Basin sedimentation extends eastwards across the Kumbarrilla Ridge and intertongues with sediments of the Moreton Basin. The Surat Basin and its southerly extension, the Coonamble Embayment, is bounded to the south by the Lachlan Fold Belt.

The structural elements and divisions present within the Surat Basin are shown in Figure 13.



12/A/300

Figure 1. Tectonic Elements, Bowen Basin

3. EXPLORATION HISTORY

Exploration in the Bowen and Surat Basins began in 1900 when a deep water bore drilled at Hospital Hill on the Roma Shelf flowed gas from the Early Jurassic Precipice Sandstone. Although a commercial gas flow could not be sustained, between 1928 and 1931 condensate was produced from the accumulation and sold as motor fuel.

Further encouragement for petroleum exploration in the Roma Shelf area was provided in 1934 by the discovery of gas in the Precipice Sandstone at Warooby, 11 kilometers east of Roma. In 1940, a modest gas flow was also recorded from the Late Triassic Moolayember Formation at Mount Bassett.

Between 1934 and 1939, Oil Search Ltd drilled two wells on the Comet Platform designed to test the Permian section in the northern Bowen Basin. Both were sited on surface anticlines and flowed gas from the Cattle Creek Formation and Aldebaran Sandstone respectively (Arcadia(OSL-3), Hutton Creek-1).

All early petroleum exploration in the Bowen and Surat Basins was based on geological field mapping. However in the early 1950's, the Bureau of Mineral Resources (BMR) undertook the first seismic survey in the area. Commercial seismic acquisition followed in the late 1950's and by the early 1960's a regional seismic grid had been established. The operators most active in the basins at this time were Australian Oil Exploration Ltd (AOE), Australian Associated Oilfields NL (AAO) and Associated Freney Oil Fields NL (AFO).

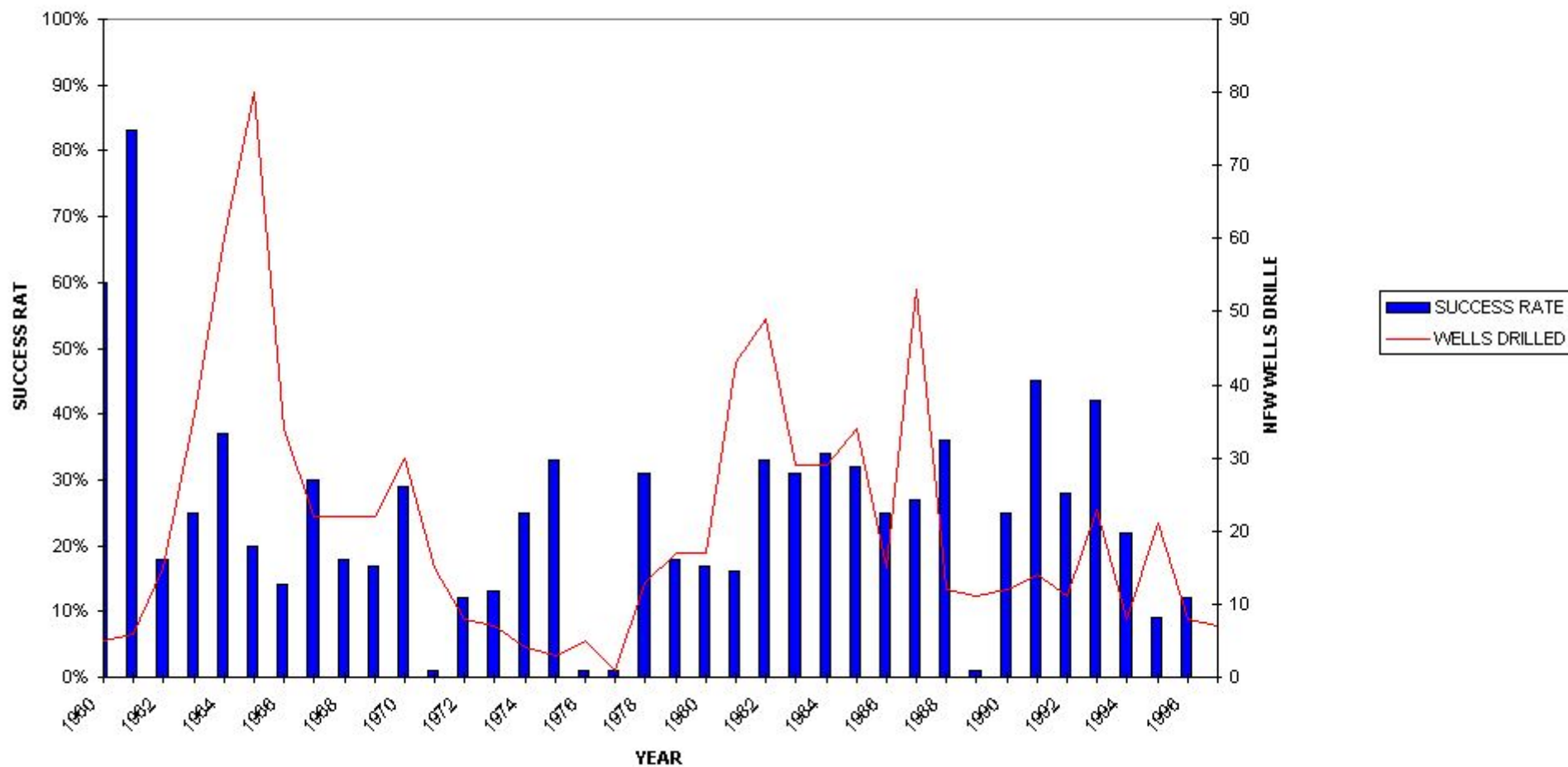
The introduction of seismic reflection techniques to petroleum exploration in the basins lead to an increase in drilling activity in the 1960's. In October 1960, one of the new entrants to exploration in the area, the Union-Kern-AOG Group (UKA) recorded a gas flow from their Cabawin-1 well, drilled on the eastern flanks of the Taroom Trough. Although the discovery was not commercial at the time, it provided encouragement for explorationists in the area. This lead to the discovery of the Moonie oil field in 1961- the largest oil accumulation discovered in the Bowen/Surat Basin to date.

Spurred on by the discovery at Moonie, seismic activity in the basin peaked in 1962 with the acquisition of approximately 6000 line kilometers of seismic for that year. Two years later in 1964, exploration drilling activity peaked when approximately 80 exploration wells were spudded.

In the period from 1965 to 1978, both exploration drilling and seismic acquisition declined in response to perceived disincentives to exploration created by energy policies of the then Federal Government. The nadir was reached in 1977 when only one exploration well was spudded.

Exploration activity in the Bowen/Surat Basin resumed in earnest in 1978. In the late 1970s, with the increased availability of better quality seismic data and the resulting improvements in mapping, success rates improved significantly. Levels of both

EXPLORATION DRILLING and SUCCESS RATES
BOWEN and SURAT BASINS



exploration drilling and seismic acquisition remained relatively high through most of the 1980s (an average of 35 exploration wells and 5000 kms of seismic per year) and a number of significant hydrocarbon discoveries were made. These include the Springton and Yellowbank gas accumulations and the Taylor oil and gas discovery.

The Bowen/Surat Basin is now a mature petroleum exploration province. Most of the leads in the area are small and many have a stratigraphic component. Consequently detailed, good quality seismic data are often required to firm up these leads to drillable prospect status. The perception amongst many explorers active in the Bowen/Surat Basin is that future discoveries are likely to be small and this has led to an overall decline in exploration in the area. However, in spite of the decline in the level of exploration drilling to around 15 exploration wells per year, during the first half of the 1990s, success rates have remained high. In addition, the establishment of oil and gas production infrastructure in the basin (particularly on the Roma Shelf), has allowed the commercial development of many of the small accumulations which may otherwise have been uneconomic.



4. BOWEN BASIN

4.1 Basin Evolution and Stratigraphy.

The formation of the Bowen Basin commenced in Late Carboniferous to Early Permian times. Initially, the area consisted of an eroded peneplain of indurated metasediments of Devonian age (Timbury Hills Formation) bounded to the west, in part, by bodies of granite, schist and gneiss. In the early years of exploration in the Bowen Basin, the various Permo-Carboniferous volcanics and indurated sediments which form economic basement in the Taroom Trough have been referred to by explorationists as the 'Kuttung Formation'. This name was originally used for rocks of Carboniferous age in the Tamworth Trough and Hunter Valley, and in more recent times its use has been abandoned.

The earliest tectonism in the basin occurred in the Late Carboniferous or Earliest Permian and appears to be extensional - a number of well developed half grabens are observed in the Denison Trough and to a lesser extent, in the Taroom Trough (Elliott, 1989). With the onset of extensional subsidence in the Early Permian, the Reids Dome beds were deposited in the Denison Trough, the Arbroath Trough and in the far northeast of the Bowen Basin, north of latitude 23 degrees South. This unit is a predominantly non-marine, paludal to fluvial sequence of sandstones, siltstones, mudstones and coals. It achieves a thickness of at least 4000 m on the downthrown side of the Merivale Fault System in the Denison Trough. Contemporaneously, the Combarngo Volcanics were laid down on the eastern flank of the Roma Shelf and further to the east, the Camboon Andesite was extruded in the vicinity of the Auburn Arch.

After the initial phase of non-marine deposition and volcanism in the earliest Permian, thermal relaxation and subsidence initiated a marine transgression which flooded the incipient basin from the east. The predominantly marine clastics of the Back Creek Group, which range in age from Early to Late Permian, were deposited over most of the basin east of the Roma Shelf and in the Denison Trough to the north.

In the Denison Trough, the initial marine transgression is represented by the shales and sandstones of the Cattle Creek Formation. A number of sharp regressions during the deposition of the Cattle Creek Formation has resulted in a thick sandy section in a medial position within this unit. A major regression in the Early Permian over most of the Denison Trough saw the deposition of a thick sequence of deltaic sandstones and conglomerates referred to as the Aldebaran Sandstone. A period of contractional deformation during the deposition of the Aldebaran Sandstone resulted in reverse movement on the Merivale and associated faults and the development of a mid-Aldebaran unconformity. The Aldebaran delta system was probably sourced from the northwest and is represented in the southwest by a distal, coquinitic, marine siltstone facies (Paten & others, 1979). The Comet Ridge became a positive feature in the basin at this time and provided an additional source of sediments for the subsiding Denison Trough.

TRIASSIC	MIDDLE	DENISON TROUGH / COMET PLATFORM	ROMA SHELVE / ST GEORGE - BOLLON SLOPE		CENTRAL AND SOUTHERN TAROOM TROUGH	
		Moolayember Formation	Moolayember Formation		"Wandoan Formation/Sst"	
			Snake Creek Mudstone Member			
EARLY	MIDDLE	Clematis Group	Showgrounds Sandstone			
		Rewan Group	Rewan Group		Rewan Group	"Cabawin Formation"
PERMIAN	LATE	Bandanna Formation	Bandanna Formation	Blackwater Group	Baralaba Coal Measures	"Kianga Formation"
		Black Alley Shale	Black Alley Shale		Burunga Formation	Back
		Mantuan Formation	Mantuan Formation			
		Peawaddy Formation	Tinowon Formation			
	EARLY	Catherine Sandstone	Muggleton Formation	Back	Undiff.	Creek
		Ingelara Formation		Creek		
		Freitag Formation		Group		
		Aldebaran Sandstone				
		Cattle Creek Formation				
		Reids Dome Beds	Reids Dome Beds		Camboon Andestie	? ? ? ?
			Combarngo Volcanics Roma Granite			
CARBON- IFEROUS	DEVONIAN	Timbury Hills Formation	Timbury Hills Formation			

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Figure 3. Generalised Stratigraphy, Bowen Basin, Queensland

A subsequent reduction in sediment supply resulted in the deposition of a sandy, marginal marine sequence (Freitag Formation), over much of the Aldebaran Sandstone. With the return of marine conditions to the Denison Trough, the dark, fossiliferous siltstones and shales of the Ingelara Formation were deposited over most of the area. This was followed in the late Early Permian with the deposition of the Catherine Sandstone. This unit is interpreted as a shoreline and nearshore shelf sand fed by fluvial channels cutting the palaeo-shoreline to the northwest (John and Fielding, 1993). The Catherine Sandstone is not as widespread as the underlying Ingelara and Freitag Formations. It fines and thins eastwards into the Denison Trough and pinches out to the south - probably due to a lack of sediment supply in this area.

Shallow marine conditions returned to the Denison Trough in the early Late Permian. The shales, siltstones, limestones and lithic sandstones of the Peawaddy Formation were deposited widely over the Denison Trough at this time. At the top of this unit, a distinctive coquinitic marker, the Mantuan Formation (formerly known as the Mantuan Productus Beds) occurs. In the north of the Denison Trough, around the Rolleston and Arcturus wells, a non-marine sandstone facies of the Mantuan Formation is found (Paten and others, 1979).

Towards the end of the Permian, marine circulation became restricted. Tuffaceous silts and shales of the Black Alley Shale were laid down followed by the coal sequences of the Bandanna Formation, which prograded over much of the Bowen Basin. The Black Alley Shale is recognised as the youngest unit within the Back Creek Group.

In areas of the Bowen Basin outside the Denison Trough (such as the Taroom Trough and the Saint George Bollon Slope), early explorationists in the basin did not differentiate the sediments of the Back Creek Group. Later workers (Beeston and others, 1995) have published a more detailed stratigraphy of the Back Creek Group in the Taroom Trough and environs, but for the purposes of this publication the unit has not been subdivided.

In the Early Permian, the Roma Shelf was largely emergent. Early Permian sediments overlapped the flanks of this feature until in the late Early Permian, (probably contemporaneously with Ingelara Formation deposition in the Denison Trough), the shallow marine shales, siltstones and sandstones of the Muggleton Formation transgressed the Roma Shelf. The Tinowon Formation, thought to be a lateral equivalent of the Peawaddy Formation to the north, was then deposited. This unit comprises marine, non-marine and coal facies while the Peawaddy Formation is thought to have been deposited under predominantly marine conditions (Paten and McDonagh, 1976). The distinctive Mantuan Formation identified in the Denison Trough is also present on the Roma Shelf at the top of the Tinowon Formation. The restricted marine conditions and then finally, the basinwide regression that took place at the close of the Permian has also resulted in the deposition of the Black Alley Shale and the Bandanna Formation in this area.

In areas of the Bowen Basin other than the Denison Trough and Roma Shelf, the Late Permian, basinwide sequence of sandstone, siltstone and coal has been referred to as

the Blackwater Group. On the eastern flank of the Taroom Trough, this sequence has been informally named the 'Kianga Formation' by many explorationists.

At the end of the Permian, granites were intruded in the orogen to the east and movement on the Goondiwindi-Moonie Fault and the Leichhardt Fault probably commenced. These events effectively isolated the Bowen Basin from the sea and at the beginning of the Triassic, the coal swamp environment that had predominated over most of the Bowen Basin in the Late Permian gave way to drier, continental conditions. Fine grained terrestrial redbeds (red and green mudstones grading to a basal, sandy conglomeratic facies in part) of the Rewan Formation were deposited over much of the basin, although this redbed sequence is not as widespread as the underlying Late Permian coals. On the southeastern flank of the basin, adjacent to the Goondiwindi-Moonie Fault, the massive conglomerates of the informally named 'Cabawin Formation' are developed. These sediments were derived from upthrust, Permo-Carboniferous blocks to the east. At this time, the Taroom Trough began to rapidly subside and become the major depocentre in the Bowen Basin.

Towards the end of the Early Triassic, after the deposition of the Rewan Formation, the rate of subsidence in the basin slowed. Erosion on the Roma Shelf and in the southern Bowen Basin considerably reduced the areal extent of both the Rewan Formation and the underlying coal sequences of the Bandanna Formation. Deposition of sheet-like, fluvial sandstones of the Showgrounds Sandstone followed. Although distribution of this unit is widespread and it appears to blanket the underlying Rewan Formation, the Showgrounds Sandstone is heterogenous, displaying rapid lateral and vertical variations in reservoir character.

On the Roma Shelf and its environs, the Showgrounds Formation rests unconformably on the Rewan Formation. In the Denison Trough to the north, the partial lateral equivalent of the Showgrounds Sandstone, the Clematis Group, appears to be largely conformably with the sediments of the underlying Rewan Formation, (although seismic data indicate that the two units may be unconformable on the eastern flank of the Comet Platform).

Thrusting on the Goondiwindi-Moonie Fault and the Leichhardt Fault continued in the Triassic. Early in the Middle Triassic the rate of subsidence in the Bowen Basin increased and a thick sequence of poorly sorted, fluvial to lacustrine, carbonaceous, sandstone, siltstone and mudstone (Moolayember Formation) was deposited over most of the basin. On the Roma Shelf and on parts of the western flank of the Taroom Trough, a thin, lacustrine shale unit, the Snake Creek Mudstone Member, has been identified at the top of the Showgrounds Sandstone. In the same area, some workers have also identified a relatively clean, quartzose fluvial sand at the base of the Moolayember Formation - this has been informally named the 'Wandoan Sandstone'.

Elsewhere in the Taroom Trough and on the eastern flanks of the basin, the informal name 'Wandoan Formation' has been used by some explorationists to describe the predominantly Middle Triassic, fluvial to lacustrine sediments which are lateral equivalents of the Showgrounds and Moolayember Formations. The 'Wandoan Formation' rests unconformably on the Rewan and 'Cabawin' Formations in this area.

In the Late Triassic, movement on the eastern basin margin faults ended and deposition within the Bowen Basin ceased. A period of erosion followed before the initial fluvial sediments of the overlying Surat Basin sequence were deposited.

4.2 Hydrocarbon Reservoirs and Seals.

4.2.1 Basement Reservoirs.

The indurated metasediments of the Timbury Hills Formation have traditionally been recognised as economic basement on the western flank of the Bowen Basin. However, in a number of locations, hydrocarbons generated in the overlying Permian sequence have migrated into fractures within the Timbury Hills Formation, giving rise to several small accumulations. The most significant of these is Pringle Downs where initial recoverable gas reserves of 30 million cubic metres (as at 30/06/96), are reservoirised in fractures within the Timbury Hills Formation. Here, the reservoir has been described as a brown, fine grained, slightly metamorphosed, lithic sandstone. It is thought that the good fracture porosity developed in the Timbury Hills Formation at Pringle Downs is due to exposure and erosion of the unit prior to the deposition of the Precipice Sandstone (Groves, 1974).

A total of 7 hydrocarbon discoveries have been made in the Timbury Hills Formation to date. In addition to Pringle Downs, very small, commercial gas discoveries have been made at Blackbutt and Namarah. Small, non-commercial gas accumulations have also been found at Pickanjinnee, East Glen and Bobadilla, while at Dirinda, both oil and gas were recovered from the Timbury Hills Formation.

On the eastern flank of the Taroom Trough, a non-commercial gas flow was recorded in the Camboon Andesite in the Scotia-1 well. The Camboon Andesite, thought to be an equivalent to the Combarngo Volcanics on the eastern flank of the Roma Shelf, is Carboniferous to Early Permian in age and outcrops on the eastern flank of the Bowen Basin. The gas reservoir at Scotia consists entirely of fracture porosity.

4.2.2 Reids Dome beds.

The Reids Dome beds were deposited in the earliest Permian in the Denison and Arbroath Troughs. The sequence rests unconformably on pre-Permian basement and attains a thickness of at least 4000 m in the Westgrove area of the Denison Trough (Brown and others, 1983). Well control in this unit is sparse and no wells have penetrated a complete Reids Dome beds section. However, it is known that this sequence shows rapid lateral facies changes and consists of predominantly non-marine, alternating carbonaceous sandstone, grey siltstone, shale, coal with minor anhydrite and dolomite. Occasionally, a thick, basal volcanolithic pebble conglomerate is developed. The presence of rare marine fossils indicates occasional marine incursions occurred during the deposition of the Reid Dome beds (Dickens and Malone, 1973).

In the Denison Trough, Brown and others (1983) have subdivided the Reids Dome beds into an 'upper' and a 'lower' unit. The Lower Reids Dome beds were deposited in an environment ranging from alluvial fan to coal swamp and are separated from the

overlying Upper Reids Dome beds by a regional unconformity. In the north of the Denison Trough, the upper unit is predominantly composed of shale with minor coals while to the south, fluvial point bar sands and marine sequences have been identified.

In the north of the Denison Trough, the Reids Dome beds are conformable with the overlying Cattle Creek Formation. In the south, however, a well defined unconformity is developed. In the Arbroath Trough on the Roma Shelf, the Reids Dome Beds are truncated by an erosional unconformity, suggesting uplift and erosion post-dated the deposition of the Reids Dome beds at this location (Power, 1967).

To date in the Denison Trough, hydrocarbons have been recovered from four pools within the Reids Dome beds - Merivale, Westgrove, Springvale and Yellowbank. Of these, the Merivale accumulation is probably the most significant. Here, the Merivale-1 well intersected a 5 m thick, marginal marine sandstone unit near the top of the Reids Dome beds where porosities exceeded 11%. DST 4 taken over the interval 1472.0 m to 1482.5 m straddled this zone, flowed gas at a rate of 6800 m³/day and recovered 18 m of oily, gas cut mud. An appraisal well, Merivale-2, flowed gas at 38 x 10³ m³/day from the uppermost 54 m section of the Reids Dome beds.

Fifteen kilometres to the northwest of the Merivale accumulation, the Reids Dome beds flowed gas at 5000 m³/day in the Yellowbank-6 well. However, to date the Yellowbank accumulation has only produced commercial quantities of gas from the Aldebaran Sandstone and the Rewan Formation. Similarly, in the nearby Westgrove accumulation, gas flowed at 7080 m³/day from a DST taken in the Reids Dome beds. However at Westgrove, gas is only produced from the overlying Cattle Creek Formation as core data from the Reids Dome beds indicate porosities of less than 5%, with no effective permeability.

At Springvale, a few kilometers to the northwest of Yellowbank, a gas pool reservoir in the Reids dome beds is estimated to hold initial recoverable reserves of around 42 million cubic metres of gas. As with the accumulations mentioned previously, however, commercial gas production from this reservoir has not yet commenced.

Porosity and permeability data for Reids Dome beds reservoirs are sparse. Reservoir quality and character can be expected to show rapid lateral variation with porosities typically less than 10% and poor to fair permeabilities. Seal for Reids Dome beds reservoirs is likely to be provided by either transgressive marine shales of the overlying Cattle Creek Formation or intraformational shales and siltstones within the Reids Dome beds.

In the Denison Trough, the top of the Reids Dome beds has been mapped in reasonable detail. A number of prominent four-way-dip closures are present at this level and probably formed during structuring in the Triassic (Paten and others, 1979). If this structuring is present at depth, then many untested closures may exist within the Reids Dome beds.

4.2.3 Cattle Creek Formation.

A marine transgression in the Early Permian saw the deposition of the shales, sandstones and limestones of the Cattle Creek Formation over much of the Denison Trough. The Cattle Creek Formation is generally conformable with the underlying Reids Dome beds over most of the Denison Trough. However, in the south and east, a predominantly calcareous, basal unit is developed. This rests unconformably on eroded Reids Dome beds.

The Cattle Creek Formation attains a maximum thickness of at least 750 m along the axis of the trough. It is comprised predominantly of dark grey mudstone with interbeds of sandstone, calcareous siltstone and silty limestone. A thick sandy facies is developed midway through the section ('Staircase Sandstone') and represents a regressive depositional phase. This sandy unit appears to be confined to the western and southern margins of the Denison Trough as they existed at that time (Paten and others, 1979).

The Reids Dome-1A well and more recently, Aldinga North-1, tested this sandy facies within the Cattle Creek Formation on the western flank of the Denison Trough. Both wells flowed gas from DSTs taken in the Cattle Creek Formation at rates in excess of 30 000 m³/day. At Reids Dome porosity in the Cattle Creek Formation ranged from 17% to 18% and permeability varied between 6.5 and 19 millidarcys.

In the Westgrove accumulation to the south, good gas flows were recorded in what was initially thought to be sands of the Cattle Creek Formation. Subsequent workers have re-picked formation tops in the Westgrove wells and assigned the 362 million cubic metres of initial recoverable gas reserves present to the Aldebaran Sandstone. In the Westgrove area, the Cattle Creek Formation exhibits porosities of between 5% and 10% with permeabilities of around 5 millidarcys.

An early well drilled on the Comet Platform in 1936, Arcadia (OSL-3), flowed gas at over 65 000 m³/day from what are now interpreted as sandstones of the Cattle Creek Formation. Compositional analysis of the gas revealed a carbon dioxide content of around 77% (Geological Survey of Queensland, 1960).

The initial transgressive shales of the Cattle Creek Formation form a regional seal for the underlying Reids Dome beds, while intraformational shales seal the sandy reservoirs within the Cattle Creek Formation. The Cattle Creek Formation is thought to be a particularly attractive exploration objective on the western and southern margins of the Denison Trough where the medial sandy facies is best developed and where structural/stratigraphic traps are present.

4.2.4 Aldebaran Sandstone.

At the end of Cattle Creek Formation times, a major Early Permian regression saw the deposition of the Aldebaran Sandstone over most of the Denison Trough. This unit is a deltaic sequence comprising quartzose sandstones, conglomeratic or feldspathic in part, with thin interbeds of carbonaceous mudstone and rare, thin coal laminae. In the northwest of the Denison Trough, a proximal, sandy and conglomeratic facies is developed, while to the southeast, a more distal, coquinitic marine equivalent is found (Paten and others, 1979). The Aldebaran Sandstone attains its maximum thickness of nearly 700 m in the axis of the trough, although rapid lateral variations in thickness suggests several distributary systems supplied sediment to the delta front.

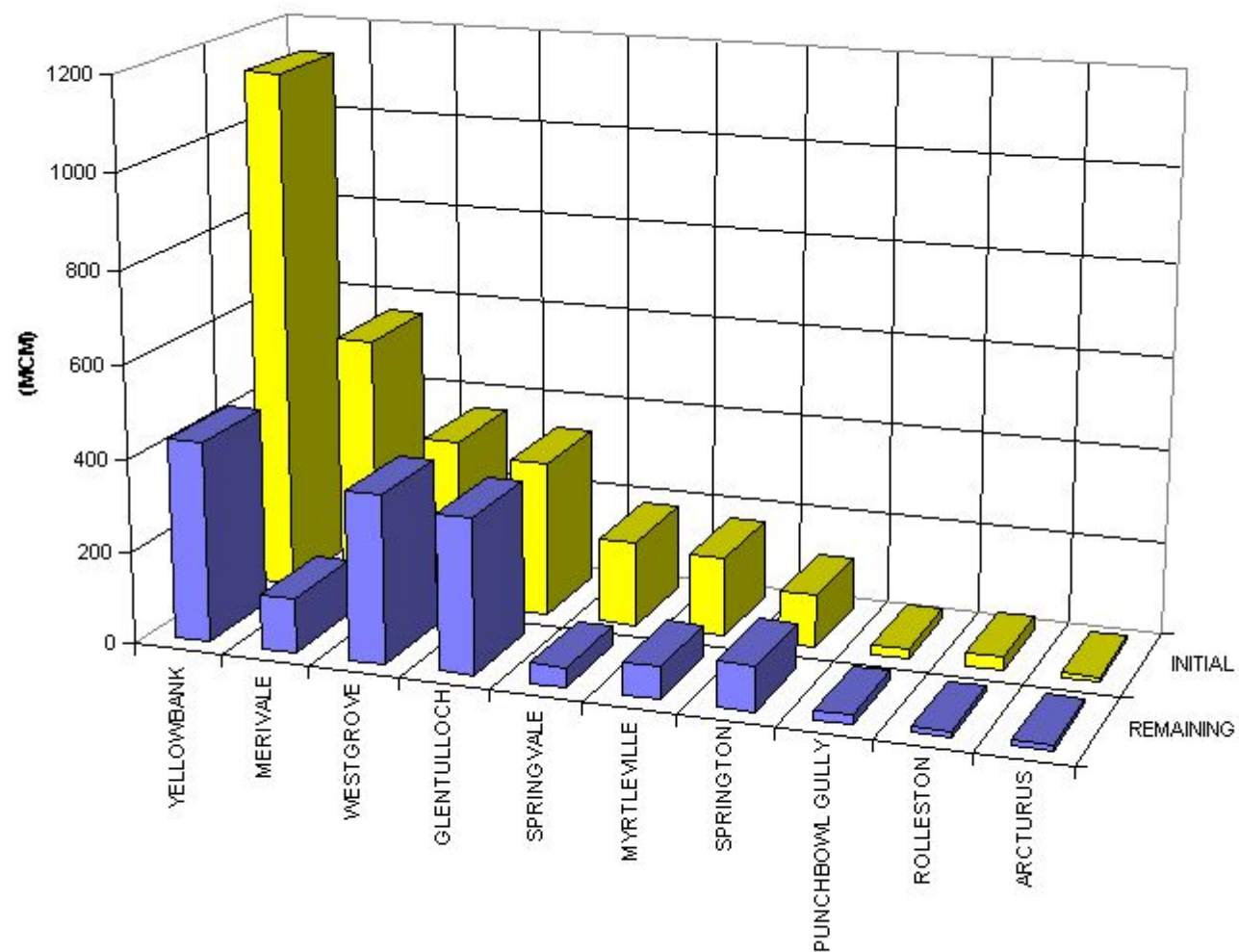
The Aldebaran Sandstone is one of the most important hydrocarbon reservoirs in the Denison Trough. To date, 14 hydrocarbon discoveries have been made in this unit both within the Denison Trough and on the Comet Platform. Gas recovered from the Aldebaran Sandstone is rich in carbon dioxide. The source of this carbon dioxide is not clear, although Brown and others believe that it has resulted from either biodegradation of hydrocarbons and Type III kerogen or, from low temperature thermal degradation of the distal coquinitic facies. The latter seems to be supported by the fact that many of the wells in the Denison Trough which have flowed gas rich in carbon dioxide are located in the south and southeast of the trough, in a proximal location to the coquinitic facies. It has also been suggested that the carbon dioxide may be of recent origin, related to Tertiary volcanic activity.

Of the 13 discoveries in the Aldebaran Sandstone, 4 are non-commercial (Warrinilla North, Chesney, Inderi, and Hutton Creek). Commercial gas production currently takes place from the remaining 9 accumulations (Yellowbank, Springton, Rolleston, Punchbowl Gully, Myrtleville, Glentulloch, Merivale, Springvale and Westgrove). The most significant of these is probably Yellowbank, where 1133 million cubic metres of initial recoverable gas (as at 30/06/96), was reservoirised in the Aldebaran Sandstone. Significant gas reserves are also found in the Aldebaran Sandstone at Merivale, Springvale, Glentulloch and Westgrove.

Porosities within the Aldebaran Sandstone are variable but generally fall within a range of 7% to 14%. Permeabilities within this unit are generally low. Potential reservoirs within the Aldebaran Sandstone are thought to be best developed around the Aldebaran delta front in the south and southeast of the Denison Trough (Paten and others, 1979). Most structural traps present in these locations are likely to contain a major stratigraphic component.

4.2.5 Freitag Formation.

The Freitag Formation represents a sandy, marginal marine facies which transgressed the Aldebaran delta in the Early Permian as a result of a reduction in sediment supply. In outcrop, it has been described as a quartzose sandstone, rarely conglomeratic and micaceous with thin interbeds of fissile siltstone. Ripple marks and worm tubes are

GAS RESERVES, Aldebaran Sandstone**(as at 30/06/96, QDME)**

common. In the subsurface, the Freitag Formation thickens to the north and in the Arcturus/Springton area this unit probably exceeds a thickness of 150 m.

Of the 4 discoveries in the Freitag Formation to date, 2 recorded minor, non-commercial gas flows (Warrinilla and Warrinilla North) while the remainder (Springton and Rolleston), contain commercial gas reserves.

Reservoir development in the Freitag Formation is sporadic. At Rolleston, the Freitag reservoir consists of a fine grained to pebbly, friable quartzose sandstone. Within the 21 m gross pay interval, porosities range from 23% to 28% and permeabilities from 4000 millidarcys (at the top of the reservoir) to considerably less at the base of the unit. The Freitag reservoir at Rolleston is interpreted as a marine bar (Devine, 1967). Here, lenticular or sinuous Freitag sands trend against regional dip, imparting a stratigraphic component to the trap. It is possible that marine bar sands, similar to that which occur at Rolleston, may occur elsewhere within the Freitag Formation. Paten and others (1979) have suggested that these shallow marine bar deposits are most likely to occur towards the zero pinchout edge of the Freitag Formation. Seal for these high porosity reservoirs at the top of the Freitag is provided by the overlying shales of the Ingelara Formation.

4.2.6 Ingelara Formation.

At the end of Freitag Formation time, full marine conditions were established over most of the Denison Trough. A thick sequence of dark, fossiliferous siltstone and Shale (Ingelara Formation) were deposited at this time. The fine grained sediments of the Ingelara Formation form a competent top seal to the predominantly sandy facies of the underlying Freitag Formation.

Although predominantly fine grained and argillaceous, coarser, arenaceous intervals are occasionally developed within the Ingelara Formation. At Warrinilla North, gas flowed at around 2000 m³/day from a DST taken over a sandy interval (probably a marine bar sand), within the Ingelara Formation. Although not commercial, the occurrence of a gas reservoir within this unit at Warrinilla North indicates there may be some potential for analogous accumulations elsewhere in the Denison Trough.

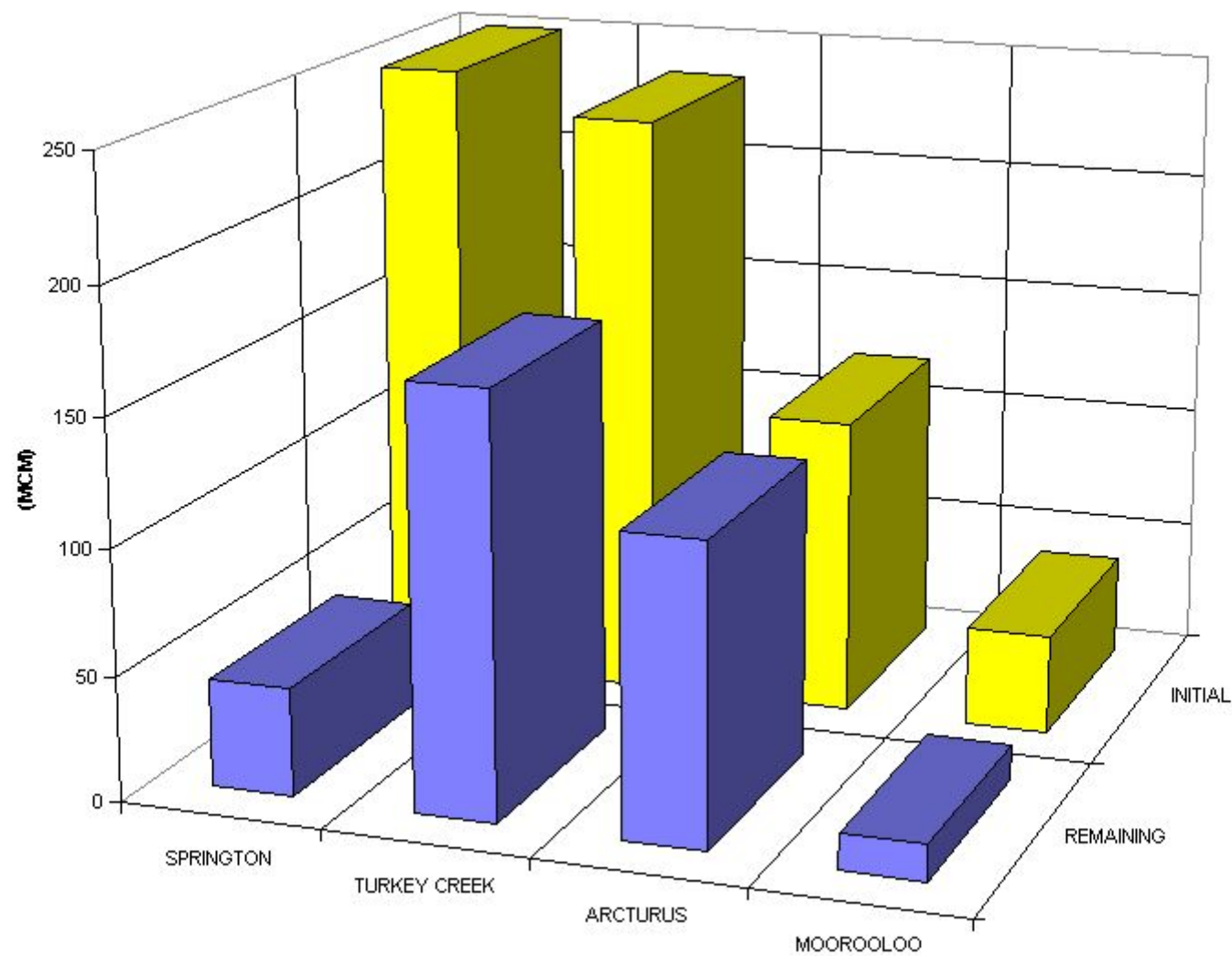
4.2.7 Catherine Sandstone.

Towards the end of the Early Permian, a regression terminated marine sedimentation over much of the Denison Trough. The Catherine Sandstone was then deposited from the north and northwest as a clastic wedge, prograding from the northwestern basin margin. The Catherine Sandstone fines and thins to the east. To the south, the Catherine Sandstone pinches out below latitude 25°00', although in parts of the Denison Trough, the unit is represented by a thin, condensed interval of pebbly and argillaceous sandstone.

John and Fielding (1993) have identified 6 main facies within the Catherine Sandstone from cores and wireline logs. These sediments were deposited in a range of depositional settings including fluvial channel, lagoonal, shoreface and offshore environments. Lithologies vary from relatively clean fluvial sandstones through to

GAS RESERVES, Catherine Sandstone

(as at 30/06/96, QDME)



finely interbedded, lagoonal sandstones, siltstones and mudstones to offshore siltstones and mudstones. The suite of facies identified by John and Fielding represents a typical coastal and nearshore marine complex.

Based on the work of John and Fielding (1993), the relatively clean, quartzose, fluvial channel sand facies offers the best reservoir potential. Unfortunately, this facies only occurs in the subsurface west of the Denison Trough, on the Springsure Shelf and is poorly situated with respect to source rock kitchen areas. A second facies, thought to represent a high energy shoreface environment, also offers potential as a hydrocarbon reservoir. This facies is areally extensive within the northern Denison Trough and consists of tabular sandstones with minor, thin interbeds of siltstone and mudstone.

To the east, the Catherine Sandstone thins, becomes more fine grained and reservoir quality deteriorates. Here, where the Catherine Sandstone pinches out and interfingers with finer grained siltstones and shales, potential may exist for stratigraphic traps. Seal for Catherine Sandstone reservoirs is likely to be provided by either the marine shales and siltstones of the Peawaddy Formation which transgressed the Denison Trough at the beginning of the Late Permian, or, by intraformational shales and siltstones.

Porosity and permeability within the Catherine Sandstone is highly variable - porosity generally ranges between 8% and 28% and permeability between .02 and 800 millidarcys. To date, 4 discoveries have been made in the Catherine Sandstone - Turkey Creek, Springton, Moorooloo and Arcturus. Commercial gas production from the Catherine Sandstone occurs at Springton, Turkey Creek and Moorooloo. A small gas resource identified in the Catherine Sandstone at Arcturus has yet to be produced.

4.2.8 Peawaddy Formation and Mantuan Formation.

After the deposition of the Catherine Sandstone, shallow marine conditions returned to the Denison Trough and its environs. The Peawaddy Formation was deposited at this time. The basal section consists of interbedded, micaceous, grey siltstone and dark, carbonaceous mudstone but the upper section of this unit becomes arenaceous and is composed predominantly of lithic sandstones.

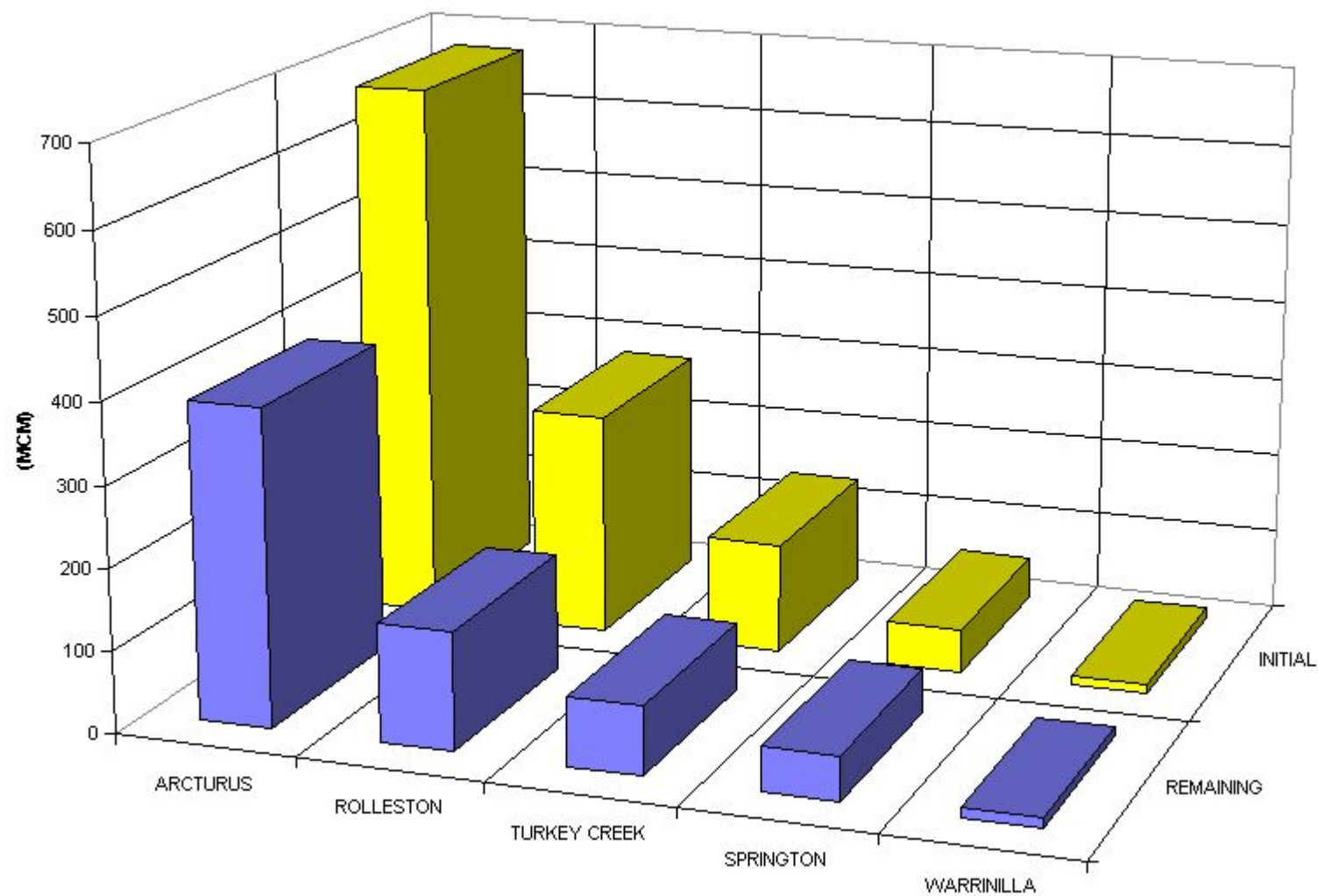
At the top of Peawaddy Formation, a distinctive, widespread, fossiliferous, coquinitic siltstone and sandstone facies, the Mantuan Formation, is developed. Deposition of the Mantuan Formation was not restricted to the Denison Trough and the unit has been intersected in the subsurface on parts of the Roma Shelf.

To date, 2 discoveries have been made in the Peawaddy Formation (Warrinilla and Arcturus) while a further 5 (Turkey Creek, Springton, Rolleston, Arcturus and Punchbowl Gully) have been made in the Mantuan Formation in the Denison Trough. One exploration well (Lowesby-1), located on the Comet Platform, also flowed gas at 4450 m³/day from a DST taken in the Mantuan Formation.

Of the above accumulations, the most important are Arcturus and Rolleston. Both these accumulations contain significant, commercial quantities of gas in the Mantuan Formation. Interestingly, both Arcturus and Rolleston are situated in the north of the

GAS RESERVES, Mantuan Formation

(as at 30/06/96, QDME)



Denison Trough, in what is regarded as a non-marine facies of the Mantuan Formation (Paten and others, 1979). The Mantuan Formation reservoir at this location consists of fine to medium grained, micaceous, quartzose sandstone with porosities in the order of 20% to 30% and permeabilities of around 20 millidarcys. A few kilometers to the north, commercial gas production from the Mantuan Formation also occurs at Turkey Creek. The gas pools in the Mantuan Formation at Springton and Punchbowl Gully are small and non-commercial.

After the deposition of the Mantuan Formation, restricted marine conditions persisted over much of the Bowen Basin. The dark shales and tuffaceous claystones of the Black Alley Shale were laid down at this time. This unit provides an effective regional seal to the underlying Mantuan and Peawaddy Formations.

4.2.9 Tinowon Formation.

The Tinowon Formation is a Late Permian, paralic sequence deposited on the eastern flank of the Roma Shelf. It is thought to be the lateral equivalent of the Peawaddy Formation to the north, although, in the Tinowon Formation the marine influence seems to be less pronounced (Groves, 1974). The distinctive coquinitic sandstone and siltstone marker present at the top of the Peawaddy Formation, the Mantuan Formation, is also found at the top of Tinowon Formation.

Six discoveries have been made in the Tinowon Formation to date - Norwood, Glenloth, Walpanara, Walpanara East, Pickanjinie and Wallumbilla South. All of these discoveries are small - the largest of which is Wallumbilla South, where 86 million cubic metres of initial recoverable gas is reservoir in the Tinowon Formation (as at 30/06/96). The Tinowon reservoir at Wallumbilla South is a medium to coarse to very coarse grained sandstone. The quartz grains are subangular to subrounded, fairly well sorted and with a white to brown clay matrix. Porosity averages around 21% and permeability around 360 millidarcys.

The producing horizon at Wallumbilla South is sealed by an intraformational shale beneath the Mantuan Formation. As in the Denison Trough to the north, the Black Alley Shale provides a regional seal for the Mantuan Formation.

4.2.10 Back Creek Group.

For the purposes of this review, in areas of the Bowen Basin outside the Denison Trough and parts of the Roma Shelf (Taroom Trough, Saint George-Bollon Slope), the Permian sequence deposited prior to the deposition of the Blackwater Group has not been differentiated. This sequence is referred to as the Back Creek Group.

Three, small, non-commercial gas discoveries have been made within the Back Creek Group near the Roma Shelf. These are Bengalla, Latemore South and Yarrowonga. A small, commercial discovery at Noorindoo contains 12 million cubic metres of initial recoverable gas (as at 30/06/96). At Noorindoo, the Back Creek Group reservoir has been described as a coarse, grey, sublabile, moderately to poorly sorted, subangular, micaceous sandstone with common clay matrix. Reservoir characteristics are variable but porosities average around 24% and permeability around 190 millidarcys.

4.2.11 Bandanna Formation.

Towards the end of the Late Permian, a basinwide regression saw the development of lacustrine to paludal environments over much of the Bowen Basin. At this time, the Bandanna Formation was deposited on the Roma Shelf and in the Denison Trough. This unit typically comprises interbedded, brown to black, carbonaceous shales, coal, siltstone and minor sandstone. The Bandanna Formation rests conformably on the underlying Black Alley Shale and in the Denison Trough, appears to be conformable with the overlying 'Rewan Formation'. However, on the Roma Shelf, an erosional unconformity at the top of the Bandanna Formation suggests uplift and erosion took place in this area prior to the deposition of the 'Rewan Formation'.

Although the Bandanna Formation is not regarded as a primary exploration target in the Bowen Basin, a small gas flow (1420 m³/day) was recorded in a DST taken in the Bandanna Formation at Warrinilla (Warrinilla-5). The Bandanna Formation gas pool discovered at Warrinilla is non-commercial.

Any petroleum accumulations discovered in this unit are likely to be reservoirized in thin, stacked sands, sealed by intraformational shales. The Bandanna Formation lacks a competent, regional top seal as the basal section of the overlying 'Rewan Formation' is sand prone.

4.2.12 Blackwater Group and 'Kianga Formation'.

Both the Blackwater Group and the 'Kianga Formation' are lateral equivalents of the Bandanna Formation. The 'Kianga Formation' has been the term used by Union Oil in the early days of exploration in the Bowen Basin to describe the Late Permian coal sequences in the Taroom Trough. (Currently, the formal name for these sequences in this locale is the Baralaba Coal Measures). The term 'Blackwater Group' has been used by later authors to describe this same sequence. The use of 'Bandanna Formation' appears to be restricted to Late Permian coal measures deposited on the Roma Shelf and in the Denison Trough.

A total of 10 discoveries have been made in the Blackwater Group and 'Kianga Formation' to date. Three, small non-commercial gas discoveries occur at Burunga, Sunnybank and North Sirrah, while at Bellbird, oil flowed at 32 bbls/day in a DST taken in the 'Kianga Formation'. The Bellbird accumulation also proved to be non-commercial.

The Cabawin discovery, drilled in 1961, provided early encouragement for explorationists targeting the Late Permian coal measures in the Bowen and Surat Basins. Here, a production test in the 'Kianga Formation' flowed both 46.5°API oil and gas. Commercial oil reserves at Cabawin have been estimated at 18 megalitres and as at 30/6/96, 17 megalitres have been produced. The 'Kianga Formation' reservoir at Cabawin consists of three, stacked sands with a total net pay of around 7

m. Porosities average 14% while permeabilities of 1 millidarcy are typical. The reservoir lithology has been described as a grey, poorly sorted, sublabile, subangular sandstone with abundant clay matrix.

A further 5 commercial gas discoveries have been made in the 'Kianga Formation'/Blackwater Group. These are Waggamba, Kungarri, Newington, Yambugle and Yuranigh. Yuranigh is the largest of these where 57 million cubic metres of initial recoverable gas (as at 30/06/96) is reservoirised in sandstones of the Blackwater Group.

4.2.13 'Rewan Formation' (formal name : Rewan Group).

In the Early Triassic, the peat swamp environments that had prevailed over most of the Bowen basin in the Late Permian dried out. A terrestrial redbed sequence, the 'Rewan Formation', was deposited at this time.

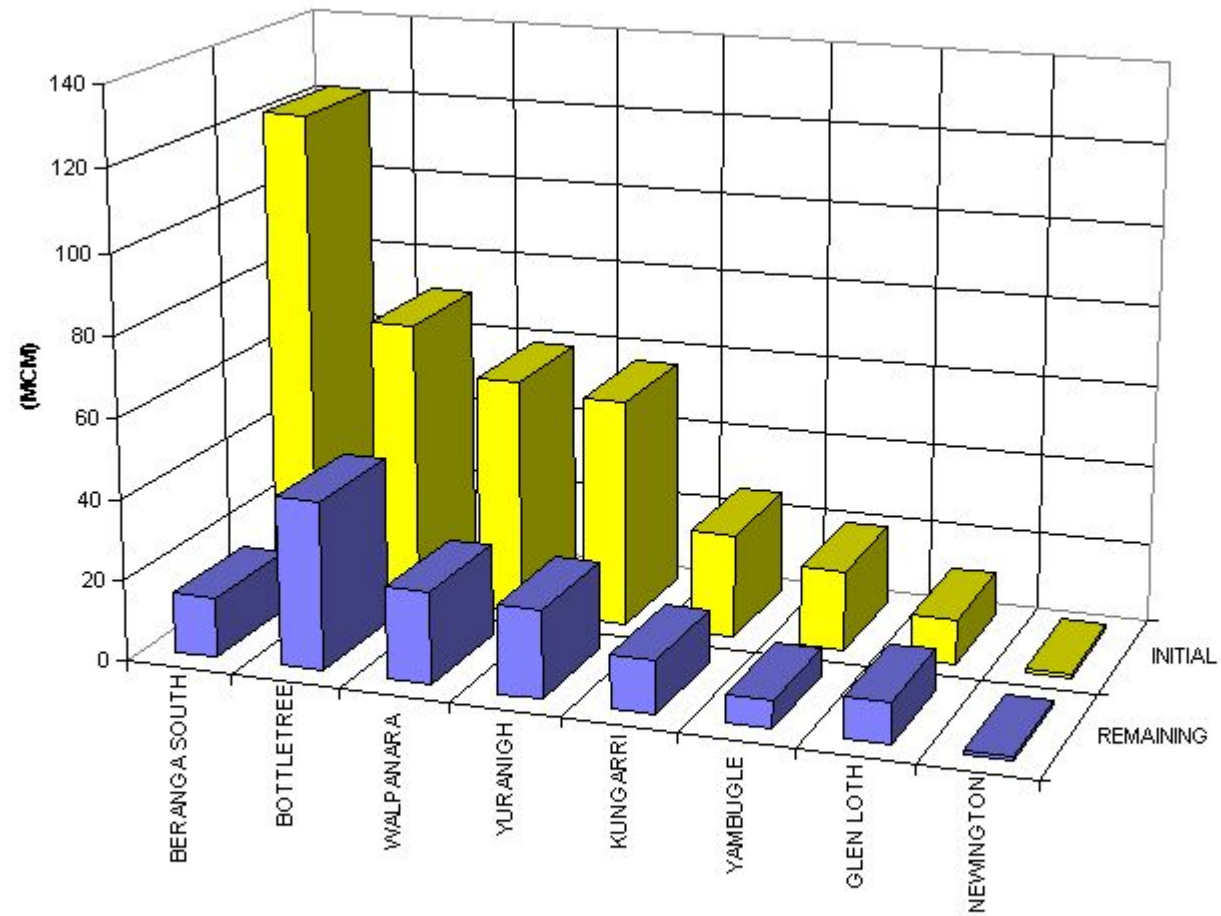
The 'Rewan Formation' onlaps the eastern flank of the Roma Shelf and thickens rapidly to the east into the Taroom Trough. Here, up to 4000 metres of 'Rewan Formation' sediments may be present. On the Roma Shelf and its environs, the unit rests either unconformably or disconformably on sediments of the Bandanna Formation and Blackwater Group. In parts of the Denison Trough to the north, sedimentation may have been continuous from Late Permian to Early Triassic times (Dickins and Malone, 1973). Towards the end of the Early Triassic, uplift and erosion on the Roma Shelf and southern Bowen Basin partially removed the upper 'Rewan Formation' section and parts of the underlying Bandanna Formation.

The 'Rewan Formation' consists of interbedded red, grey-green and dark grey shales, siltstones and lithic sandstones with minor amounts of conglomerate. The sandstones are poorly sorted, subangular to subrounded and range in composition from sub-litharenites to lithic and quartz arenites. In a number of accumulations, sand grain size distribution in 'Rewan Formation' reservoirs is bimodal, indicating sediments may have been derived from both the Roma Shelf and from the Permo-Carboniferous high block to the east (Cosgrove and Mogg, 1985). Grainsize and the proportion of volcanic detritus within the 'Rewan Formation' decreases from east to west across the basin. There is also a general fining upwards through the sequence. In many areas, a coarse grained, basal sand unit is overlain by a sealing mudstone (Dickins and Malone, 1973). In the southeast of the Bowen Basin, adjacent to the Goondiwindi-Moonie Fault, massive conglomerates, shed from the uplifted Permo-Carboniferous terrain to the east were deposited. This facies has been informally named the 'Cabawin Formation'.

Of the 16 hydrocarbon accumulations discovered in the 'Rewan Formation' to date, only one (Yellowbank) is located in the Denison Trough. The remainder are found either on the Roma Shelf or on the western flank of the Taroom Trough (Saint George-Bollon Slope). Five of these recorded small, non-commercial gas flows from the Rewan Formation (Pickanjinie, Winnathoola, Warroon, Rednook and Myall Creek). A further 7 (Snake Creek, Parknook, East Glen, Bloodwood, Mentor, Tinker and Namarah) have been completed as commercial Rewan gas producers. Tinker and

GAS RESERVES, Permian, Southern Bowen Basin

(as at 30/06/96, QDME)



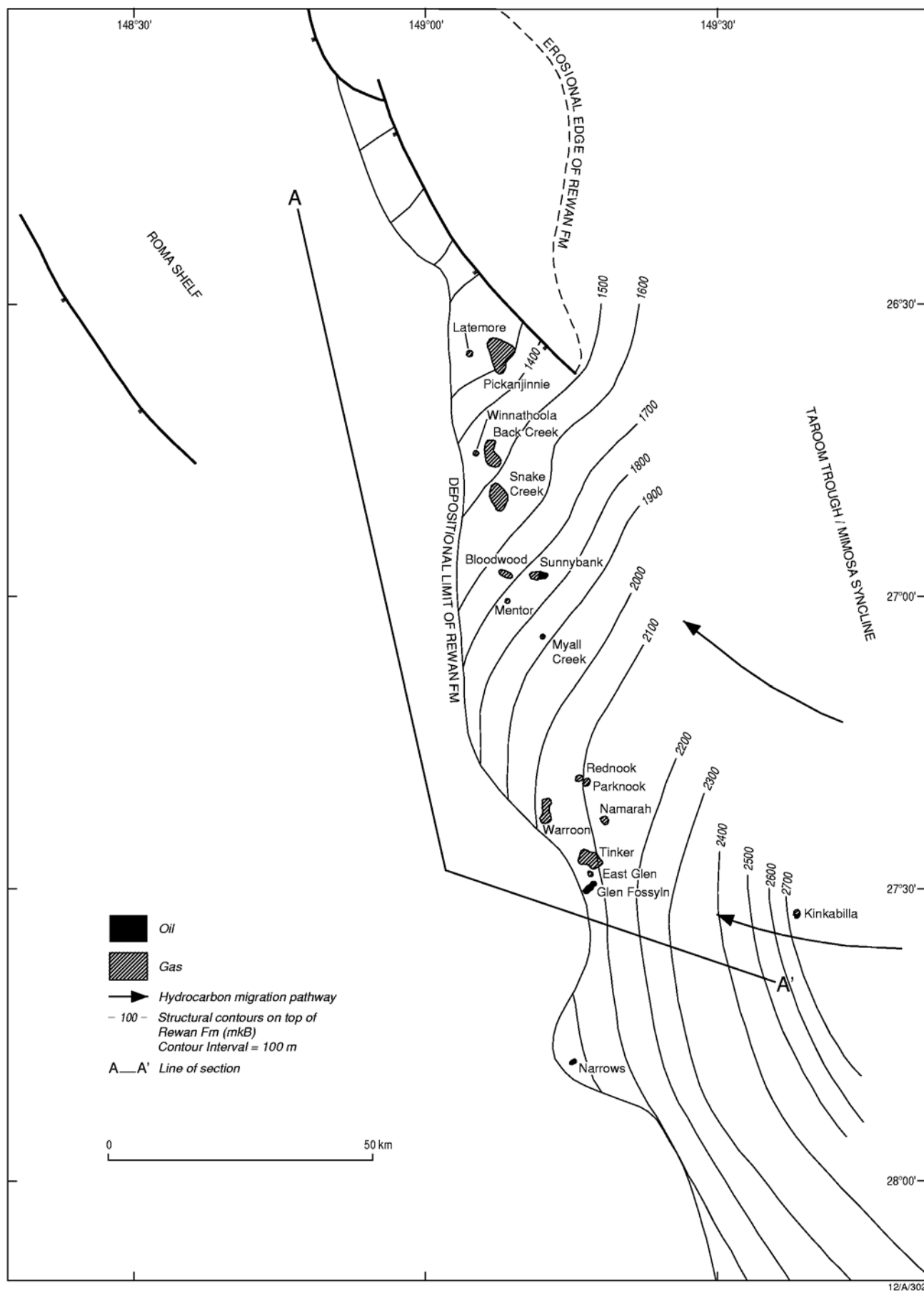
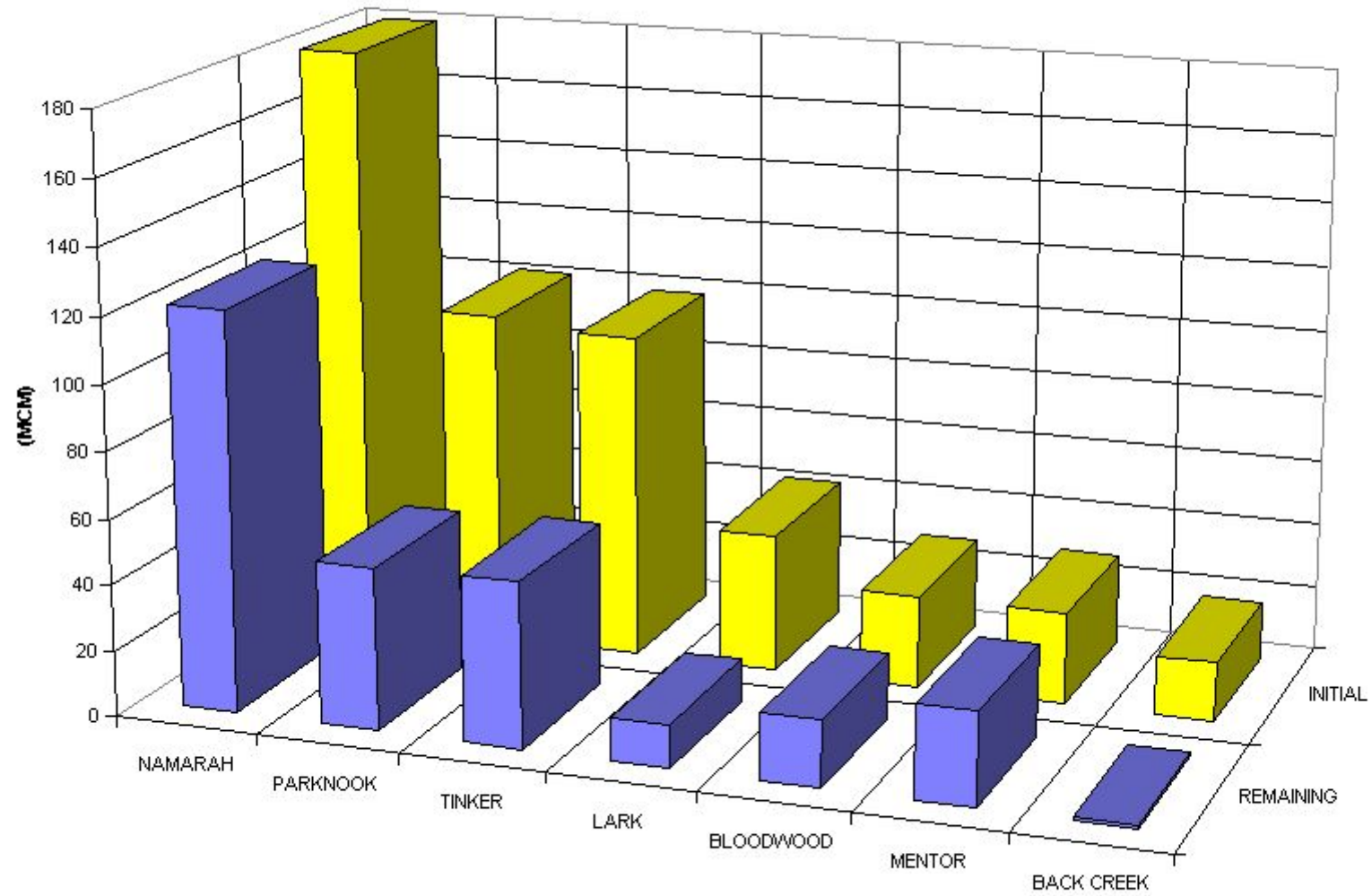


Figure 8. Location of Rewan Formation hydrocarbon accumulations

GAS RESERVES, Rewan Formation, Southern Bowen Basin (as at 30/06/96, QDME)



Namarah are probably the most significant of these, with 99 million cubic metres and 180 million cubic metres of initial recoverable gas (as at 30/06/96) reservoirised in the 'Rewan Formation' respectively. Two, small commercial oil accumulations (Narrows and Sunnybank) and one, small non-commercial oil accumulation (Glen Fosslyn) have also been discovered in the 'Rewan Formation'.

In many areas, silicification and clay alteration of 'Rewan Formation' sediments has significantly reduced primary porosity and permeability. However in places, leaching of volcanic clasts and brecciation of potassium feldspar clasts has lead to the development of secondary porosity (Butcher, 1984). Porosity and permeability within this unit is highly variable. The scant data available indicates porosity probably varies between 5% and 20% (averaging around 14%) while permeabilities are in the order of 0.1 millidarcy to 1.0 millidarcy. Seal for 'Rewan Formation' reservoirs is invariably provided by intraformational shales and mudstones, as the overlying Showgrounds Sandstone and 'Clematis Sandstone' are non-sealing facies.

On the eastern flank of the Roma Shelf, where the erosionally truncated edge of the Rewan Formation onlaps Permian sediments, the 'Rewan Formation' becomes increasingly fine grained and is thought to act as a vertical hydraulic barrier to hydrocarbons generated from downdip Permian source rocks (Butcher, 1984). Consequently, many of the hydrocarbon accumulations found in the overlying Showgrounds Sandstone occur west of the zero edge of the 'Rewan Formation'. In some instances, where hydrocarbons are found reservoirised within the 'Rewan Formation', local faulting has been invoked to account for their presence (Brown, 1981). The location of hydrocarbon accumulations reservoirised within the 'Rewan Formation' in the southern Bowen Basin are shown in Figure 8.

4.2.14 Showgrounds Sandstone.

In the Roma Shelf area, at the end of the Early Triassic, uplift, erosion and a period of non-deposition followed the deposition of the 'Rewan Formation'. The sheet-like blanketing, fluvial sands of the Showgrounds Sandstone were then laid down on this erosional surface. This unit is the primary hydrocarbon exploration target in the Bowen Basin.

Although the Showgrounds Sandstone is laterally extensive and sheet-like in character, it is a heterogenous unit, showing rapid vertical and lateral changes in reservoir quality. This unit was deposited in a fluvial system with sediment probably supplied from areas of high relief to the south and west of the Roma Shelf and to a lesser extent, from localised highs (Butcher, 1984). However, in spite of the large number of exploration wells that have intersected the Showgrounds Sandstone, core data is relatively sparse and incomplete. Often, core orientation was not recorded in many of the early wells which intersected the Showgrounds Sandstone, and dipmeter data, where available, is of poor quality. Consequently, it is difficult to accurately determine palaeocurrent directions at the time of deposition of the Showgrounds Sandstone.

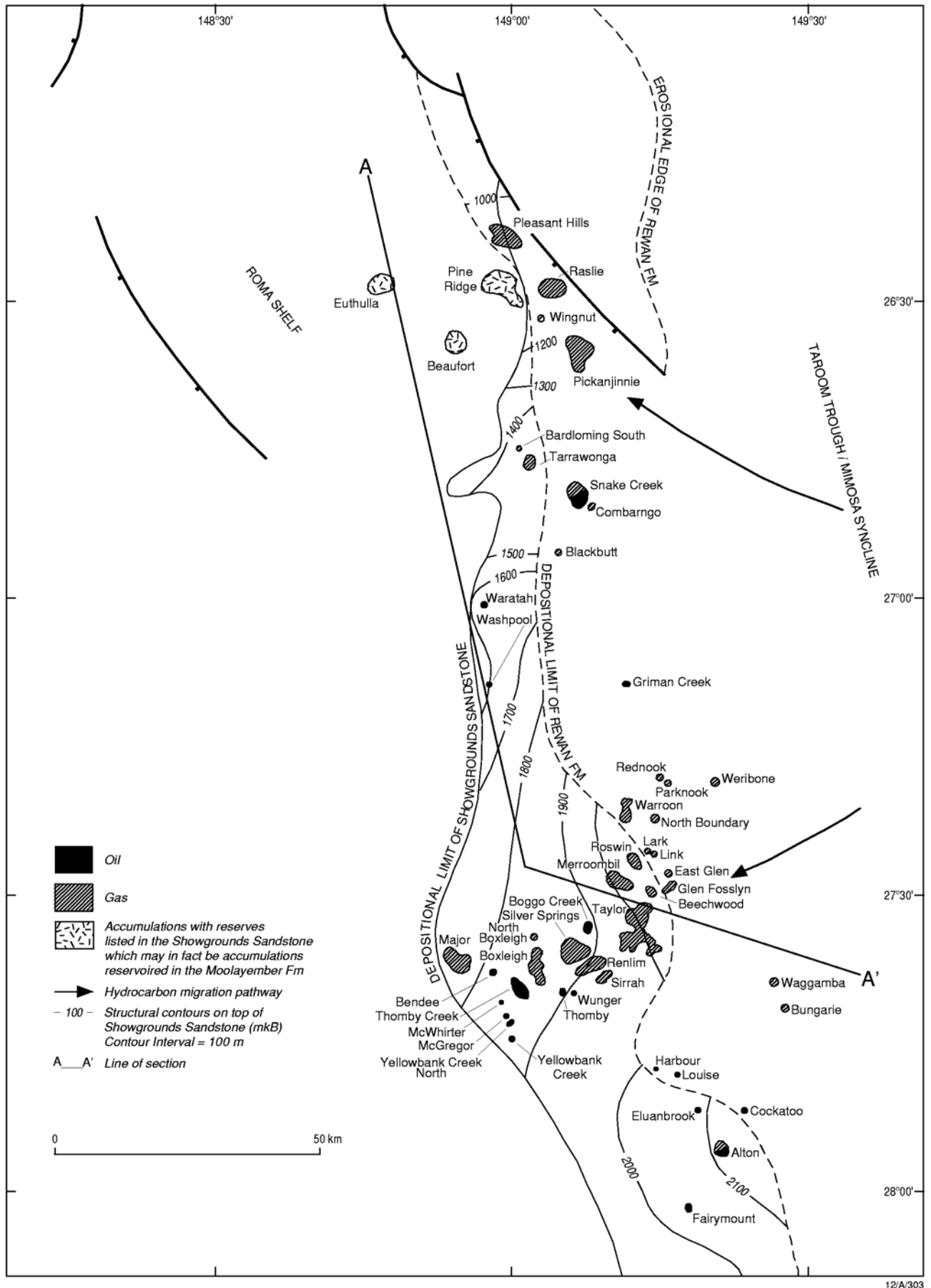


Figure 10. Location of Showgrounds Sandstone hydrocarbon accumulations with respect to the zero edge of the Rewan Formation

Butcher (1984), in a detailed study of the Showgrounds Sandstone in an area immediately to the south and adjacent to the Roma Shelf, recognised three distinct facies within the unit. The first is described as a poorly sorted, coarse to very coarse sandstone and conglomerate and is thought to represent a bed-load facies deposited in a high flow fluvial environment. This facies appears to be restricted to pre-existing valleys and is thin and poorly developed near the depositional edge of the Showgrounds Sandstone.

A second sequence, representing a mixed-load facies deposited under a more moderate flow regime, comprises poorly sorted, very coarse to very fine sandstone and siltstone. The third facies recognised by Butcher (1984) consists of medium to coarse, moderately well sorted quartz sandstones interbedded with siltstones and shales which contain abundant organic material. Acritarchs identified within this facies indicate the sequence has brackish to marginal-marine affinities and was probably deposited either as a prodelta, distal, distributory mouth bar sequence or possibly in a saline lake environment.

Extensive silicification is common in most facies of the Showgrounds Sandstone, but diagenesis has not completely occluded primary porosity. Diagenetic kaolinite (formed from the alteration of feldspars), vermiculite and illite (from biotites) are also found lining pore spaces and throats. However subsequent flushing of these clays by formation waters has created a significant system of secondary porosity (Butcher, 1984). In places, secondary carbonates have replaced clays and infilled pore spaces. Subsequent partial dissolution of this carbonate cement has also contributed to secondary porosity.

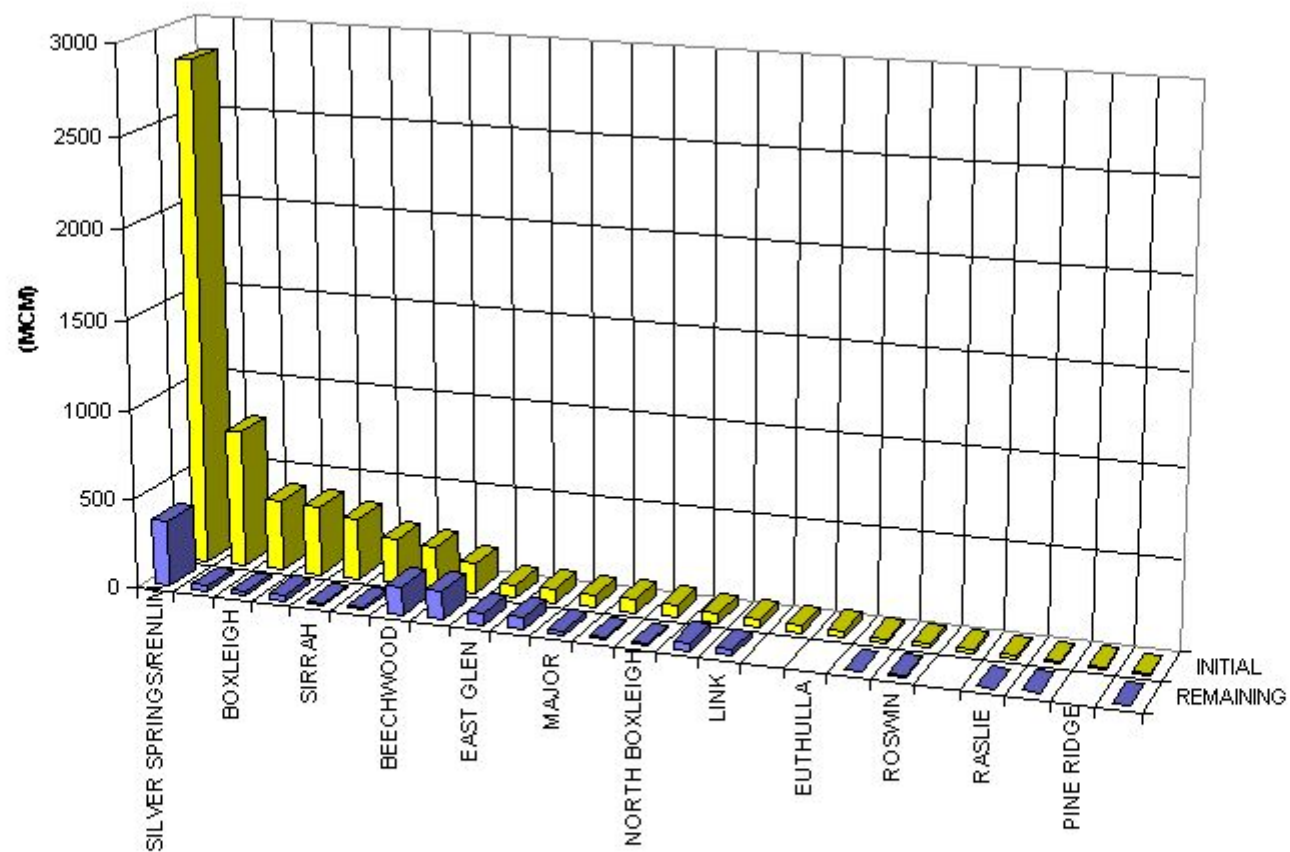
As mentioned above, porosity and permeability within the Showgrounds Sandstone is highly variable. The best reservoir characteristics are found in the coarse, conglomeratic, high flow, bed-load facies described by Butcher (1984). Here, porosities range from 12% to 20% and permeabilities from 500 millidarcys to 10 darcies. The above author also noted that where hydrocarbons are reservoired in this facies, the early emplacement of these hydrocarbons has had a significant influence on the preservation of primary porosity.

Generally, the mixed-load and distal, distributory mouth bar facies described above exhibit lower porosities and permeabilities. However, porosities of up to 17% and permeabilities of up to 700 millidarcys have still been measured in these units. Vertical permeability in the distal, marginal-marine facies tends to be low due to the presence of thin, interbedded shales and siltstones.

In the Middle Triassic, a basinwide transgression terminated deposition of the Showgrounds Sandstone. A marginal marine, tidal flat or lacustrine environment prevailed over much of the southern Bowen Basin at this time during which, the dark grey to black shales and mudstones of the Snake Creek Mudstone Member were laid down. This unit provides a regional seal for the underlying Showgrounds Sandstone. In the west, deposition of the Snake Creek Mudstone Member extended past the zero edge of the Showgrounds Sandstone, while to the east, the unit thickens slightly into the Taroom Trough. Typically, the Snake Creek Mudstone Member is around 15 m to

GAS RESERVES, Showgrounds Sandstone

(as at 30/06/96, QDME)



20 m thick, with minor thickening associated with underlying Showgrounds Sandstone channels.

To date, 51 hydrocarbon accumulations have been discovered in the Showgrounds Sandstone. Of these, 23 are commercial gas discoveries, 9 are commercial oil discoveries, 3 are commercial oil and gas discoveries, 10 are non-commercial gas discoveries, 5 are non-commercial oil discoveries and one is a non-commercial oil and gas discovery. As mentioned in section 5.2.13, most of the commercial hydrocarbon discoveries in the Showgrounds Sandstone are located west of the zero edge of the underlying 'Rewan Formation' (Figure 10).

Of the gas discoveries made in the Showgrounds Sandstone, the Silver Springs/Renlim accumulation is probably the most significant. Here, nearly 2828 million cubic metres (as at 30/06/96), of initial recoverable gas is reservoired in the Showgrounds Sandstone. The trapping mechanism at Silver Springs/Renlim is both structural and stratigraphic - coarse to very coarse, fluvial sandstones and conglomerates of the Showgrounds Sandstone thin onto the western flank of a north-south trending anticline. The accumulation is sealed by a 15 m section of mudstone (Snake Creek Mudstone Member). At Silver Springs/Renlim both porosity and permeability are highly variable. Horizontal and vertical permeabilities range between 0.1 millidarcys and 700 millidarcys while porosity varies between 5% and 21%.

Other accumulations where significant gas resources are reservoired within the Showgrounds Sandstone include Pleasant Hills (770 million cubic metres), Boxleigh (395 million cubic metres), Taylor (384 million cubic metres), Sirrah (344 million cubic metres), Pickanjinnie (258 million cubic metres) and Beechwood (231 million cubic metres). All reserve figures quoted above refer to initial recoverable gas reserves, as at 30/06/96.

Oil accumulations discovered in the Showgrounds Sandstone to date have been small - less than half a million barrels of recoverable oil. The Taylor oil and gas accumulation is the largest of these. Here, initial recoverable oil reserves have been estimated at 249 megalitres. Other small, commercial oil accumulations discovered within the Showgrounds Sandstone include Fairymount, Waratah, Yellowbank Creek and Louise.

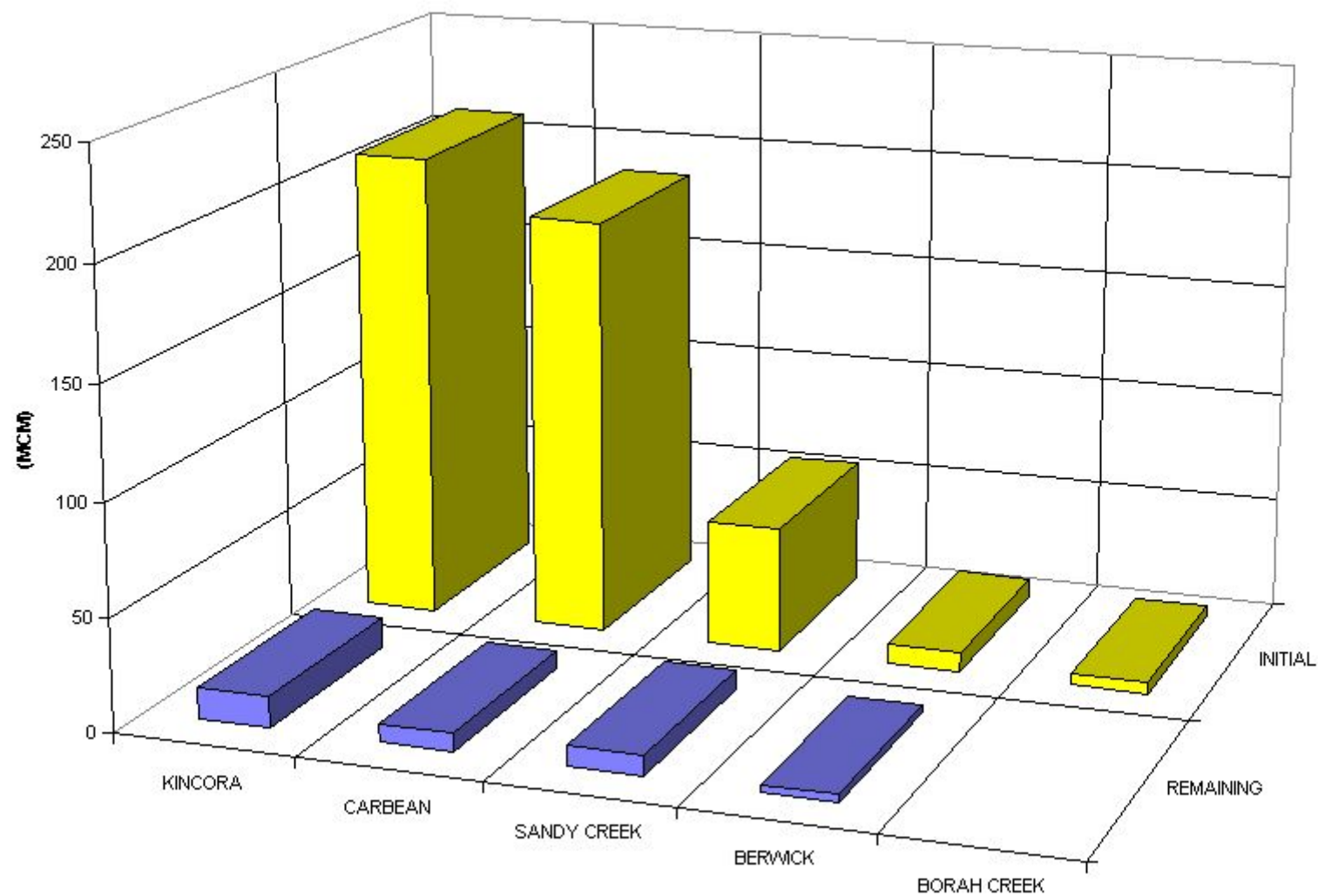
4.2.15 'Clematis Sandstone' (formal name : Clematis Group).

The 'Clematis Sandstone' is the partial lateral equivalent of the Showgrounds Sandstone in the Denison Trough. It consists predominantly of poorly sorted, quartzose, sheetlike, fluvial sandstones with thin interbeds of red-brown mudstone. The 'Clematis Sandstone' varies in thickness from around 100 m in the west to up to 2000 m towards the axis of the trough.

Although this unit is characterised by good reservoir properties, a hydrocarbon discovery has yet to be made in the 'Clematis Sandstone'. The absence of hydrocarbon accumulations within this unit is probably due to the lack of a competent top seal (sediments of the overlying Surat Basin are not present in the Denison

GAS RESERVES, Moolayember Formation

(as at 30/06/96, QDME)



Trough, while in many areas, much of the Moolayember Formation was removed by uplift and erosion at the end of the Triassic).

4.2.16 Moolayember Formation, 'Wandoan Formation' and 'Wandoan Sandstone'.

Renewed subsidence in the Middle Triassic saw the deposition of the Moolayember Formation over much of the Bowen Basin. This unit comprises shales, mudstones, siltstones and lithic sandstones deposited in a fluvio-lacustrine to marginal marine environment. The Moolayember Formation is conformably overlies both the 'Clematis Sandstone' in the north of the basin and the Showgrounds Sandstone further to the south.

On the Roma Shelf, Cosgrove and Mogg (1985), have subdivided the Moolayember Formation into three units. The basal unit, the Snake Creek Mudstone Member, is a laterally extensive, transgressive shale which provides a regional seal to the underlying Showgrounds Sandstone. A middle unit comprises nearshore and fluvio-deltaic, carbonaceous shales, siltstones and fine grained lithic sandstones and is considered to have some reservoir potential. An upper unit is composed of grey shale and grey-green siltstone deposited in a marginal marine to lacustrine environment.

In the Middle to Late Triassic, uplift and erosion removed the uppermost section of the Moolayember Formation. Over some pre-existing basement highs, the unit has been entirely eroded. In the Roma Shelf area, the amount of erosion that took place in the Middle to Late Triassic seems to increase in a northerly direction, especially around accumulations such as Pleasant Hills and Mooga (Cosgrove and Mogg, 1985).

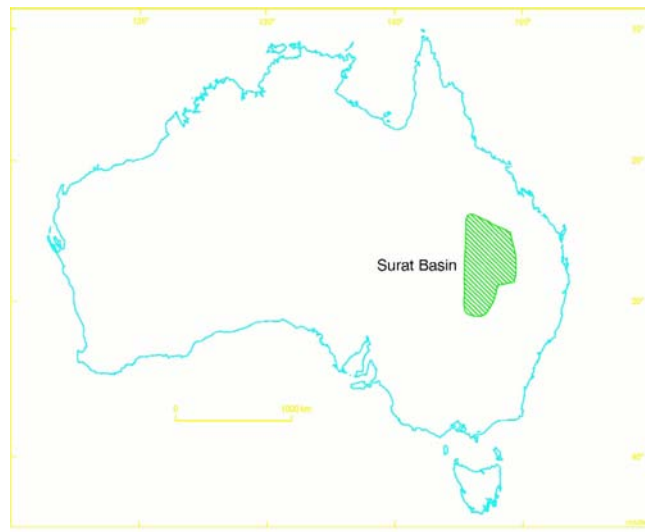
On the flanks of the Roma Shelf, the Saint George-Bollon Slope and the Taroom Trough, many early workers did not differentiate between the Showgrounds Sandstone and the overlying Moolayember Formation. Here, the sandy, Middle Triassic, fluvio-lacustrine sequence lying immediately below the Jurassic sediments of the Surat Basin is informally referred to as either the 'Wandoan Sandstone' or 'Wandoan Formation'.

To date, a total of 28 hydrocarbon discoveries have been made in the Moolayember Formation, 'Wandoan Formation' or 'Wandoan Sandstone'. These include 6 commercial gas discoveries, 2 commercial oil and gas discoveries, 4 commercial oil discoveries, 9 non-commercial gas discoveries, 3 non-commercial oil and gas discoveries and 4 non-commercial oil discoveries. None of these discoveries are found in the Denison Trough, where the Moolayember Formation is probably non-prospective for hydrocarbons.

The most significant of the above accumulations is Kincora, where 55 megalitres of initial recoverable oil and 210 million cubic metres of initial recoverable gas (as at 30/06/96), are reservoirised in what is essentially a stratigraphic trap in the 'Wandoan Sandstone'. Here, the Moolayember Formation reservoir consists of light grey, poorly sorted, sublabile, angular and quartzose fluvial sandstones with porosities ranging from 13% to 20% and permeabilities of less than 20 millidarcys.

Apart from Carbean, located 20 kilometres to the southeast of Kincora, where 187 million cubic metres of initial recoverable gas has been discovered in the 'Wandoan Sandstone', the remaining hydrocarbon accumulations in the Moolayember Formation/'Wandoan Sandstone'/'Wandoan Formation' are small - individual oil accumulations contain less than 8 megalitres of initial recoverable oil, while the gas accumulations discovered to date are smaller than 50 million cubic metres.

Reservoir character is highly variable within this unit although the Moolayember Formation typically exhibits fair to good porosity with poor permeability. At Richmond, where a non-commercial oil and gas flow was recorded from the Moolayember Formation, reservoir porosities range from 18% to 27% and permeability from 0 to 10 millidarcys. At Donga, average reservoir porosity is around 14% and permeability ranges from 0.2 to 74 millidarcys. Seal for Moolayember reservoirs is invariably provided by intraformational shales and mudstones - the Jurassic sandstones of the Surat Basin which immediately overly the Moolayember Formation do not provide a competent top seal.



Location map, Surat Basin

5. SURAT BASIN

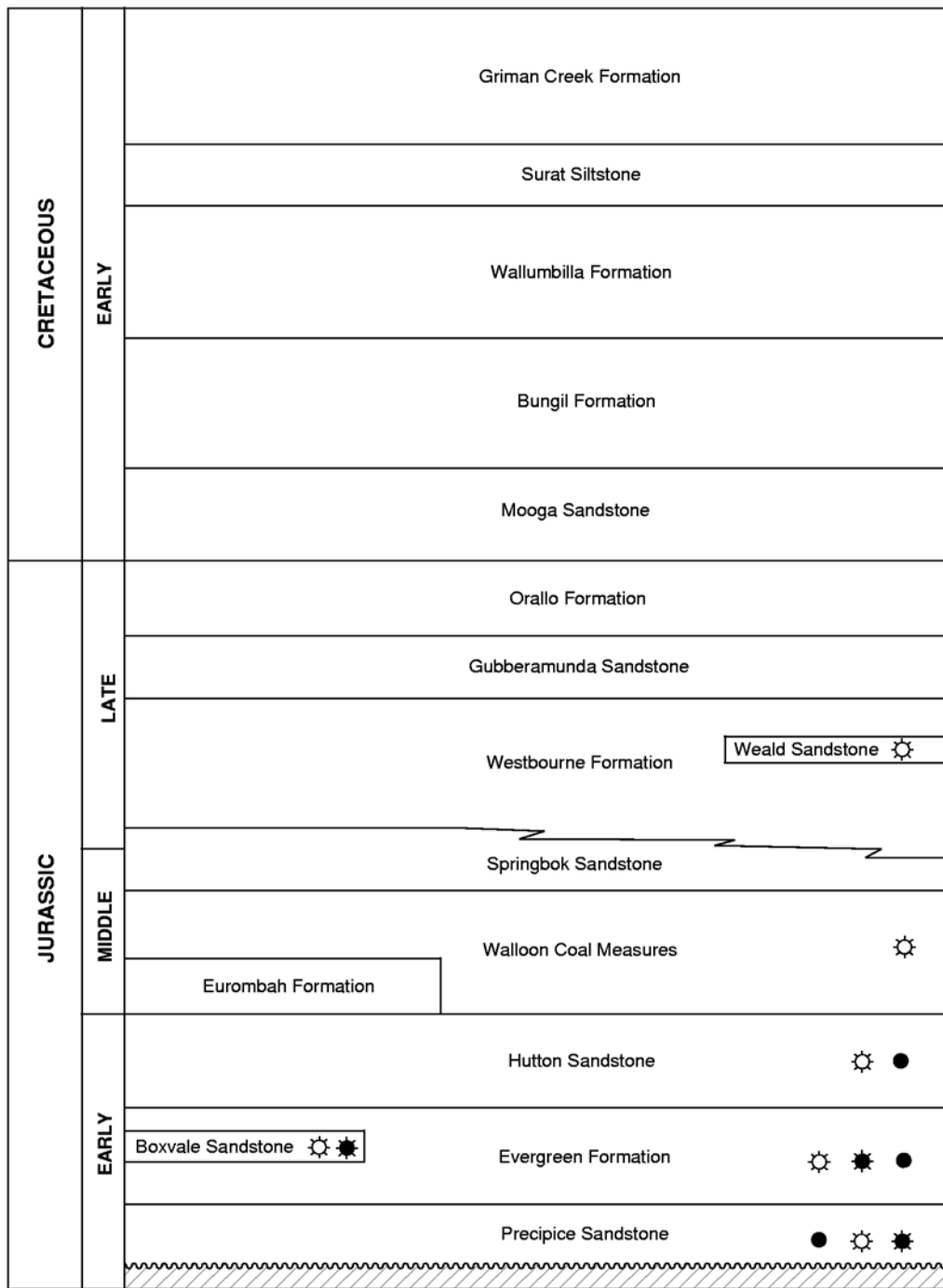
5.1 Basin Evolution and Stratigraphy.

Towards the end of the Triassic, uplift and erosion terminated sedimentation over much of the Bowen Basin. Considerable thicknesses of Moolayember Formation, Rewan and Clematis Group sediments were removed, leaving a peneplained surface with subdued topography. The compressional regime that had persisted from Permian through to Triassic times and had given rise to thrust faulting and anticlinal folding, abated. Consequently, most structures within the Surat Basin sequence have resulted from either drape over pre-existing basement highs or differential compaction and are invariably of lower relief than those found in the underlying Triassic section (Golin and Smyth, 1986). A contractional deformational event early in the Late Cretaceous led to limited propagation of thrust faults from the underlying section into the Surat Basin sequence. More commonly, however, this episode resulted in folding and uplift of Surat Basin sediments over these deeper, reactivated thrust faults. (Korsch & Totterdell, 1996).

In the early Jurassic, regional subsidence commenced with relatively little reactivation of earlier faulting. The first sediments to be deposited on this erosional surface were the fluvial sandstones of the Precipice Sandstone (although in some areas, the Late Triassic 'Eddystone beds' are thought to represent the basal sediments of the Surat Basin sequence). This unit is the primary hydrocarbon exploration target in the Surat Basin and contains numerous oil and gas accumulations. The Precipice Sandstone was probably derived from Precambrian rocks bordering the west and southwest of the Great Artesian Basin (Martin, 1981) and prograded across the basin as a series of fluvial sands deposited in meandering and braided stream environments. The unit achieves a maximum thickness of at least 120 m in the Mimosa Syncline adjacent to the Chinchilla-Goondiwindi/Moonie Faults but it thins to the west over the Roma Shelf, where the Precipice Sandstone is less than 40 m thick.

Immediately overlying the Precipice Sandstone is the Evergreen Formation. Also of Early Jurassic age, the boundary between the Lower Evergreen Formation and the Precipice Sandstone is often gradational and difficult to determine. Sediments of the Evergreen Formation represent a transgressive phase, comprising basal fluvial sandstones (which are continuous with those of the underlying Precipice Sandstone), superceded by siltstones, shales and minor fine grained sandstones deposited under fluvio-lacustrine to marginal marine environments. The Evergreen Formation is more areally extensive than the Precipice Sandstone and thickens both to the north and to the east into the Mimosa Syncline. The sandy, basal Evergreen Formation is an important hydrocarbon reservoir in the Surat Basin.

Towards the end of the Early Jurassic, after the deposition of the Evergreen Formation, a regressive sequence of fluvial, deltaic and lacustrine sandstones with minor siltstone, shales and coals was deposited over most of the Surat Basin. Deposition of this sequence (Hutton Sandstone) was widespread and continuous with the Eromanga Basin to the west. The Hutton Sandstone is a relatively uniform,



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Figure 13. GENERALISED STRATIGRAPHY, SURAT BASIN, QUEENSLAND

blanketing sand body ranging in thickness between 150 m and 250 m, although some thickening into the Mimosa Syncline is evident. While this unit is a prolific hydrocarbon producer in the Eromanga Basin to the west, only a small number of minor hydrocarbon discoveries have been made in the Surat Basin at Hutton Sandstone level. Both the Hutton Sandstone and the Precipice Sandstone are major aquifers in the Surat Basin.

By the Middle Jurassic, coal swamp environments began to predominate over much of the Surat Basin. In the north, however, the Eurombah Formation, which comprises lithic sandstones with minor conglomerates, mudstones and siltstones, conformably overlies the Hutton Sandstone. The Eurombah Formation was deposited in a meandering stream environment, although the lack of extensively reworked sediments suggests that the depositional environment was of lower energy than that of the underlying Hutton Sandstone (Exon, 1976).

To the south, the Walloon Coal Measures transgressed the Hutton Sandstone, while in the north, they rest conformably on the Eurombah Formation. Although much of the Walloon Coal Measures sequence was deposited in a peat swamp environment, the basal section, consisting of fine grained lithic sandstones with interbedded mudstones and siltstones, was probably laid down in a fluvial environment (Exon, 1976). The Walloon Coal Measures thicken eastwards into the Mimosa Syncline and attain a maximum thickness in excess of 400 m in the north and east of the basin.

Towards the end of the Middle Jurassic, fluvial conditions again predominated over much of the basin. The Springbok Sandstone was deposited at this time. Comprising fine grained lithic sandstones with interbedded, carbonaceous and micaceous siltstones and mudstones, the Springbok Sandstone rests conformably on the Walloon Coal Measures. The unit thickens to the east (to a maximum thickness of around 200 m), and interfingers with the Adori Sandstone of the Eromanga Basin in the west.

At the beginning of the Late Jurassic, sediments of the Westbourne Formation were deposited conformably over the Springbok Sandstone. The Westbourne Formation is a fluvial sequence of interbedded lithic sandstones, mudstones and siltstones. In places, it is difficult to differentiate the basal Westbourne Formation from the underlying Springbok Sandstone. Exon, (1976) has suggested that the two units represent different facies of the same fluvial cycle and that the basal fluvial sands of the Westbourne Formation were simply laid down in a lower energy environment than those of the Springbok Sandstone. Although not considered a primary exploration target in the Surat Basin, at Pleasant Hills, on the Roma Shelf, commercial quantities of gas have been produced from a coarse grained, quartzose sandstone interval within the Westbourne Formation (informally named the 'Weald Sandstone').

Towards the end of the Jurassic and in the earliest Cretaceous, a series of fluvial sandstones infilled the slowly subsiding Surat Basin (Gubberamunda Sandstone, Orallo Formation and Mooga Sandstone). Deposition of these sequences was widespread. To the west, they interfinger with lateral equivalents in the Eromanga Basin. Although exhibiting good reservoir properties in places, these units are not thought to be prospective for hydrocarbons.

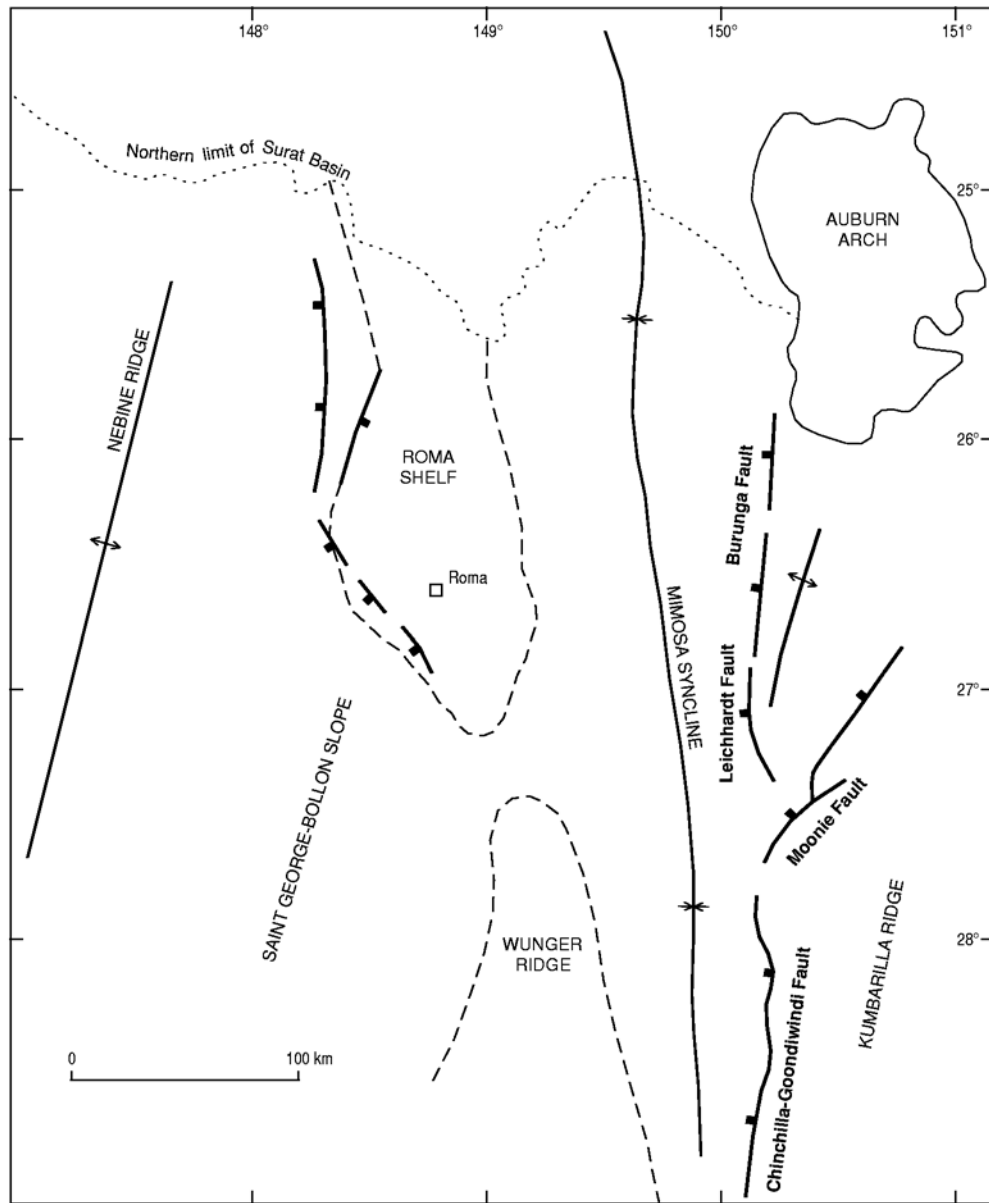


Figure 14. Tectonic Elements, Surat Basin

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After the deposition of the Mooga Sandstone in the Early Cretaceous, marine influences returned to the Surat Basin. The Bungil Formation, which comprises lithic sandstones, mudstones and siltstones, was deposited conformably over the Mooga Sandstone at this time. Laid down in a paralic environment, the formation shows increasing marine affinities towards the top of the section (Exon, 1976). This marine transgression culminated in the Aptian, with the deposition of the marine mudstones, siltstones and lithic sandstones of the Wallumbilla Formation and the Surat Siltstone.

Towards the end of the Early Cretaceous, the seas began to retreat from the Surat Basin. The Griman Creek Formation, which rests conformably on the Surat Siltstone, was laid down at this time. This unit consists predominantly of thinly interbedded siltstone, fine grained sandstone and mudstone but conglomerates and coals become more common towards the top of the sequence. The lower Griman Creek Formation is probably marine while the upper section grades to transitional and finally a freshwater facies.

Early in the Late Cretaceous, a contractional deformational event resulted in folding and uplift of Surat Basin sediments over reactivated thrust faults deeper in the section. This was followed in the Late Cretaceous and Early Tertiary by erosion and peneplanation which took place over most of the Surat Basin. Deep weathering profiles and surficial silcrete deposits developed at this time. In the Oligocene, epeirogenic movements tilted the entire sedimentary section to the southwest. This was accompanied by the extrusion of basalts to the north and east of the Surat Basin. The Oligocene tilting event resulted in increased erosion in the north of the basin, while to the south, where uplift was much less pronounced, erosion is less evident. Following this tilting event (probably post-Miocene), meteoric waters flowed in a southerly direction through the Early Jurassic, Lower Precipice Sandstone, which is a primary hydrocarbon exploration target in the Surat Basin. Erosion of Surat Basin sediments has continued from Tertiary times until the present day, with Cainozoic sedimentation represented by a thin cover of fluvial sandstones and siltstones.

5.2 Hydrocarbon Reservoirs and Seals.

5.2.1 Precipice Sandstone.

The Precipice Sandstone is the primary hydrocarbon exploration target in the Surat Basin. Distribution of the unit in the subsurface is widespread - it attains a maximum thickness of at least 120 m in the Mimosa Syncline, adjacent to the Chinchilla-Goondiwindi/Moonie Faults, but thins dramatically over the Roma Shelf to the west, where the Precipice Sandstone is less than 40 m thick. Generally, however the thickness and distribution of the Precipice Sandstone is determined by the palaeo-relief of the underlying Triassic unconformity surface and subsequent differential compaction. The outcrop of the Precipice Sandstone to the north of the Roma Shelf defines the northern limit of Surat Basin sedimentation.

The Precipice Sandstone is a predominantly fluvial sequence. Throughout most of the Surat Basin, the unit consists predominantly of massive, medium to coarse grained, quartzose sandstones. However, on the Roma Shelf, the sandstones tend to be finer grained and contain higher proportions of mica, feldspars and lithic fragments with occasional carbonate cement. The Precipice Sandstone is diachronous and 'youngs' to the west (Reiser and Williams, 1969).

Initially, the Precipice Sandstone was deposited in a moderately high energy braided stream fluvial environment on the eroded, Triassic sediments of the underlying Bowen Basin. Sedimentary features associated with this type of depositional environment and found within this facies include longitudinal bars, transverse bars and rare channel fill sequences which fine upwards from gravel to medium grained sandstones.

After the initial braided stream deposits transgressed the basin, the palaeogradient across the Surat Basin decreased and the depositional environment changed from a braided stream to a meandering stream environment. Consequently, point bar deposits and finer grained channel fill sequences become more common towards the top of unit. Throughout the Early Jurassic, the sediment source for the Precipice Sandstone appears to have been Precambrian rocks bordering the western and southwestern margin of the Great Artesian basin (Martin, 1981).

Separating the braided stream sediments of the Lower Precipice Sandstone from the meandering stream deposits of the Upper Precipice is a thin (approximately 5 m to 15 m thick), regionally extensive, silty, lacustrine shale. This facies may have been deposited at a time when the rate of basin subsidence exceeded the rate of sediment supply (Rigby and Kantsler, 1987). In many instances, this unit provides a competent seal for hydrocarbons reservoired in the Lower Precipice Sandstone.

The overlying sandstones of the Upper Precipice Sandstone grade upwards into the sandstones of the Lower Evergreen Formation and in many wells there is no distinct stratigraphic break between the two units. The Lower Evergreen Formation is considered to be a transitional facies, comprised of lacustrine shales and siltstones and

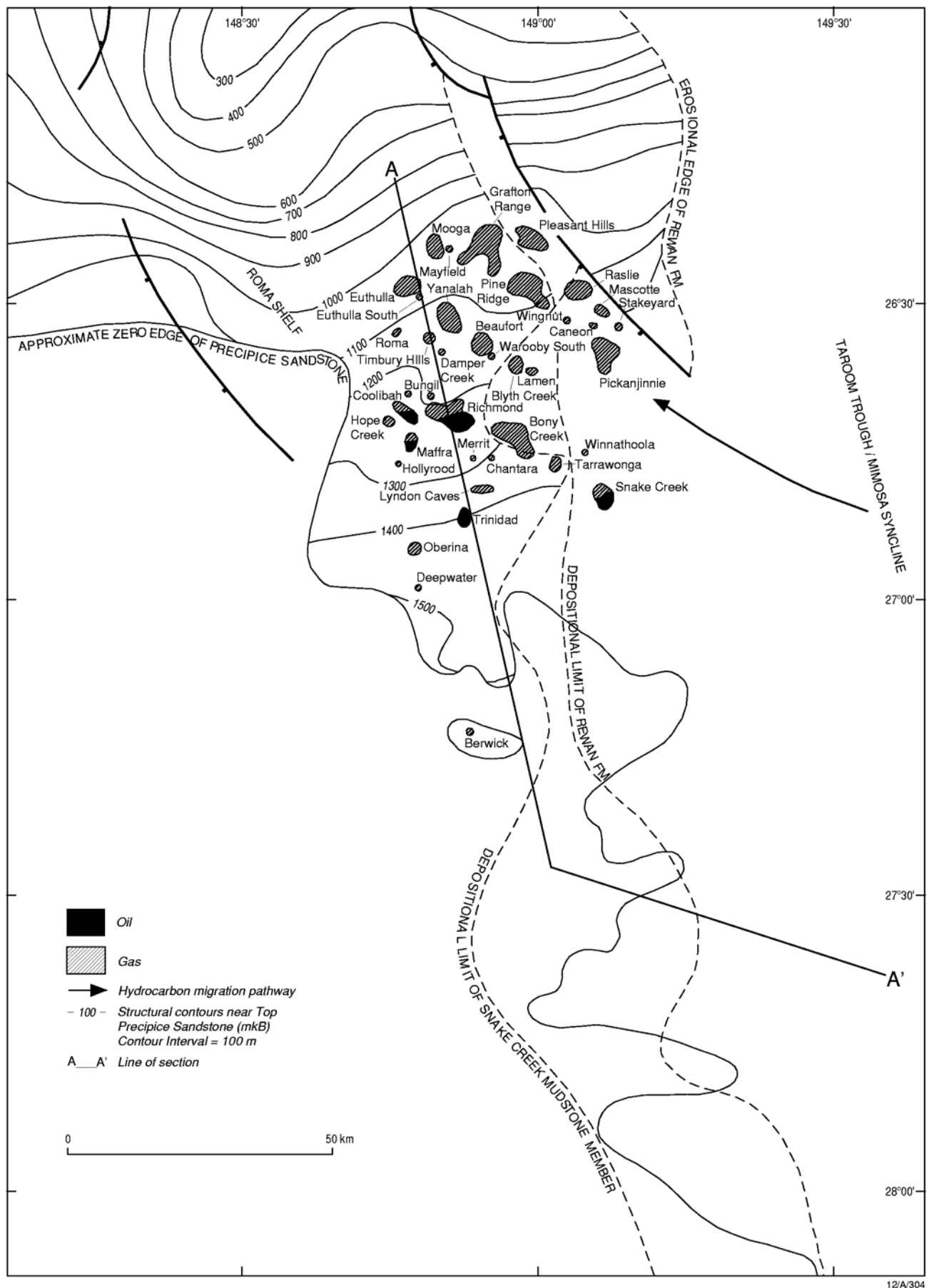
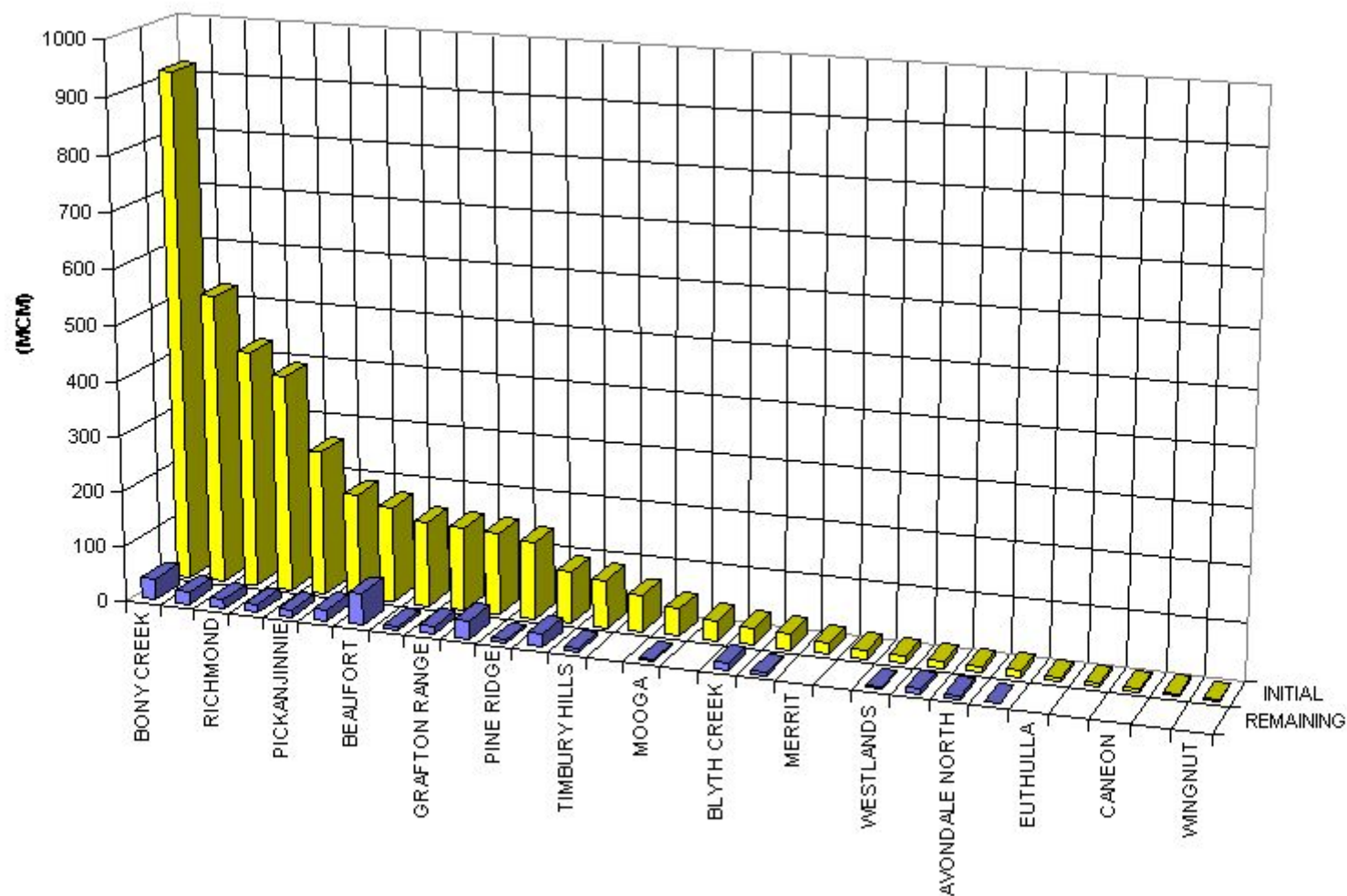


Figure 15. Location of Precipice Sandstone hydrocarbon accumulations with respect to the zero edge of Snake Creek Mudstone Member and the Rewan Formation

GAS RESERVES, Precipice Sandstone

(as at 30/06/96, QDME)



fine grained, shoreface sandstones (Cosgrove and Mogg, 1985). These fine grained sediments provide a top seal for hydrocarbons reservoired in the Upper Precipice Sandstone.

On the Roma Shelf, only the finer grained, meandering stream facies of the Upper Precipice Sandstone is present - the coarser, braided stream deposits of the Lower Precipice Sandstone were not deposited. In this locale, these sediments probably represent the final phase of Precipice Sandstone deposition in the Surat Basin and may be coeval with the basal Evergreen Formation deposited to the east and north of the Roma Shelf (Martin, 1981).

Reservoir properties are highly variable within this unit, with the best porosities and permeabilities found in the coarser, braided stream deposits of the Lower Precipice Sandstone. However, over seventy five percent of the hydrocarbon discoveries made within the Precipice Sandstone occur on the Roma Shelf, where this facies is absent. Generally, in the producing Precipice Sandstone reservoirs on the Roma Shelf, porosities average around 20% and permeabilities around 110 millidarcys. Reservoir porosity rarely exceeds 25% and permeability 700 millidarcys, although, on the eastern margin of the Mimosa Syncline, permeabilities of up to 4000 millidarcys have been measured in the Precipice Sandstone reservoir at Moonie.

Of the 51 hydrocarbon discoveries made in the Precipice Sandstone to date, 39 occur on the Roma Shelf. With the exception of Deepwater, all of the 26 commercial gas accumulations discovered in the Precipice Sandstone are also found on the Roma Shelf. The largest of these accumulations include Bony Creek, Tarrawonga, Richmond, Pleasant Hills and Pickanjinnee. Three additional commercial gas accumulations on the Roma Shelf also contain an oil leg in the Precipice Sandstone. These are Maffra, Duarran and Richmond. Commercial quantities of oil have also been recovered at Trinidad. All of the oil accumulations discovered on the Roma Shelf to date are small (10 megalitres of initial recoverable oil or less).

Figure 15 shows the location of the Roma Shelf petroleum accumulations reservoired in the Precipice Sandstone, with respect to the zero edge of the Rewan Formation and the Snake Creek Mudstone Member. This figure clearly shows that the majority of accumulations lie to the west of these zero edges, implying that the Rewan Formation and the Snake Creek Mudstone Member are acting as barriers to the vertical migration of petroleum through the sequence. The apparently anomalous petroleum occurrences to the east (Snake Creek, Pickanjinnee, Mascotte, Stakeyard etc) may be explained by either local faulting or by the fact that fine grained sediments in the Rewan Formation and Snake Creek Mudstone Member become only partially sealing as the units thin towards the west. A diagrammatic cross section (Figure 19) through the western flank of the basin shows the relationship between these hydraulic barriers to vertical migration and the location of Precipice Sandstone petroleum accumulations.

The largest oil accumulation in the Surat Basin (Moonie) is reservoired in the Precipice Sandstone. Located on the eastern flank of the Mimosa Syncline, Moonie was Australia's first commercial oil accumulation. Here, 3859 megalitres of initial recoverable oil (as at 30/06/96) is found in two separate pools within the Precipice

Sandstone, trapped in a four-way-dip closure immediately to the east of the Moonie Fault. To the north of Moonie, a further two, small commercial oil accumulations (Bennett and Leichhardt) and three non-commercial oil accumulations (Humbug Creek, Rockwood North and Xyloil South) have been discovered.

5.2.2 Evergreen Formation.

The Evergreen Formation rests conformably on the Precipice Sandstone and in many wells, the fine grained sandstones of the Upper Precipice Sandstone grade upwards into the basal Evergreen Formation without a distinct stratigraphic break.

Consequently, the lowermost Evergreen Formation was probably deposited in the same meandering stream, fluvial environment present in Upper Precipice Sandstone times. These basal Evergreen sandstones are predominantly fine to medium grained, and sublabe to labile. They constitute an important hydrocarbon reservoir in the Surat Basin.

As deposition of Evergreen Formation sediments continued, fluvial sandstones of the basal Evergreen Formation give way to fine grained, argillaceous sandstones and siltstones. Some authors believe these finer grained, argillaceous sediments were deposited in a marginal marine environment while others are of the opinion they were deposited in a lacustrine environment. In some instances, these silty sandstones provide intraformational seals for hydrocarbons reseroired in the basal Evergreen Formation. However, these siltstones are not ideal cap rocks and leakage is probably common. In some accumulations, connectivity is known to exist between the basal Evergreen Formation reservoir and the Boxvale Sandstone reservoir, which overlies the finer grained, siltstone facies (Golin and Smyth, 1986).

On the Roma Shelf, many workers have subdivided the Evergreen Formation into an upper and lower unit, separated by the 'mid-Evergreen marker' - an easily identifiable sonic marker which often corresponds to a break in resistivity on wireline logs. This marker, sometimes termed the Evergreen Resisitvity Marker (ERM), is composed of oolitic ironstone granules and well rounded quartz grains in an iron-rich cement. The ERM is thought to represent a disconformity and probably formed during a period of basin-wide subaerial exposure (Cosgrove and Mogg, 1985). The Evergreen Resistivity Marker is probably the lateral equivalent of the Westgrove Ironstone Member which was deposited in the northern Surat Basin at this time.

At the top of the Lower Evergreen Formation, overlying the fine grained, silty sandstone facies, is the Boxvale Sandstone Member. A number of hydrocarbon accumulations have been discovered within this unit. The coarse sandstones commonly found at the base of the Boxvale Sandstone are thought to be fluvial, while the well sorted, fine grained, quartzose sandstones in the upper part of the member are considered to represent either beach sands (Exon, 1976) or a fluvio-lacustrine delta. Deposition of the Boxvale Sandstone Member appears to be restricted to the northwestern Surat Basin and the western flank of the Mimosa Syncline. Boxvale Sandstone reservoirs are sealed by the siltstones, minor silty shales and argillaceous

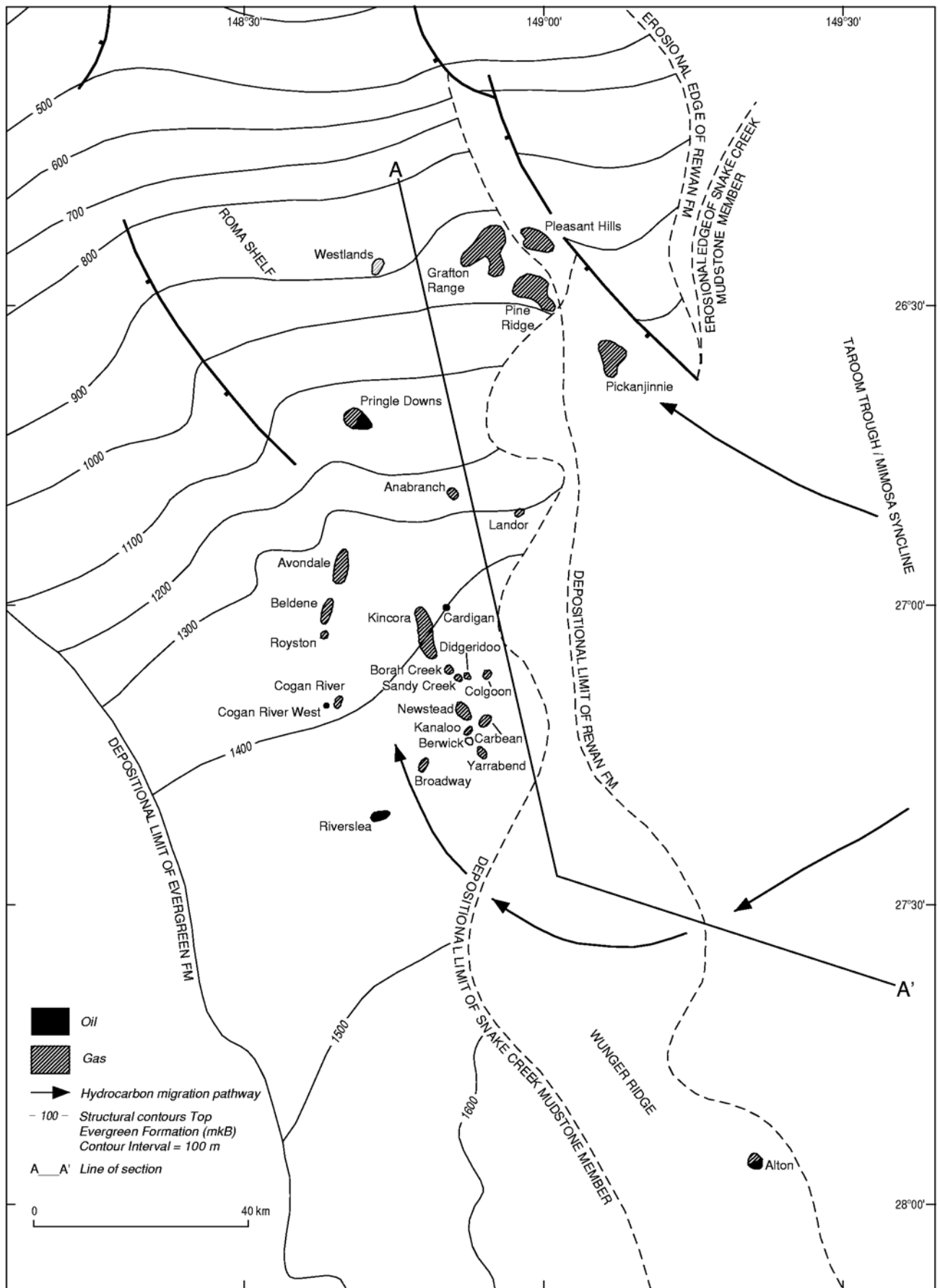
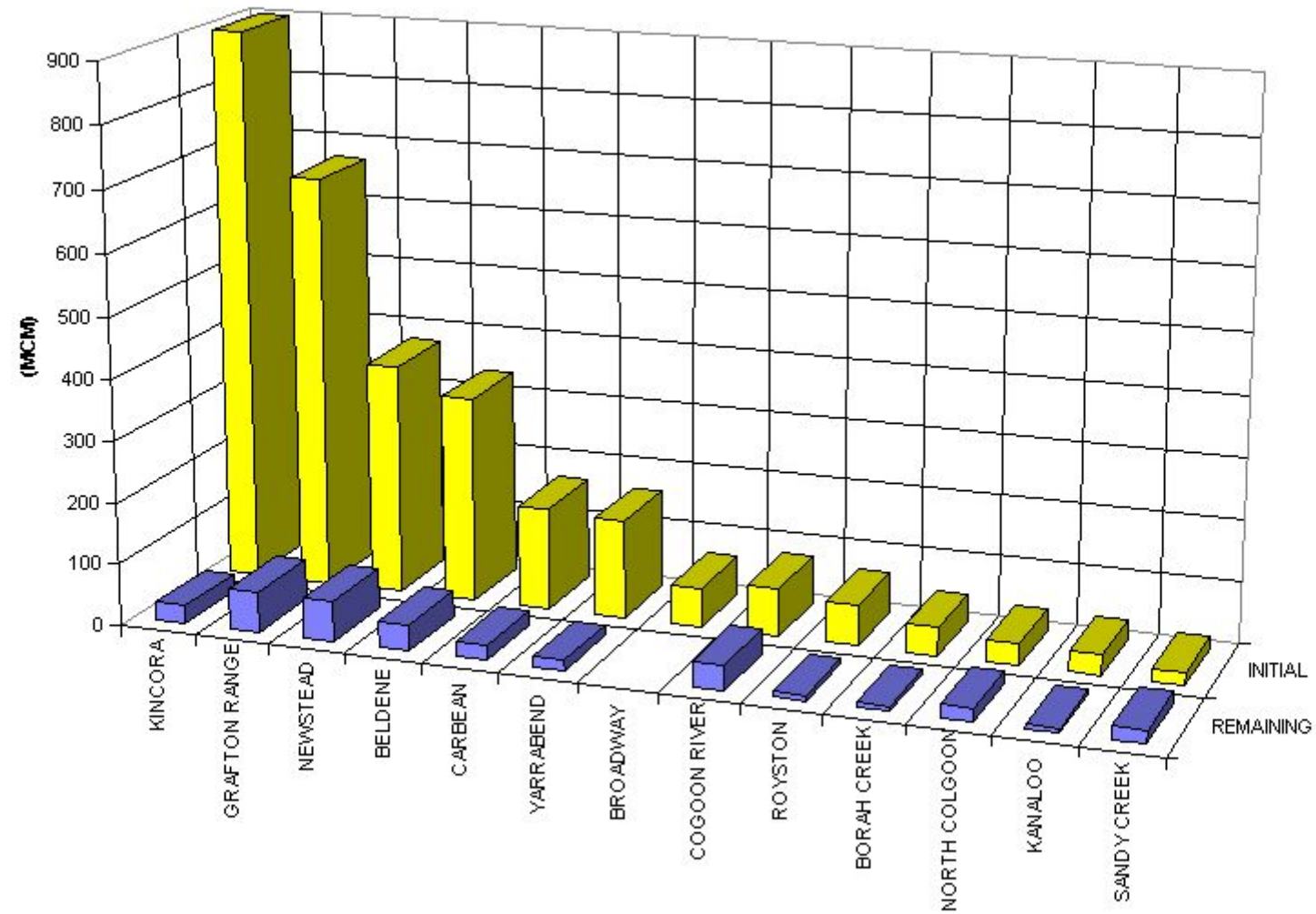


Figure 15. Location of Evergreen Fm hydrocarbon accumulations with respect to the zero edge of the Snake Creek Mudstone Member and the Rewan Formation

GAS RESERVES, Evergreen Formation

(as at 30/06/96, QDME)



sandstones of the Upper Evergreen Formation. Golin and Smyth (1986) consider the latter sequence probably represents a stable, deltaic shorezone, dissected by fluvial and distributary channels. However, as with the Lower Evergreen Formation, the marine affinities of the Upper Evergreen Formation are debatable, with some authors preferring a lacustrine depositional environment. The presence of siderite and pyrite in drill cuttings recovered from wells that have intersected this facies indicate that these sediments were probably deposited under mildly reducing conditions (Golin and Smyth, 1986).

In the northern Surat Basin, a pelletic and oolitic deposit, the Westgrove Ironstone is developed within the Upper Evergreen Formation. The pellets and oolites are composed of chamosite and siderite. Early authors considered this unit was probably deposited in a shallow marine or lacustrine, low energy, reducing environment (Mollan and others, 1972), however later workers have suggested that a lacustrine environment is more likely. The Westgrove Ironstone is widespread in the north and equivalent pelletal ironstones have been found in the Moreton Basin to the east (Allen, 1971).

Thirty hydrocarbon accumulations have been discovered in the Evergreen Formation to date, of which, 22 are commercial. Most of the hydrocarbon discoveries within the Evergreen Formation lie on the western flank of the Mimosa Syncline. As with the petroleum accumulations reservoired in the Precipice Sandstone on the Roma Shelf, the distribution of these accumulations appears to be controlled, at least in part, by the presence or absence of the 'Rewan Formation' and the Snake Creek Mudstone Member in the underlying section. Both these units are thought to act as barriers to the vertical migration of hydrocarbons. Consequently, hydrocarbon accumulations within the Evergreen Formation tend to lie to the west of the zero edge of both the 'Rewan Formation' and the Snake Creek Mudstone Member (Figure 17). The restriction of Evergreen Formation accumulations to these areas suggests Permian source rocks have provided the primary hydrocarbon charge for Evergreen Formation accumulations on the Roma Shelf and Saint George-Bollon Slope.

Of the 30 Evergreen Formation accumulations discovered to date, 7 are Boxvale Sandstone Member discoveries while the remainder contain hydrocarbons in both multiple and discrete reservoirs within the Lower or basal Evergreen Formation. Most of the accumulations are gas discoveries, although commercial quantities of oil have been produced from the Evergreen Formation at Alton, Anabran, Cogoon River West, Conloi, Mindagabie, Pringle Downs and Riverslea. The largest of the Evergreen Formation gas accumulations are Kincora and Grafton Range which contain 900 million cubic meters and 671 million cubic meters of initial recoverable gas respectively (as at 30/06/96).

Reservoir properties within the Evergreen Formation are somewhat variable although porosities are generally good to excellent, ranging between 15% and 25%. Good porosity appears to be preserved within the Evergreen Formation, both towards the axis of the Mimosa Syncline (15% porosity at Burunga) and to the north, in the southern Denison Trough (11.5% porosity at Glentulloch). Permeabilities are more variable and range from less than 20 millidarcys to greater than 240 millidarcies.

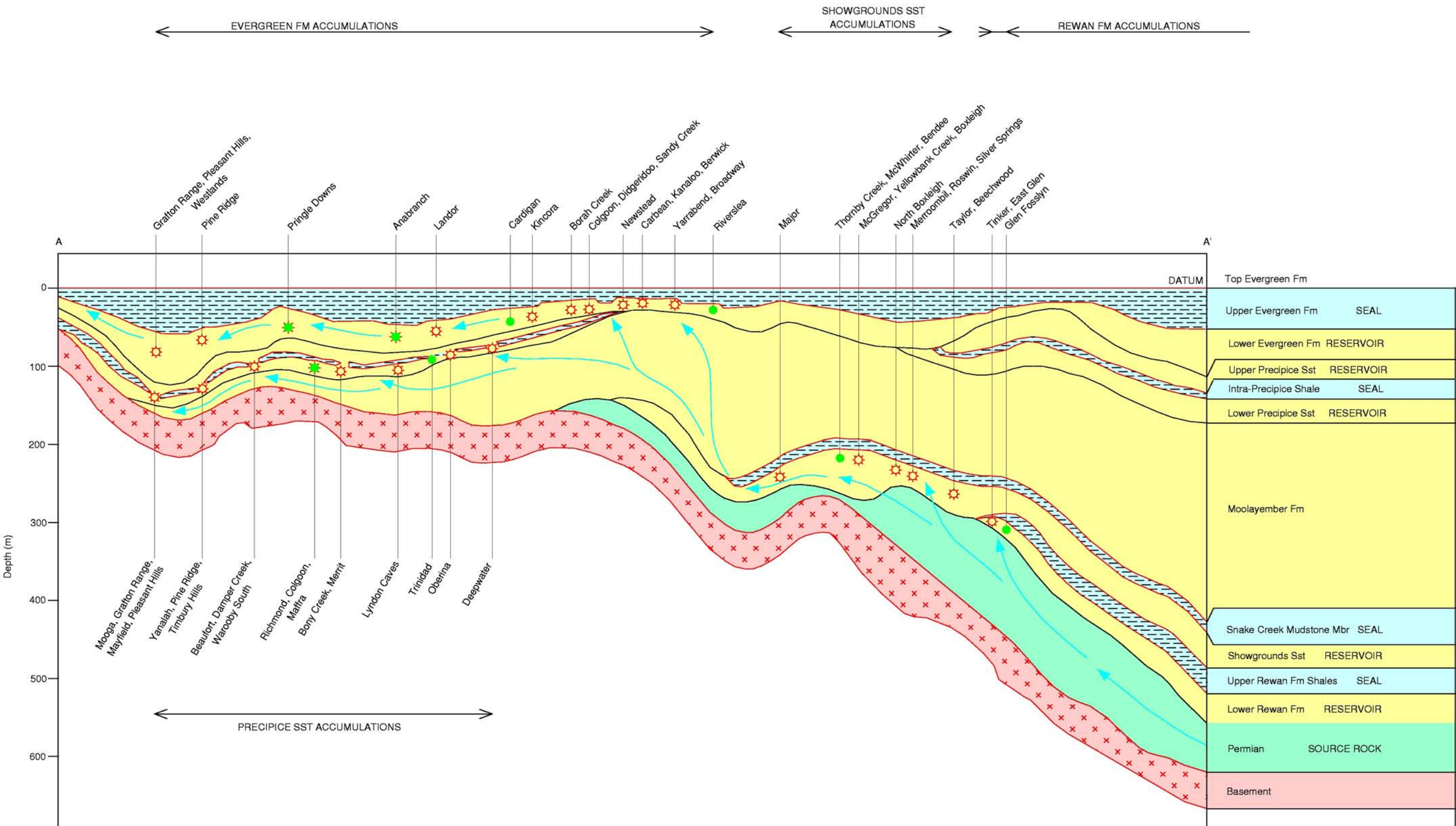


FIGURE 19 - DIAGRAMATIC CROSS SECTION AA' (DATED ON TOP EVERGREEN FM) SHOWING LOCATION OF HYDROCARBON ACCUMULATIONS ON THE WESTERN FLANK OF THE TAROOM TROUGH AND POSSIBLE MIGRATION PATHWAYS OF HYDROCARBONS GENERATED FROM PERMIAN SOURCE ROCKS

5.2.3 Hutton Sandstone

Towards the end of the Early Jurassic, after the deposition of the predominantly marine Upper Evergreen Formation, the Jurassic seas retreated and the fluvial sandstones of the Hutton Sandstone prograded across the basin. Deposition of this unit is widespread and continuous with the Eromanga Basin to the west. To the east, the unit interfingers over the Kumberilla Ridge with the upper section of the Marburg Sandstone in the Moreton Basin. Although the Hutton Sandstone is generally considered to be a uniform, blanketing sand, ranging between 150 m and 250 m thick, significant lateral and vertical facies changes do occur, often reflecting changes from meandering stream to lacustrine depositional environments.

The Hutton Sandstone is a quartzose to sublabilite sandstone with minor siltstone and mudstone. In spite of the fact that primary porosity has been partially occluded by quartz overgrowths, kaolinite, chlorite and calcite cement, porosity and permeability within the Hutton Sandstone remain good. Porosity values generally range between 15% and 25% with permeabilities rarely exceeding 100 millidarcys. The Hutton Sandstone is an important aquifer in the Surat Basin.

Although the Hutton Sandstone is a prolific hydrocarbon producer in the Eromanga basin to the west, only two, non-commercial hydrocarbon accumulations have been discovered within this unit in the Surat Basin. Both of these occur near the eastern basin margin. At Leichhardt, gas flowed at 169 900 m³/day from a DST taken in the Hutton Sandstone, while at Xylex, 40 kilometers to the northeast, a small quantity of oil was recovered on DST. The close proximity of these accumulations to major basin margin thrust faults (Leichhardt Fault and Undulla Fault) indicates that the hydrocarbons reservoired in these two accumulations may have migrated up fault conduits from Permian source rocks. The apparent absence of hydrocarbon accumulations in other areas of the Surat Basin within the Hutton Sandstone suggests that this unit is largely isolated from an effective hydrocarbon charge and that Hutton Sandstone exploration targets are only viable when they are in close proximity to Permo-triassic faulting. Hutton Sandstone traps rely on intraformational siltstones, mudstones and tight sandstones to provide effective top seal.

5.2.4 Walloon Coal Measures.

At the beginning of the Middle Jurassic, the Walloon Coal Measures were deposited over the Hutton Sandstone in the southern Surat Basin. To the north, this unit rests conformably on the Eurombah Formation. Although much of the Walloon Coal Measures sequence was deposited in a coal swamp environment, the basal section consists predominantly of lithic sandstones, with common interbedded carbonaceous siltstone and mudstone, which were probably deposited in a fluvial environment (Exon, 1976). Coal becomes more abundant towards the top of the unit, until finally, the upper Walloon Coal Measures comprise interbedded mudstone, siltstone, fine grained lithic sandstone and thin coal seams.

Although the Walloon Coal Measures are not generally regarded as an exploration objective, a small, non-commercial gas flow (1420 m³/day) was measured in a DST taken in the Walloon Coal Measures at Xyloleum-1. This well is located

approximately 50 kilometers northeast of the Leichhardt discovery, towards the eastern basin margin. As the Middle Jurassic coal sequence is thermally immature throughout the Surat Basin, the hydrocarbons recovered at Xyloleum (as with the Hutton Sandstone accumulations), probably migrated up major thrust faults on the eastern basin margin from Permian source rocks.

5.2.5 Westbourne Formation.

Towards the end of the Middle Jurassic, the Springbok Sandstone, a fluvial unit composed predominantly of fine grained lithic sandstones was deposited conformably over the Walloon Coal Measures. These were followed by the meandering stream and back-swamp sediments of the Westbourne Formation. In the south and east of the Surat Basin there is no distinct stratigraphic break between the upper Springbok Sandstone and the lower Westbourne Formation. Lithologies within the Westbourne Formation typically consist of interbedded mudstone, siltstone and fine grained quartzose sandstones. Although the Westbourne Formation probably forms part of the same fluvial cycle as the underlying Springbok Sandstone, the presence of glauconite, heavy mineral concentrations, barite nodules and acritarchs within the unit suggests occasional marine incursions probably occurred during Westbourne Formation times (Exon, 1976).

Traditionally, the Westbourne Formation has not been considered as an exploration target in the Surat Basin due to its remoteness from mature source rocks. However, at Pleasant Hills on the Roma Shelf, commercial quantities of gas have been produced from a thin sandstone interval within the Westbourne Formation (informally named the 'Weald Sandstone'). Here, the reservoir comprises coarse grained, angular to subrounded, quartzose sandstone with rare garnets and minor white clay matrix. Porosities exceed 20% and permeabilities are good in the one well that produced from this reservoir (Pleasant Hills-8), although in the surrounding wells, permeability within the 'Weald Sandstone' is poor. 17 million cubic metres of initial recoverable gas (as at 30/06/96) is reservoided in this unit at Pleasant Hills.

The gas recovered from the 'Weald Sandstone' is predominantly methane with very little of the higher molecular weight hydrocarbons present. Due to the thermal immaturity of source rock intervals present in the Jurassic section, the gas reservoided in the Westbourne Formation at Pleasant Hills probably migrated up the adjacent Wallumbilla Fault Zone from mature, Permian source rocks.

6. HYDROCARBON SOURCE ROCKS AND MATURATION

6.1 Hydrocarbon Source Rocks

Since the early 1980's, several attempts have been made to identify potential source rocks and to characterise the hydrocarbons in the identified petroleum accumulations in the Bowen and Surat Basins.

Thomas and others (1982) undertook a source rock study of approximately 30 wells in the Taroom Trough and on the western flanks of the basins. They identified rich source rock intervals in the Walloon Coal Measures (Jurassic), the upper part of the Moolayember Formation (Middle Triassic) and in the Blackwater and Back Creek Groups (Permian). Source rocks with moderately good source potential were also found in the Evergreen Formation (Lower Jurassic) and towards the base of the Moolayember Formation. The study also indicated that all source rocks analysed were rich in land plant material but had distinct differences in maceral composition between Jurassic, Triassic and Permian source rocks. All the source rocks identified in the study contain Type II and Type III kerogen and had some potential for both oil and gas generation. However, Permian source rocks tend to be more gas prone, with high proportions of vitrinite and inertinite and relatively little exinite present.

In spite of this, localised oil sources do occur in the Permian sequence, particularly within the Blackwater Group along the southern and eastern basin margins (Hawkins et al, 1992). Boreham (1995) analysed core and outcrop samples from approximately 40 wells and locations throughout the Bowen and Surat Basins (including the Denison Trough). Solvent extract work on these samples showed that good gas and liquid source potential exists in Jurassic, Triassic and Permian sediments. Within the Permian succession, the shales and mudstones of the Blackwater Group are generally regarded as having the best liquids source potential (Carmichael and Boreham, 1994) while the sediments of the Back Creek Group and Reids Dome beds tend to be more gas prone.

In the Denison Trough to the north, source rock data is sparse. A palynological study undertaken by Price (1976) of all wells drilled in the Denison Trough at that time, indicated that all the shales from the Permian sequence sampled in the study contained greater than 1% total organic carbon and could be considered as potential source rocks. A limited number of kerogen analyses show that these Permian source rocks are gas prone with a predominance of Type III, humic organic matter although intervals within the Cattle Creek Formation and Aldebaran Sandstone do contain more oil prone material (Paten and others, 1979). The most prospective source rock intervals within the Denison Trough are thought to be found in the Cattle Creek Formation and the Reids Dome Beds (Jackson and others, 1980).

6.2 Thermal Maturation

Present day geothermal gradients over the Bowen and Surat Basins show considerable variation. In the Taroom Trough/Mimosa Syncline, gradients tend to be in the order of 2.0 to 3.0°C per 100 m, while on the flanks of the trough, which are underlain by thermally conductive basement, geothermal gradients in excess of 6.0°C per 100 m

have been measured (Thomas and others, 1982). The lower geothermal gradients in the Taroom Trough have offset the effects of deeper burial, resulting in a thermal maturation profile (as measured by vitrinite reflectance) which increases in a consistent manner with depth over most of the basin.

A number of workers (Jackson and others, 1980; Thomas and others, 1982; Boreham, 1995) have determined that for the Jurassic, Triassic and Permian Type III, kerogen rich source rocks identified in the Bowen and Surat Basins, peak hydrocarbon generation probably occurs between 0.7% R_o and 1.3% R_o . Although potential oil and gas prone source rocks have been identified within the Walloon Coal Measures, the Middle Jurassic section is thermally immature over the entire Surat Basin and cannot be considered as a significant source of hydrocarbons. Similarly, potential source rocks within the Lower Jurassic Evergreen Formation are regarded as marginally mature, having attained thermal maturities of between 0.6% R_o and 0.7% R_o over most of the basin and are unlikely to have generated large volumes of either oil or gas.

Deeper in the sequence, Triassic sediments in the Taroom Trough have entered the 'oil window'. Vitrinite reflectance data indicates that thermal maturity in the Taroom Trough increases from south to north in a systematic manner (Thomas and others, 1982). Consequently, oil generative Moolayember Formation source rocks are more likely to be found in the central and northern Taroom Trough. Unfortunately, on palaeo-highs and towards the eastern basin margin, uplift and erosion in the Middle to Late Triassic has removed the good quality source rocks found within the Upper Moolayember Formation.

In the southern Bowen and Surat Basins (south of Roma), most of the Permian Blackwater and Back Creek Groups are currently oil generative. However, further north in the Taroom Trough, Permian source rocks are probably overmature and in the dry gas phase of hydrocarbon generation. Carmichael and Boreham (1996) and Boreham and others (1996) assessed the individual oil and gas contribution of a number of source rock intervals in the Permian succession. They concluded that in the central Bowen Basin, 90% of both the oil and gas reserves identified in the area had been sourced from the Permian.

In the Denison Trough to the northwest, almost all of the Permian sequence is mature and lies within the 'oil window'. It is only in the deeper, axial areas of the trough that parts of the Early Permian succession (Reids Dome beds) are overmature and generating dry gas.

6.3 Timing of Oil and Gas Generation.

Vitrinite reflectance and fission track data have been used by Korsch and others (1996) and Boreham and others (1996) to create a unified heat flow model for the central Bowen and Surat Basins. This model is characterised by a relatively high heat flow during the Early Permian (extensional phase), a slow thermal decay during the late Permian (thermal relaxation phase), low heat flow throughout the Early Triassic (foreland loading phase), higher heat flow during the Middle and Late Triassic (uplift and erosion), lower heat flow during the Jurassic and Early Cretaceous (thermal subsidence) and finally, a steady rise in heat flow towards the end of the Early

Cretaceous (magmatic intrusive events), culminating in a maximum heat flow in the early Late Cretaceous.

Over most of the Bowen and Surat Basins, these high heat flows at the end of the early Cretaceous saw sediments attain their maximum palaeotemperatures. Burial history modelling (Boreham and others, 1996) shows that this heat pulse is coincident with the time of maximum burial for most of the sediments in the central Bowen/Surat Basins and this has resulted in a sudden increase in petroleum generation and migration in the early Late Cretaceous. Permian source rocks on the flanks of the Taroom Trough entered the 'oil window' at this time. Towards the axis of the Taroom Trough where thick Permo-Triassic sequences were deposited however, Permian source rocks became oil generative as early as the Late Permian and continued to expel hydrocarbons until the Cretaceous (Korsch and others, 1996).

Petroleum trap formation either pre-dates or is coincident with the time of peak petroleum generation and migration in the Bowen and Surat Basins. Much of the identified petroleum reservoirs in the Bowen/Surat succession is trapped either stratigraphically or in structural traps with a major stratigraphic component. Many of these traps (particularly in the Showgrounds and Precipice Sandstones) have formed as a result of drape and differential compaction of fluvial reservoir sequences either over or on the flanks of pre-existing palaeo-highs. Trapping geometries in Triassic Showgrounds Sandstone reservoirs probably developed in the Middle Triassic as the fluvial sandstones of the Showgrounds Sandstone were transgressed and sealed by the fine grained sediments of the Snake Creek Mudstone Member.

In the Early Jurassic succession, the primary exploration target is the fluvial, Precipice Sandstone. Stratigraphic traps within the lower Precipice Sandstone were probably formed in the Early Jurassic as the intra-Precipice shale, a widespread lacustrine unit, drowned and sealed the underlying fluvial sequence. At the end of the Early Cretaceous, coincident with time of peak petroleum generation in the basins, the entire sedimentary succession was tilted to the south. This major trap forming episode has had a significant impact on present day trapping geometries. The invasion from the north of the lower Precipice Sandstone by meteoric waters at this time has also affected the composition and distribution of a number of identified petroleum accumulations in this unit.

In the Denison Trough to the north, the formation of anticlinal closures within the Permian section probably commenced in the Late Permian and peaked in the Triassic in response to the predominating compressional tectonic regime. A number of these structural closures have been successfully targeted as gas accumulations. Seismic data shot in the southern Denison Trough indicates some of these structures may have developed as early as Reids Dome beds time (Early Permian) (Paten and others, 1979). In addition, the Permian sequence in the Denison Trough has considerable potential for stratigraphic traps. The fluvio-deltaic to shallow marine environments that prevailed in the Denison Trough throughout most of the Permian are conducive to the formation of lenticular, shallow marine sand bodies and curvilinear sands which pinch out against pre-existing palaeo-topographic highs.

7. HYDROCARBON CHARACTERISATION

7.1 Oil

Boreham (1995) analysed a suite of over 70 oil and condensate samples from 46 accumulations in the Bowen and Surat Basins. Gas chromatography on these samples revealed that oils and condensates vary widely in composition throughout the basins from unaltered, light, paraffinic crudes and condensates through to napthenic, biodegraded oils and condensates.

The unaltered oils and condensates are characterised by a predominance of low molecular weight *n*-alkanes. Of the oils analysed in the study, 22 were thought to be unaltered and include the oil reservoired at Rockwood North (Precipice Sandstone), Cabawin (Blackwater Group), Anabranh (Evergreen Formation), Maffra (Precipice Sandstone), Richmond (Precipice Sandstone), Borah Creek (Moolayember Formation), Sunnybank (Rewan Formation) and Taylor (Showgrounds Sandstone). Unaltered condensate is found at Rolleston (Catherine Sandstone and Freitag Formation).

A number of oils and condensates in the basins have undergone varying degrees of biodegradation and possibly water washing. Typically, biodegraded oils are characterised by progressive loss of the low molecular weight *n*-alkanes, followed by the higher molecular weight, 'waxy' *n*-alkanes and finally by the depletion of pristane and phytane. Boreham (1995) in his study showed that 9 oils appeared to be moderately biodegraded and had lost a significant proportion of their lower molecular weight *n*-alkanes but retained their heavier 'waxy' *n*-alkane content. These oils include those recovered at Bennett (Precipice Sandstone), Moonie (Precipice Sandstone), Waratah (Showgrounds Sandstone) and Harbour (Showgrounds Sandstone).

A small number of oils have been extensively biodegraded, their gas chromatograms showing significant depletion of both of both light and heavy *n*-alkanes. This group of oils includes Conloi (Evergreen Formation), Leichhardt (Precipice Sandstone) and Riverslea (Evergreen Formation).

Boreham (1995) concluded, on the basis of biomarker and stable carbon isotope work, that the oils recovered in the Bowen and Surat Basins have been sourced from Permian terrestrial sediments with minor contributions from marine influenced source rocks. He has also suggested that Triassic source rocks may have made a minor contribution to the oils found in the basins.

7.2 Gas

In preparing this report, the results from over 100 compositional gas analyses of both associated and non-associated gas from identified petroleum accumulations throughout the Bowen and Surat Basins have been compiled. Typically, for non-associated gases, gas wetness varies between 8% and 12%. Little variation in composition is apparent in the gas found in Jurassic, Triassic and Permian reservoirs

(Figure 20), although the data suggests that gas reservoir in the Precipice Sandstone appears marginally drier than that reservoir elsewhere in the sequence.

In the Denison Trough, average gas wetness in the Freitag Formation, Aldebaran Sandstone and Cattle Creek Formation also ranges between 8% and 12% (Figure 21). Gas in the 'Catherine Sandstone' and Reids Dome beds appears significantly drier but this may be due, in part, to the small number of samples available from these formations.

Previous authors (Thomas and others, 1982), have noted that in the Southern Bowen and Surat Basins, gas wetness decreases from south to north (Figure 22). Anomalously high gas wetness values have been recorded at Hope Creek and Noorindoo. These authors have interpreted this trend to be a direct result of the increasing thermal maturation of sediments towards the north of the Taroom Trough. However, work by Boreham (1995) on carbon isotope ratios in these gases shows no clear isotopic maturity trend.

The ratio of iso-butane to *n*-butane was calculated in over 50 gas reservoirs both in the Taroom Trough and on the western flank of the basin. The results have been plotted in Figure 23. The iC_4/nC_4 ratio decreases from around 1.5 in accumulations in the Lower Jurassic, Evergreen Formation to around 0.7 in the Permian accumulations. This trend is probably a reflection of the increasing thermal maturation that has taken place in the reservoirs with increasing depth. Anomalously high iC_4/nC_4 ratios may be explained by either biodegradation (Boreham (1994) noted the selective removal of *n*-alkanes with respect to their branched analogues by bacteria in gases from Beldene, Kincora, Merivale and Pleasant Hills), compositional differences in the source rocks from which the gases were derived or by water washing.

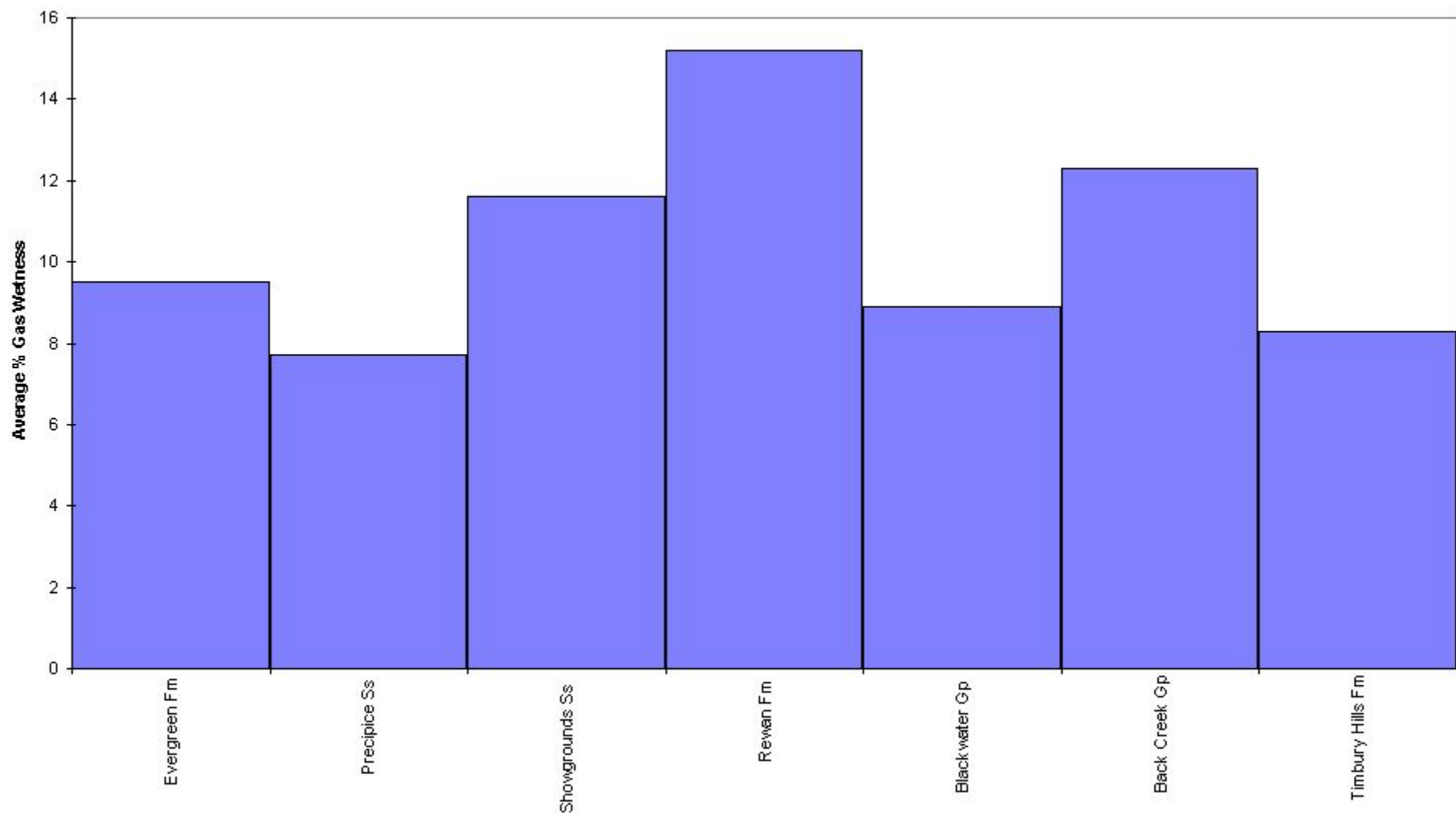
A number of gas accumulations in the Denison Trough contain unusually high concentrations of carbon dioxide. These include Arcadia (77% CO₂ in gas from the Cattle Creek Formation), Yellowbank (31% CO₂ in gas from the Aldebaran Sandstone), Westgrove (24% CO₂ in gas from the Aldebaran Sandstone), Glentulloch (11% CO₂ in gas from the Aldebaran Sandstone) and Warrinilla (11% CO₂ in gas from the Freitag Formation). Although the majority of all gas samples analysed from the Denison Trough comprise in excess of 1% CO₂, the highest concentrations of carbon dioxide are found in gas reservoir in the Cattle Creek Formation and Aldebaran Sandstone. The source of the carbon dioxide in the Denison Trough has not been firmly established. However, the lack of significant quantities of carbon dioxide in gases from the Early Permian Reids Dome beds suggests that the carbon dioxide is not a product of high levels of thermal maturation. Paten and others (1979) have suggested that the carbon dioxide is a result of biodegradation and groundwater solution of calcareous facies in the Peawaddy Formation, Aldebaran Sandstone and Cattle Creek Formation.

To the south, on the western flanks of the Taroom Trough, gas rich in carbon dioxide has been found at Blackbutt (22.6% CO₂/Timbury Hills Formation), Snake Creek (13.2% CO₂/Showgrounds Sandstone), Back Creek (9.2% CO₂/Rewan Formation) and Tarrawonga (6.4% CO₂/Showgrounds Sandstone). Several gas accumulations

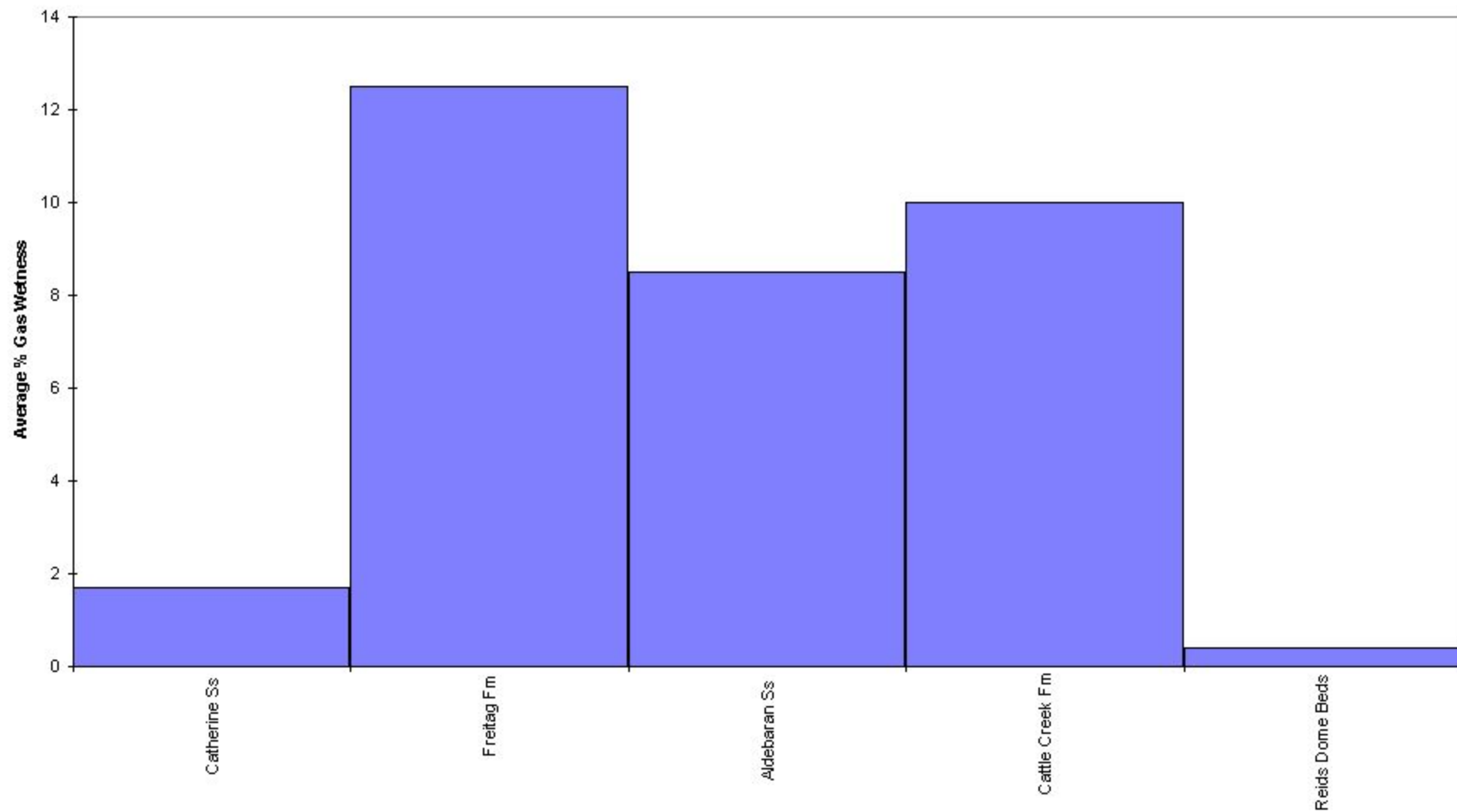
Figure 20. Average percent gas wetness by formation, southern Bowen and Surat Basins.

Figure 21. Average percent gas wetness by formation, Denison Trough.

Average % Gas Wetness by Formation, Southern Bowen and Surat Basins

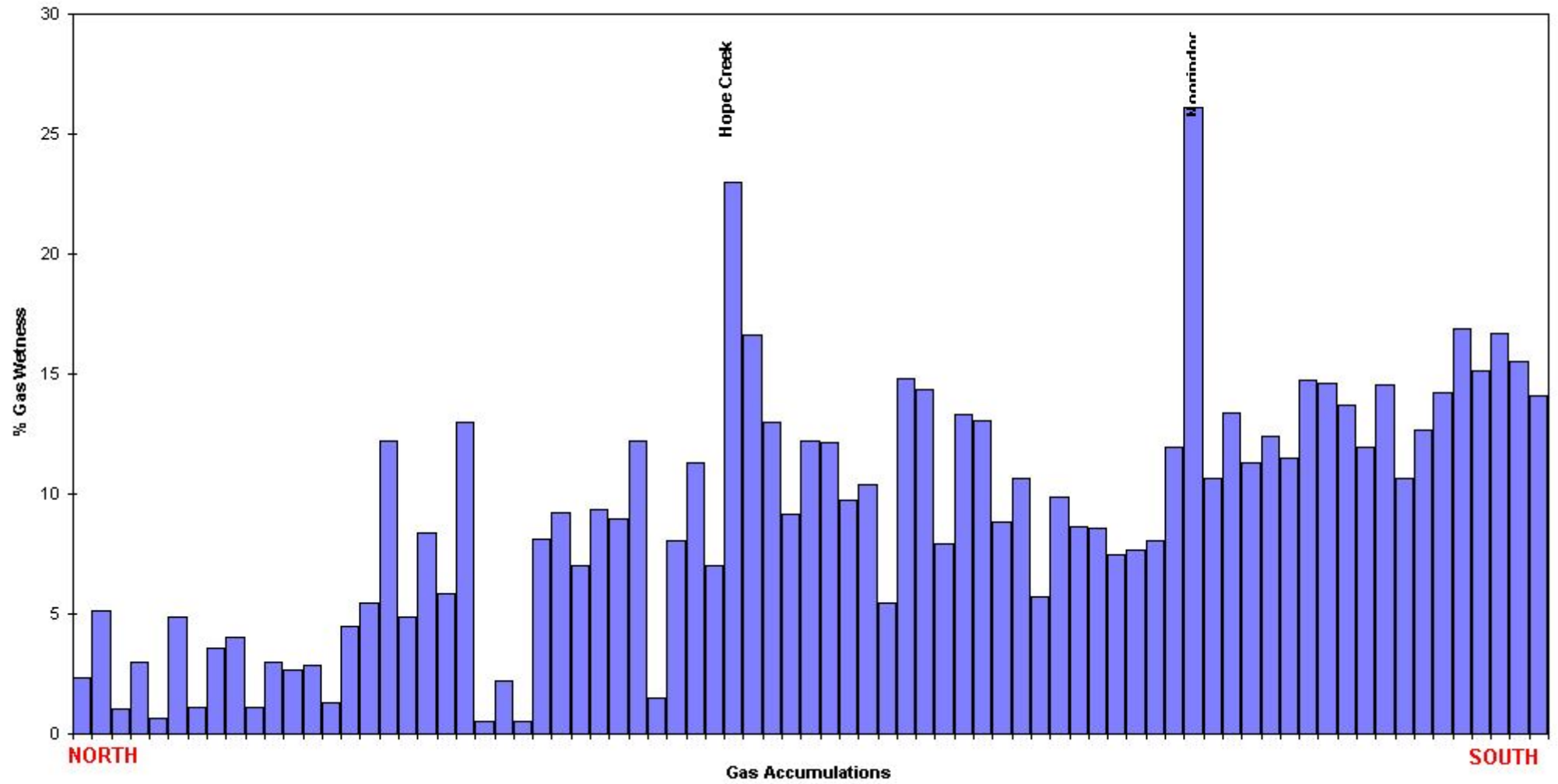


Average % Gas Wetness by Formation, Denison Trough

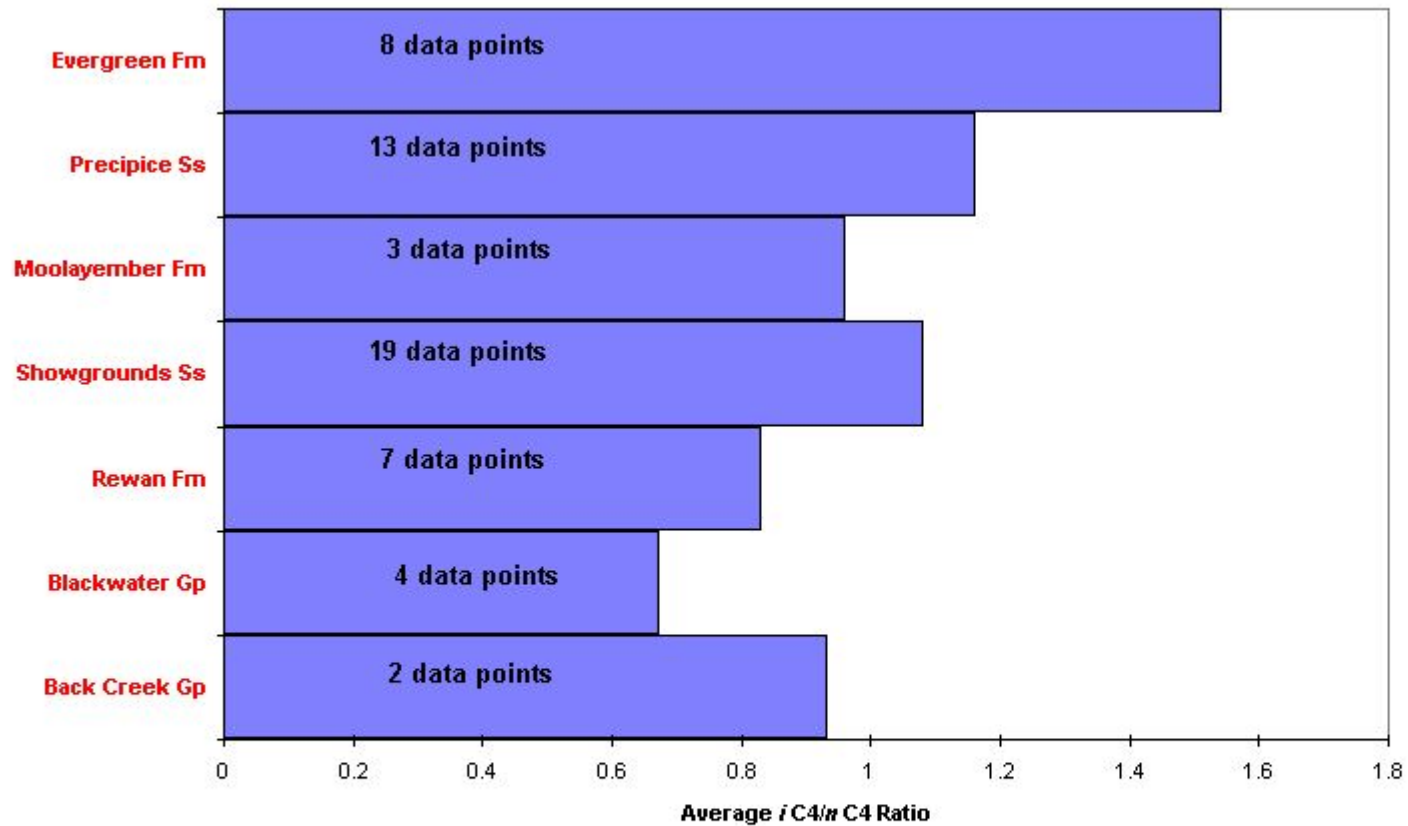


Percent Gas Wetness, Southern Bowen and Surat Basins, ordered by Latitude

09



Average iso-Butane/n-Butane Ratio by formation, Southern Bowen and Surat Basins



reservoired in the Precipice Sandstone on the Roma Shelf also contain gas which comprises in excess of 1% carbon dioxide.

8. SELECTED PETROLEUM ACCUMULATIONS

8.1 Oil Accumulations.

8.1.1 Alton.

The Alton oil accumulation is located approximately 160 kilometers south-southwest of Roma on the western flank of the Surat Basin (Saint George-Bollon Slope). Discovered in 1964 by the Union Oil Development Corporation, Alton was brought in to production in 1966. Oil from Alton is trucked to Moonie and produced into the Moonie-Brisbane oil pipeline.

The Alton structure formed as a result of drape and differential compaction over a pre-existing basement high. The oil at Alton is trapped in thin, multiple reservoirs occupying a crestal position on the four-way-dip closure within the Evergreen Formation (Boxvale Sandstone Member). Although the trap at Alton is predominantly structural, a significant stratigraphic component is also present - reservoir distribution is partially controlled by permeability barriers and edge-water contacts. The areal extent of the hydrocarbon accumulation at Alton is 7.5 square kilometers while total areal closure for the structure is 10.1 square kilometers. Reservoir lithologies generally comprise light grey, medium grained, well sorted, sublabile to quartzose sandstones with traces of carbonaceous material and mica.

At Alton, Union Oil identified 5 separate, thin hydrocarbon bearing sandstones within the Evergreen Formation over an 82 m interval. Average net pay is approximately 5 m. Permeability within the reservoir sands ranges from 11 to 884 millidarcys (260 millidarcys average) and porosity from 15.4% to 19.8% (average 17.2%). The oil produced from the Evergreen Formation at Alton is a light, paraffinic crude with an API gravity of 54.2 degrees. Oil was also recovered from the Showgrounds Sandstone in a DST taken in Alton-1. Here, 38 m of yellow-green 45 degree API crude was recovered in the drill string and an associated weak gas flow of 708 m³/day was recorded. The oil accumulation in the Showgrounds Sandstone at Alton was not deemed commercial.

Commercial oil production from the Evergreen Formation at Alton commenced in 1966 at a rate of approximately 1000 barrels/day, but as production declined (oil production has declined since 1969 at a rate of 15% per year), the producing wells were converted to beam pumps. To date, 10 wells have been drilled on the Alton structure.

Production at Alton is characterised by low water cut and high residual oil saturations (around 50%). The Evergreen reservoir appears to lack appreciable aquifer support and in the late 1980's, the Alton accumulation became the subject of a field study for microbial enhanced oil recovery. In early 1989, 86 barrels of microbial solution was injected into the Evergreen reservoir in Alton-3. Three weeks later the well was brought back into production. Results show that twelve months after treatment, an approximate 40% increase in net oil production continued.

The Alton oil accumulation is near depletion. As at 30/06/94, 310 megalitres of oil had been produced from the Evergreen reservoir, with an estimated 24 megalitres of remaining recoverable oil in place.

8.1.2 Moonie.

In 1959, an aeromagnetic survey, surface exploration and a seismic reconnaissance line shot by the Bureau of Mineral Resources had established the presence of a north-south oriented structural trend on the eastern flank of the Mimosa Syncline. Cabawin-1, spudded in 1960, 30 kilometers northwest of the Moonie accumulation, was the first well to test a structural closure on this trend. The presence of a thick Permian sequence, gas in the Precipice Sandstone and oil and gas in the 'Kianga Formation' at Cabawin provided encouragement for further exploratory drilling in the area.

In November 1961, Moonie-1 was spudded by Union Oil on an anticlinal structure on the eastern side of the Moonie Fault. The well flowed oil at 250 barrels/day from an openhole DST in the Precipice Sandstone. A month long production test over the same interval in December of that year flowed oil at an average rate of 1757 barrels/day. To date, 38 wells have been drilled on the Moonie accumulation.

The Moonie structure is a northeast oriented, elongate anticline located on the eastern, upthrown side of the Moonie-Chinchilla-Goondiwindi Fault system. The western flank of the anticline is truncated by a fault associated with this system which is thought to be non-sealing (O'Sullivan and others, 1991). Approximately 11 square kilometers of areal closure and 35 m of vertical closure are present at Moonie.

At Moonie, the Precipice Sandstone reservoir rests unconformably on basement ('Kuttung Formation') and is conformably overlain by sandstones, siltstones and shales of the Evergreen Formation. The oil at Moonie is reservoirized in two separate units within the Precipice Sandstone - the 56' and 58' sands (named by Union Oil after the two reservoirs were intersected at 5600 feet and 5800 feet respectively in Moonie-1). Pressure data indicate that the two reservoirs are not in communication. The 56' sand occurs at the top of the Precipice Sandstone and has been divided into two subunits - an upper 56-4 sub-unit and a lower 56-5 sub-unit. The former is discontinuous and thin (average net pay of 2 m) and is confined to the northeast and central part of the structure. The latter is continuous across the structure and is slightly thicker (average net pay of approximately 5 m). Top seal for the 56' sand reservoir is provided by the siltstones and shales of the overlying Evergreen Formation.

Separating the 56' reservoir from the underlying 58' reservoir is a sealing facies, up to 30 m thick, comprising carbonaceous shales and sandy siltstone. The majority of the oil at Moonie is reservoirized in the 58' sand. Here, net pay averages around 8 m and reservoir quality is generally superior to that observed in the 56' unit.

The 56' sand is a medium to coarse grained quartzose sandstone with common feldspar and lithic fragments and minor mica and kaolinite. Both calcite and silica cementation is occasionally found in the reservoir. Porosities range from 14% to



65

20% and permeabilities from 1 to 3000 millidarcys. The lower, 56-5 sub-unit was deposited in a braided stream depositional environment while the upper, 56-4 sub-unit represents a waning of depositional energy and was probably laid down in a meandering stream (O'Sullivan and others, 1991).

With the exception of grain size, which is slightly coarser, the 58' sand is similar petrologically to the 56' unit. Porosities range from 14% to 23% and permeabilities from 1 to 4000 millidarcys. As with the 56' unit, a waning of depositional energy is evident from the base to the top of the 58' sandstone. The coarser, more permeable sandstones at the base of the unit were deposited in a braided stream environment while the uppermost sands were probably laid down in a meandering stream. The basal sandstones of the 58' unit comprise the best quality reservoirs at Moonie. Greater than 55% of the oil reserves at Moonie are found in these sandstones (O'Sullivan and others, 1991).

Of the 38 wells drilled on the Moonie accumulation, 32 were producers, 5 were dry holes and one was suspended as an observation well. The accumulation has been developed on an average well spacing of 64 acres per well. Production at Moonie commenced in 1964 with the completion of the Moonie-Brisbane pipeline. The oil at Moonie is produced by means of edge-water drive. However, high water cut early in the production life of the field saw the introduction of beam pumps on Moonie in 1965. Further rapid increases in water production resulted in the need to install gas lift in a number of wells. Eventually, a total of 20 wells on the field had gas lift installed, but in the early 1980's, as oil reserves at Moonie became depleted, the gas available for artificial lift also declined. Consequently, during 1983 and 1984, electrical submersible pumps were installed in 10 of the producing wells.

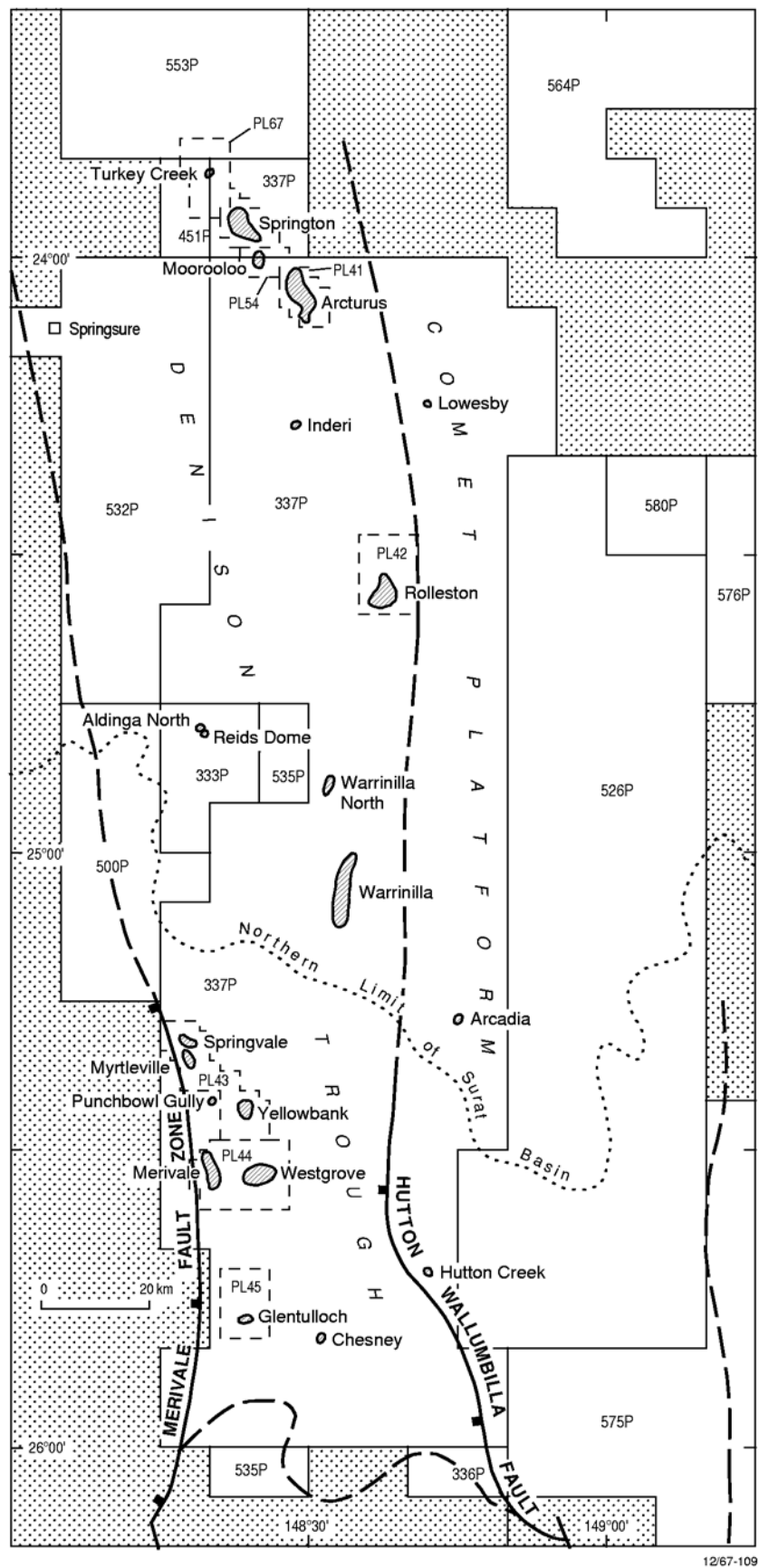
As of 1991, 20 wells on the Moonie accumulation were in production - 14 of these have electric submersible pumps installed while the remaining 6 are produced with beam pumps. Oil from Moonie is pumped into the Moonie-Brisbane pipeline and commingled with crude oil from the Jackson-Moonie pipeline to the west. As at the 30/06/96, 3686 megalitres of oil had been produced from Moonie, with the remaining recoverable oil estimated at 173 megalitres.

8.2 Denison Trough Gas Accumulations.

8.2.1 Arcturus.

The Arcturus gas accumulation was discovered in 1964 by Associated Freney Oil Fields Ltd, 285 kilometers north-northwest of the town of Roma on the eastern flank of the Denison Trough. The Arcturus structure is a north-south oriented anticline with some faulting on its eastern flank. At the top of the Mantuan Formation, areal closure is 25 square kilometers and vertical closure 90 m. The areal extent of the combined hydrocarbon pools at Arcturus is 3.4 square kilometers.

The discovery well, Arcturus-1, encountered commercial quantities of gas in four separate sandstones over a 120 m interval at the top of the Mantuan/Peawaddy Formation. The Mantuan/Peawaddy Formation reservoirs comprise fine to medium



12/67-109

Figure 25. PETROLEUM DISCOVERIES, DENISON TROUGH, BOWEN AND SURAT BASINS, QUEENSLAND

grained, quartzose sandstones with average sonic log porosities of around 25% and permeabilities averaging 20 millidarcys. The net to gross ratio over this section is 0.2. A further commercial gas flow was recorded from one of three thin sands within the 'Catherine Sandstone'.

A further 5 development/appraisal wells have been drilled on the Arcturus structure. Both Arcturus-2 and Arcturus-5 intersected the reservoir horizons below the inferred gas/water contact and were plugged and abandoned, while Arcturus-3 and Arcturus-5 were completed as gas producers. In 1991, Arcturus-6, drilled in a crestal position on the structure, intersected a gas pool within the Aldebaran Sandstone. Although the Aldebaran gas pool is commercial, over 98% of the initial recoverable gas reserves at Arcturus are found in the Mantuan/Peawaddy Formation and the 'Catherine Sandstone'. Of the 803 million cubic meters of initial recoverable gas estimated to be in place at Arcturus (as at 30/06/96), 286 million cubic meters has been produced. The gas produced at Arcturus is dry (92% to 96% methane) with relatively low levels of carbon dioxide (0.25% to 0.83%).

8.2.2 Glentulloch.

The Glentulloch structure is a reverse faulted, four-way-dip closure on the upthrown side of the Merivale Fault. Located 100 kilometers north-northwest of Roma on the southern margin of the Denison Trough, the Glentulloch gas accumulation was discovered by Associated Australian Oil Fields in 1961, when Glentulloch-1 flowed gas from multiple reservoirs within the Aldebaran Sandstone. Areal closure at the top of the Aldebaran Sandstone has been mapped at 26 square kilometers and vertical closure at 80 m. The Glentulloch structure is thought to be filled to spill point (Brown and others, 1983).

The Aldebaran Sandstone reservoir at Glentulloch comprises multiple, thin (down to 0.5 m) sandstone stringers within a 100 m interval of shaly, marine conglomerate at the top of the Aldebaran Sandstone. Total net pay is about 12 m, porosity within the sandstone stringers averages less than 15% and permeability is low. Pressure data indicate that the individual reservoir sands are in communication. The gas produced at Glentulloch comprises 84.5% methane and is rich in carbon dioxide (10.75%).

A total of 5 wells (including the discovery well) have been drilled on the Glentulloch structure. Of these, Glentulloch-2 and 3 were dry, while Glentulloch-4 and 5, drilled in more crestal positions, were cased and suspended as gas producers. Initial recoverable gas reserves at Glentulloch have been estimated 337 million cubic meters (as at 30/06/96).

8.2.3 Merivale.

The Merivale gas accumulation was discovered in 1982 by Associated Australian Resources Ltd. Located 128 kilometers north-northwest of Roma on the western flank of the Denison Trough, the Merivale structure is a northwest-southeast trending anticline on the upthrown side of the Merivale Fault. Approximately 8 square kilometers of areal closure and 70 m of vertical closure are present at the top of the Aldebaran Sandstone.

The discovery well, Merivale-1, flowed gas in DSTs taken over two separate intervals in the Aldebaran Sandstone and over a third interval in the Reids Dome beds. A further 5 development/appraisal wells have been drilled on Merivale, all of which were suspended as gas producers. Pressure data suggest that the Merivale structure is filled to spill point (Brown and others, 1983).

The uppermost Aldebaran gas reservoir at Merivale lies below an intra-Aldebaran unconformity which occurs within the Upper Aldebaran Sandstone. At Merivale-1, porosity and permeability within this reservoir average 11% and 10 millidarcys respectively, while at Merivale-2, where the reservoir sands subcrop the unconformity, reservoir quality improves. Here porosity averages 14% and permeability 175 millidarcys. In the Lower Aldebaran Sandstone gas reservoir, porosities of around 15% and permeabilities of 6 millidarcys are typical. Porosity and permeability in the Aldebaran Sandstone at Merivale has been partially occluded by the formation of authigenic clays (kaolinite, illite and smectite).

A DST taken in Merivale-1 over the interval 1472 m to 1482.5 m tested a 5 m sandstone section in the Reids Dome beds. Here, gas flowed at a rate of 6800 m³/day from sands showing porosities of around 11%. Analysis of a gas sample taken from the Lower Aldebaran Sandstone reservoir showed this gas comprises 83.2% methane and is relatively rich in carbon dioxide (4.04%). The gas produced from the Reids Dome beds reservoir, however, contains negligible quantities of carbon dioxide.

Nearly 90% of the initial recoverable gas reserves at Merivale (659 million cubic meters, as at 30/06/96) are reservoired in the Aldebaran Sandstone.

8.2.4 Rolleston.

The Rolleston gas accumulation, located 230 kilometers north of the township of Roma, on the eastern flank of the Denison Trough, was discovered in 1964 by the Rolleston-1 well, drilled by Associated Freney Oil Fields Ltd. The Rolleston structure is a four-way-dip culmination on the southern end of a major north-south trending anticlinal axis. Approximately 50 square kilometers of areal closure and 120 m of vertical closure have been mapped at the top of the Permian while the combined areal extent of the gas pools is approximately 6.2 square kilometers (Paten and others, 1979). Three separate gas reservoirs have been identified at Rolleston, with interpreted gas/water contacts at 405 mSS (Mantuan Formation reservoir), 840 mSS (Freitag Formation reservoir) and 1170 mSS (Aldebaran Sandstone reservoir).

The Mantuan reservoir occurs at the top of the Peawaddy Formation and comprises fine to medium grained, micaceous, quartzose sandstone. Porosity is generally good (up to 25%) over the 17 m net pay interval, permeabilities are generally low (around 3 millidarcys) and reservoir development is sporadic. The gas in the Mantuan Formation is predominantly methane (94%) with only minor amounts of higher molecular weight hydrocarbons recorded.

The Freitag Formation reservoir at Rolleston has been interpreted as marine bar (Devine, 1967). As with the Mantuan reservoir, reservoir development in the Freitag

Formation at Rolleston is sporadic. Generally, the producing Freitag sands show porosities ranging between 18% and 24% over a net pay interval of 13 m. However, the best porosities and permeabilities are preserved in the uppermost 7 m of the unit, where porosity averages around 23% and permeabilities of between 1 and 3 darcys are typical. The gas reservoir in the Freitag Formation is significantly wetter (86% methane) than that produced from the Mantuan Formation. Pale, straw yellow condensate with an API gravity of 50.1 degrees is produced from the Freitag Formation at a rate of 350 barrels/million cubic meters of gas. The gas produced from the Freitag Formation is also notable for its high carbon dioxide content (2.70%).

A small, commercial gas reservoir within the Aldebaran Sandstone was intersected by Rolleston-1. Here, a small gas flow of 53 m³/day was measured in DST 5, taken over the interval 1143-1144.2 m. The gas reservoir in the Aldebaran Sandstone is slightly wetter than that found in the Freitag Formation but the carbon dioxide content is lower (0.20%). Over 95% of the gas reserves at Rolleston are found in the Mantuan and Freitag Formations. As at 30/06/96, 372 million cubic meters of gas had been produced from the Rolleston accumulation from an initial recoverable gas reserve estimated at 676 million cubic meters.

8.2.5 Westgrove.

The Westgrove structure is a faulted, four-way-dip closure lying on a north-south oriented anticlinal trend in the southern Denison Trough. Located 125 kilometers north-northwest of the town of Roma, Westgrove was discovered in 1962 by CSR Ltd with their Westgrove-2 well. Gas flows were recorded from both the Aldebaran Sandstone and the Reids Dome beds in Westgrove-2.

Approximately 140 square kilometers of areal closure is present at both the top of the Aldebaran Sandstone and the Reids dome beds. Vertical closure is around 495 m and 550 m at top Reids Dome beds and top Aldebaran Sandstone levels respectively. A total of 6 wells have been drilled on the Westgrove structure. Westgrove-1 and 4 intersected the Aldebaran reservoir below the gas/water contact, while Westgrove-2 through 6, drilled in more crestal positions, are gas producers. The Westgrove structure is not filled to spill point. Brown and others, (1983) have suggested that faulting, oriented approximately east-west through the crest of the structure, may have acted as a conduit for gas leaking from the Aldebaran reservoir.

The Aldebaran Sandstone reservoir at Westgrove comprises fine to coarse grained, conglomeratic and carbonaceous sandstone with an abundant white clay matrix. Gas is produced from two sands (approximately 7 m of net pay) with an average porosity of around 14% and an average permeability of 12 millidarcys. Gas has not been produced in commercial quantities from the Reids Dome beds due to the high proportion of swelling clays in the reservoir (Brown and others, 1983).

The gas produced at Westgrove comprises approximately 67% methane with very high concentrations of carbon dioxide (up to 30%). Gas recovered from the Reids Dome beds contains negligible quantities of carbon dioxide (1.5%). As of 30/06/96, initial recoverable gas reserves at Westgrove have been estimated at 362 million cubic

meters. At that time, only minor quantities of gas had been produced from the accumulation.

8.2.6 Yellowbank.

The Yellowbank accumulation was discovered in 1982 by Associated Australian Resources Ltd. The discovery well, Yellowbank-1, intersected gas pools in the 'Rewan Formation' and Aldebaran Sandstone. The Yellowbank structure is a four-way-dip closure located 12 kilometers north of the Westgrove feature, on the same anticlinal trend. Approximately 12 square kilometers of areal closure and 112 m of vertical closure is present at top Aldebaran Sandstone level.

A further 6 development wells were drilled at Yellowbank. Yellowbank-4, drilled on the eastern flank of the structure, was dry, while Yellowbank-6, drilled in 1991 in a crestal position, flowed gas on DST at 5000 m³/day from a small, non-commercial gas pool in the Reids Dome beds. The remaining wells were cased as Aldebaran Sandstone or 'Rewan Formation' gas producers.

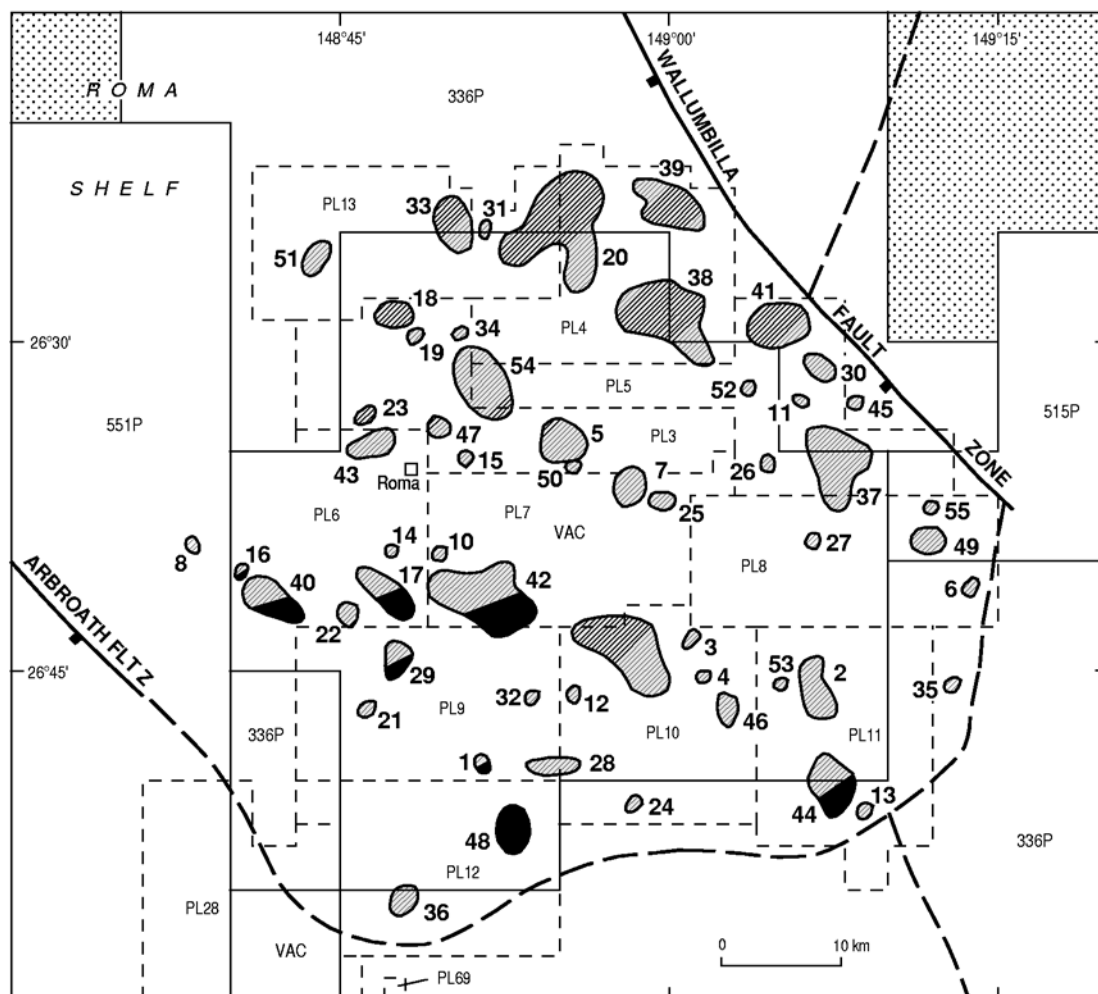
The Aldebaran Sandstone reservoir at Yellowbank comprises multiple sands within the Lower Aldebaran Sandstone. Pressure data suggests that the individual sands are in communication. The producing sands are not correlatable to the gas saturated Aldebaran sands at Westgrove, 12 kilometers to the south, which occupy a more medial position within the Aldebaran sequence. At Yellowbank, the Aldebaran Sandstone was deposited in a beach to shoreface environment (Brown and others, 1983). The gas produced from the Aldebaran Sandstone comprises approximately 60% methane and is extremely rich in carbon dioxide (in excess of 30%)

The gas produced from the 'Rewan Formation' is reservoired in two sands with a total net pay of approximately 7 m. 'Rewan Formation' gas contains negligible amounts of carbon dioxide. Over 97% of the initial recoverable gas estimated to be in place at Yellowbank (1164 million cubic meters, as at 30/06/96), is found in the Aldebaran Sandstone.

8.3 Roma Shelf Oil and Gas Accumulations.

8.3.1 Bony Creek.

The Bony Creek gas accumulation was discovered in 1963 by Associated Australian Oilfields Ltd. The Bony Creek structure is an elongate, northwest-southeast oriented, four-way-dip closure at Precipice Sandstone level. Although the trapping mechanism is essentially structural (formed by drape of early Jurassic sediments over a pre-existing basement high), a permeability barrier on the northwest flank of the structure has imparted a significant stratigraphic component to the trap. Areal closure is



12/67-105

Figure 26. PETROLEUM DISCOVERIES, ROMA SHELF, BOWEN AND SURAT BASINS, QUEENSLAND

1 Anabran	12 Chantara	23 Hospital Hill	34 Mount Bassett	45 Stakeyard
2 Back Creek	13 Combarngo	24 Landor	35 Norwood	46 Tarrawonga
3 Bardloring	14 Coolibah	25 Lamen	36 Oberina	47 Timbury Hills
4 Bardloring South	15 Damper Creek	26 Latemore	37 Pickanjinie	48 Trinidad
5 Beaufort	16 Dirinda	27 Latemore South	38 Pine Ridge	49 Wallumbilla South
6 Bengalla	17 Duarran	28 Lyndon Caves	39 Pleasant Hills	50 Warooby South
7 Blyth Creek	18 Euthulla	29 Maffra	40 Pringle Downs	51 Westlands
8 Bobadilla	19 Euthulla South	30 Mascotte	41 Raslie	52 Wingnut
9 Bony Creek	20 Grafton Range	31 Mayfield	42 Richmond	53 Winnathoola
10 Bungil	21 Hollyrood	32 Merrit	43 Roma	54 Yanalah
11 Caneon	22 Hope Creek	33 Mooga	44 Snake Creek	55 Yarrawonga

approximately 18 square kilometers near the top of the Precipice Sandstone and vertical closure around 36 m. The discovery well, Bony Creek-1, recorded a gas flow of 56 600 m³/day from a DST taken between 1306.7 m and 1322.8 m through a 12.7 mm choke in the Precipice Sandstone.

The Precipice Sandstone reservoir at Bony Creek comprises fine to coarse grained, cross-bedded quartzose sandstone with thin lenses of conglomerate and has an average gross thickness of around 15 m. Three meters of nett pay are present. Porosity averages around 18% and permeability around 160 millidarcys.

To date, 18 exploration and development wells have been drilled on the structure. Four of these were water-wet (Bony Creek-3, 7, 8 and 11) while the remainder were cased as gas producers. Gas analysis shows the gas produced at Bony Creek is moderately wet (84.4% methane) with negligible quantities of carbon dioxide (<1%). Condensate, with an API gravity of 47 degrees, is produced from the Precipice Sandstone at a rate of 6.7 barrels per 100 000 m³ of gas. The condensate is trucked to Moonie and produced into the Jackson-Moonie oil pipeline.

Gas production at Bony Creek commenced in 1969 with the commissioning of the Roma-Brisbane gas pipeline. However, the Bony Creek accumulation is nearing depletion and as at 30/06/96, over 95% of the 921 million cubic meters of initial recoverable gas estimated to be in place at Bony Creek had been produced.

8.3.2 Grafton Range.

The Grafton Range gas accumulation lies on the flanks of a north-south oriented basement high, 28 kilometers northeast of the town of Roma. In 1964, Belbri-1 was drilled on the crest of the structure, but was plugged and abandoned after encountering gas shows in water saturated Evergreen Formation sandstones which rest directly on granitic basement. Down-dip, Triassic and Early Jurassic sediments onlap and pinch out on the flanks of the basement high. Consequently, the trapping mechanism at Grafton Range is predominantly stratigraphic.

In 1969, Grafton Range-1 was drilled approximately 3.5 kilometers to the northeast of Belbri-1 in a down-dip position. This well intersected a thick (approximately 15 m) Precipice Sandstone section which proved to be water saturated. The discovery well, Grafton Range-2, drilled in the same year in a more crestal position, flowed gas at a rate of 138 750 m³/day from a DST taken in the Evergreen Formation and at a rate of 42 500 m³/day from a second DST taken in the Precipice Sandstone. Of the 23 exploration and development wells drilled on the Grafton Range structure to date (excluding Belbri-1 and Sleepy Creek-1), 11 have been cased as gas producers. Two of these wells produce from both the Evergreen Formation and Precipice Sandstone.

Appraisal and development drilling on Grafton Range has delineated five commercial gas pools reservoired in the Evergreen Formation and Precipice Sandstone. Most of the gas reserves at Grafton Range are found in the informally named 'D' and 'C' sands of the Evergreen Formation. The 'D' sand of the Evergreen Formation typically comprises white, fine to medium grained, subrounded to rounded, well sorted quartzose sandstone with a white, kaolinitic matrix, minor chert and lithic fragments.

Porosity ranges between 17% and 20% and permeability is generally greater than 100 millidarcys. Nett pay for the 'D' sand averages around 3 m to 5 m. The 'D' sand has been interpreted as a shoreline strand deposit laid down during a hiatus in the Evergreen Formation transgression (Groves, 1974). Later authors, however, prefer a non-marine provenance for Evergreen Formation reservoirs.

The 'C' sand is slightly coarser grained but similar petrologically to the 'D' unit. Nett pay for the 'C' sand ranges between 6 m and 9 m. The 'C' sand was probably deposited in a fluvial channel system that formed as a result of a minor regression during Evergreen Formation times (Groves, 1974). Production data indicate that reservoir development (particularly in the 'C' sand) is sporadic and that several of the producing wells are draining discrete pools (Robertson Research, 1988).

The Precipice Sandstone reservoir, intersected by the discovery well Grafton Range-2, comprises white, coarse grained, angular to subangular, poorly sorted quartzose sandstone with a white, kaolinitic matrix. Porosity and permeability are good (averaging around 20% and 100 millidarcys respectively) and nett pay varies between 6 m and 9 m.

Gas produced from both the Evergreen Formation and the Precipice Sandstone is similar in composition. The gas comprises predominantly methane and is dry, although small quantities of 60 degree API condensate have been produced from the Evergreen 'D' reservoir at a rate of around 107 barrels of condensate per million cubic meters of gas. The majority of the gas reserves at Grafton Range are reservoirised in the 'D' sand of the Evergreen Formation. The accumulation is nearing depletion and as at 30/06/96, 90% of the initial recoverable gas reserves (estimated at 822 million cubic meters) had been produced.

8.3.3 Pickanjinie.

Pickanjinie-1 was drilled in 1960 by Associated Australian Oilfields Ltd, 33 kilometers east of Roma, to test an anticlinal closure near the top of the Precipice Sandstone. DST-1, taken over the interval 1204.6 - 1228.3 m in the Precipice Sandstone, flowed gas at 68 400 m³/day. Weak gas flows were also recorded in DST-3, taken in the Showgrounds Sandstone and DST-6, taken in the 'Rewan Formation' (700 m³/day and 425 m³/day respectively). The following year, Pickanjinie-2, drilled approximately 1 kilometer to the south, flowed gas on drill stem test at 2100 m³/day from both the Moolayember and Timbury Hills Formations. Subsequent appraisal/development drilling delineated additional gas pools in the Evergreen Formation (Pickanjinie-6) and the Tinowon Formation (Pickanjinie-10). A total of 11 exploration and development wells have been drilled at Pickanjinie to date.

Of the 7 gas pools present at Pickanjinie, only 3 (the Precipice, Showgrounds and Tinowon pools) have proved to be commercial. Gas production from the remaining pools is constrained by poor permeability. The Evergreen Formation gas pool is thought to be an isolated sandstone lens within a largely impermeable Evergreen Formation section (Groves, 1974).

At Pickanjinnee, the Precipice Sandstone reservoir comprises medium to very coarse grained, subrounded, moderately well sorted, quartzose sandstone. Porosity averages around 20% and permeability around 175 millidarcys. The nett pay interval varies between 3 m and 5 m and water saturation averages around 32%. Although the trapping mechanism at Precipice Sandstone level is predominantly structural, a permeability barrier on the northeastern flank of the structure has imparted a significant stratigraphic component to the trap.

The Showgrounds Sandstone reservoir is similar petrologically to the Precipice reservoir but is less well sorted and the quartz grains show less rounding. The trapping mechanism at Showgrounds Sandstone level is partly structural and partly stratigraphic - the trap was formed by the drape and pinchout of the Showgrounds Sandstone over the nose of an easterly trending basement ridge. Nett pay in the Showgrounds reservoir averages around 4 m and porosity around 15%. Permeabilities in excess of 1 darcy have been recorded within this unit.

Due to its limited areal extent, only small quantities of gas were produced from the Evergreen Formation reservoir before its eventual depletion. The trapping mechanism at this level is entirely stratigraphic, the reservoir being limited in all directions by permeability barriers.

Commercial quantities of gas are produced from a gas pool in the Tinowon Formation, intersected by Pickanjinnee-10, drilled in 1986. To date, no data on the Tinowon Formation reservoir parameters have been made available.

Gas analyses on samples recovered from the Precipice Sandstone, Showgrounds Sandstone and 'Rewan Formation' reservoirs show all three gases are similar in composition. All are rich in methane (in excess of 91%), dry and contain negligible amounts of carbon dioxide. Sixty degree API condensate is produced from the Precipice Sandstone reservoir at a rate of 78 barrels/million cubic meters of gas.

Most of the gas reserves at Pickanjinnee are reservoirised in the Precipice Sandstone and the Showgrounds Sandstone (261 and 258 million cubic meters of initial recoverable gas, respectively). Only minor quantities of commercial gas have been identified in the Tinowon Formation (11 million cubic meters of initial recoverable gas). The Pickanjinnee gas accumulation is nearing depletion. As at 30/06/96, only 32 million cubic meters of recoverable gas remained in place.

8.3.4 Pleasant Hills.

In 1962, Pleasant Hills-1 was spudded 30 kilometers northeast of Roma near the crest of a structural closure defined by seismic at both Top Showgrounds Sandstone and Top Boxvale Sandstone levels. Attempts to test the Triassic and Jurassic objectives were unsuccessful and it was not until six years later in 1968, that the discovery well Pleasant Hills-2 was drilled.

The Pleasant Hills gas accumulation lies on the flanks of a basement high on the downthrown side of the Wallumbilla Fault System. Pleasant Hills-2, drilled approximately 3 kilometers north of Pleasant Hills-1, flowed gas at 92 700 m³/day

and water at 120 barrels/day from a nett pay interval of around 5 m within the Showgrounds Sandstone. Since that time, a total of 24 exploration, appraisal and development wells have been drilled at Pleasant Hills, resulting in the discovery of an additional 4 gas pools. Pleasant Hills-8, drilled in 1969, intersected a small, commercial gas pool reservoir in a coarse, quartzose sandstone in the Injune Creek Group (informally named the 'Weald Sandstone'). The following year, a DST taken in the Pleasant Hills-11 well flowed gas at 133 100 m³/day from the Precipice Sandstone. A further two gas pools were discovered in the Evergreen Formation (informally named 'D' and 'C' sands) by Pleasant Hills-13 in 1970.

The Showgrounds Sandstone reservoir at Pleasant Hills comprises white to grey, coarse grained, subangular, quartzose sandstone with a kaolinitic matrix. Porosity averages around 18% and permeability around 130 millidarcys. The trapping mechanism at Showgrounds Sandstone level is partly structural and partly stratigraphic. To the east, the unit pinches out against basement, while to the southeast, the Showgrounds reservoir is limited by poor permeability. Elsewhere, the limits of the Showgrounds pool are predominantly structurally controlled.

Similarly, the Precipice Sandstone gas pool is reservoir in a combination/structural trap - the reservoir is structurally controlled to the northwest and south, while to the east, the reservoir limits are controlled by poor permeability. The reservoir itself comprises fine to medium grained, subangular, poorly sorted quartzose sandstone with a kaolin matrix. Porosity exceeds 20% and permeability is generally good.

Trapping within both the 'D' and 'C' sands of the Evergreen Formation is entirely stratigraphic. The 'D' sand is apparently a linear sand body developed around the flanks of the Pleasant Hills feature while the 'C' sand has been interpreted as an isolated permeable sand pod within the Evergreen Formation (Groves, 1974). Petrologically, both sand bodies are similar, comprising well sorted, quartzose sandstones with a kaolinitic matrix. However the 'D' sand tends to be slightly finer grained with the individual sand grains exhibiting a greater degree of rounding. Porosity and permeability in both units is good (typically greater than 20% and in excess of 100 millidarcys respectively).

The composition of the gas produced from all five reservoirs at Pleasant Hills is very similar - the methane content exceeds 90% with only very small quantities of higher molecular weight hydrocarbons present. Condensate with an API gravity of 60 degrees is produced from both the Precipice and Showgrounds Sandstones at a rate of 78 barrels/million cubic meters of gas. The Pleasant Hills accumulation is nearing depletion. As at 30/06/96, a total of 44 million cubic meters of recoverable gas remained to be produced from the Showgrounds and Precipice reservoirs. Initial recoverable gas has been estimated at 1180 million cubic meters.

8.3.5 Richmond.

The Richmond oil and gas accumulation is located 10 kilometers southeast of Roma on the same basement ridge trend as both Bony Creek and Tarrawonga. Richmond-1, drilled by Associated Australian Oilfields in 1963, targeted a small anticlinal closure at Top Boxvale Sandstone level. The well flowed 43 degree API oil on DST at around 1000 barrels/day (together with associated gas at 2690 m³/day) from a 16 m interval spanning the Precipice Sandstone. Subsequent development and appraisal drilling at Richmond showed that the oil pool intersected by Richmond-1 is an isolated sandstone lens of good porosity and permeability (21-25% and up to 690 millidarcies respectively) encapsulated by largely impermeable, clay choked Precipice Sandstone.

To date, a total of 24 exploration, development and appraisal wells have been drilled at Richmond. Development drilling has delineated a further two separate gas pools within the Precipice Sandstone and an oil and gas pool within the Moolayember Formation (Richmond-10). The gas reservoirs are interpreted as two separate, permeable, fluvial channel sands oriented north-northeast, which cross the Richmond/Bony Creek/Tarrawonga basement high. Reservoir limits are constrained to the east and west by permeability barriers (increasing clay content) which correspond to the edges of the palaeochannels. To the north, both pools are closed structurally by drape of Mesozoic sediments over the structural high. Closure to the south is also structural.

The Precipice Sandstone gas reservoirs at Richmond comprise white, medium to coarse grained, subangular to subround, slightly lithic and garnetiferous quartzose sandstones with a kaolinitic matrix. Thin lenses of carbonaceous shale and siltstone are commonly found throughout the unit while the basal section is frequently conglomeratic. Porosity averages around 16% and permeability from a few millidarcies to more than one darcy, over a nett pay interval of 8 m.

Richmond-10 flowed 44 degree API oil at 220 barrels/day and gas at 18 400 m³/day from a 48 m interval in the Moolayember Formation. To date, no commercial hydrocarbon production has taken place from the Moolayember pool at Richmond due to poor permeability in the Moolayember reservoir.

Gas produced from the Precipice Sandstone is moderately wet (around 85% methane) and unlike the gas produced at Tarrawonga, 24 kilometers to the southeast on the same structural trend, contains only minor amounts of carbon dioxide. Condensate is produced from the gas stream at a rate of 67 barrels/million cubic meters of gas. The associated gas produced from the Precipice Sandstone oil pool at Richmond-1 comprises around 58% methane and is rich in higher molecular weight hydrocarbons. Both the oil and the gas reservoir in the Moolayember Formation are similar in composition to the hydrocarbons found within the Precipice Sandstone.

The Richmond accumulation is currently nearing depletion. As at 30/06/96, 414 million cubic meters of gas had been produced from an initial recoverable reserve of 430 million cubic meters. Of the 3 megalitres of initial recoverable oil estimated to be present in the Richmond-1 pool, only very small reserves remain. The oil and

condensate produced at Richmond was either burned in the Roma powerhouse or trucked to Moonie and produced into the Moonie-Jackson oil pipeline.

8.3.6 Tarrawonga.

The Tarrawonga gas accumulation is located approximately 34 kilometers southeast of the town of Roma and 10 kilometers southeast of Bony Creek. The Tarrawonga feature is a four-way-dip closure at Precipice Sandstone level and lies on the same northwest trending basement ridge as the Bony Creek accumulation. The discovery well, Tarrawonga-1, was drilled in 1965 and flowed gas at 96 300 m³/day from a DST taken in the Precipice Sandstone.

The Precipice Sandstone reservoir at Tarrawonga has been interpreted as a north-east trending fluvial channel sand overlying a basement ridge (Groves, 1974). Although structural closure is present at Precipice Sandstone level, the trapping mechanism at Tarrawonga is in part stratigraphic, with decreasing permeability to the north and east of the structure. A total of 7 exploration and development wells have been drilled at Tarrawonga, of which, 5 were cased as Precipice Sandstone gas producers. Tarrawonga-4, drilled in 1966, intersected a new gas pool in the Showgrounds Sandstone. Here, gas flowed at 48 100 m³/day with a small quantity of associated condensate from a DST taken over the interval 1411.9 m to 1427.1 m within this unit. Gas reserves in the Showgrounds Sandstone reservoir are thought to be very small and to date, only minor quantities of gas have been produced from this pool.

The Precipice Sandstone reservoir at Tarrawonga comprises white, medium to coarse grained, subangular to angular, moderately well sorted, quartzose sandstone with minor kaolinitic matrix. Porosity averages around 16%. Permeability is variable but is as high as 2 darcies in places. Nett pay in the Precipice Sandstone generally averages around 4 m, but at Tarrawonga-4, gas is produced from a net pay interval of around 10 m.

The gas produced from both the Precipice Sandstone and the Showgrounds Sandstone is similar in composition. It is characterised by low methane content (around 75%) and high levels of carbon dioxide (in excess of 6%). Condensate yields from the Precipice Sandstone have been estimated at 109 barrels of condensate per million cubic meters of gas. The Tarrawonga accumulation is near depletion. As at 30/06/96, over 85% of the initial recoverable gas reserves (estimated at 598 million cubic meters) had been produced.

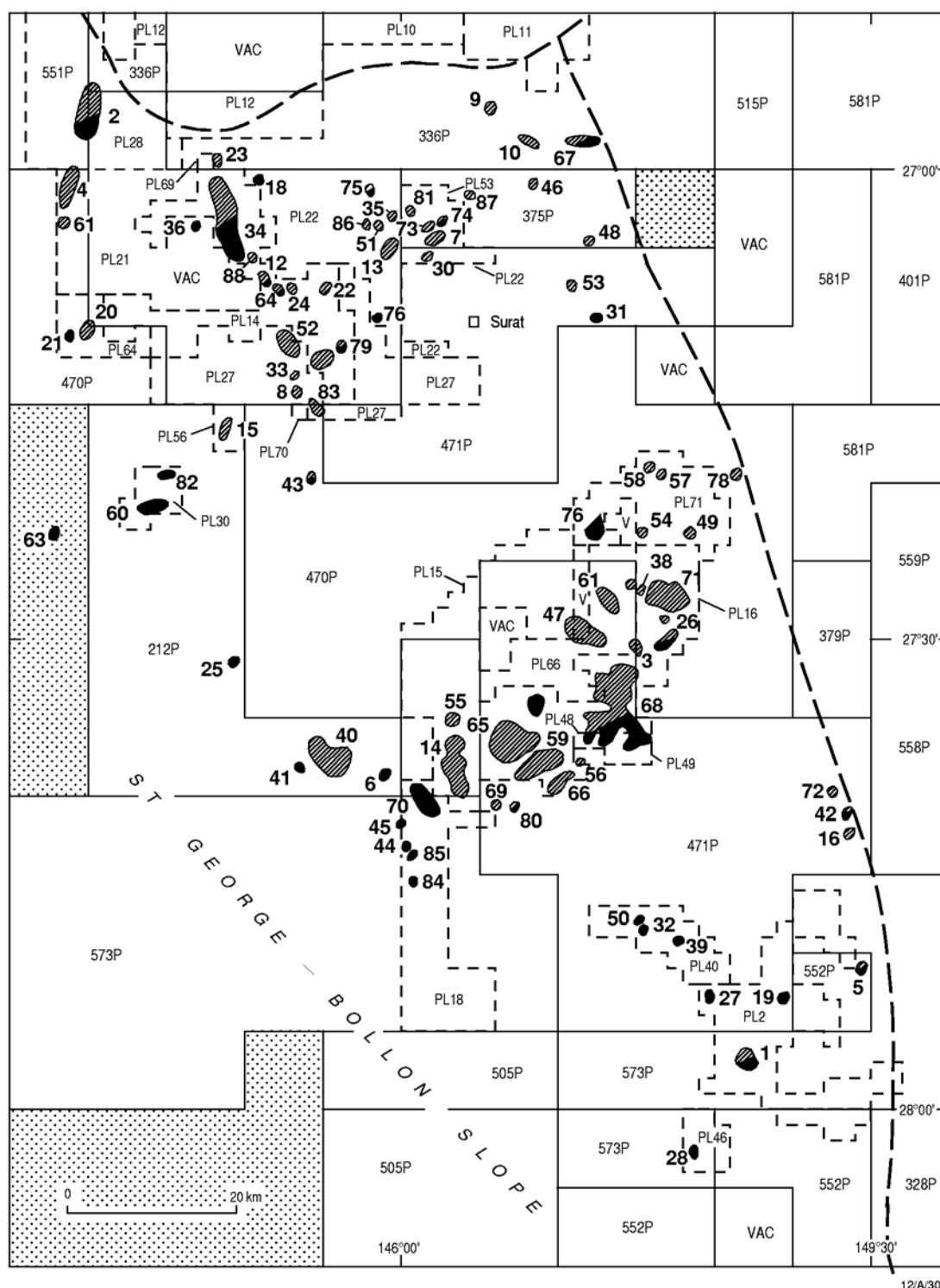


Figure 27. Petroleum discoveries, St George-Bollon Slope and Wunger Ridge, Bowen and Surat Basins, Queensland

1 Alton	14 Boxleigh	27 Eluanbrook	40 Major	53 Noorindoo	66 Sirrah	79 Wilga
2 Avondale	15 Broadway	28 Fairymount	41 Major South	54 North Boundary	67 Sunnybank	80 Wunger
3 Beechwood	16 Bungarie	29 Glen Fosslyn	42 Mamaree	55 North Boxleigh	68 Taylor	81 Yambugle
4 Beldene	17 Carbean	30 Glen Loth	43 Martini	56 North Sirrah	69 Thomby	82 Yapunyah
5 Bellbird	18 Cardigan	31 Griman Creek	44 McGregor	57 Parknook	70 Thomby Creek	83 Yarrabend
6 Bendee	19 Cockatoo	32 Harbour	45 McWhirter	58 Rednook	71 Tinker	84 Yellowbank Creek
7 Beranga South	20 Cogoon River	33 Kanaloo	46 Mentor	59 Renlim	72 Waggamba	85 Yellowbank Creek Nth.
8 Berwick	21 Cogoon River W	34 Kincora	47 Merroombil	60 Riverslea	73 Walpanara	86 Yuranigh
9 Blackbutt	22 Colgoon	35 Kungarri	48 Myall Creek	61 Roswin	74 Walpanara East	87 Bainbilla
10 Bloodwood	23 Deepwater	36 Lancewood	49 Namarah	62 Royston	75 Waratah	88 Caxton
11 Boggo Creek	24 Didgeridoo	37 Lark	50 Narrows	63 Samari Plains	76 Warroon	
12 Borah Creek	25 Donga	38 Link	51 Newington	64 Sandy Creek	77 Washpool	
13 Bottletree	26 East Glen	39 Louise	52 Newstead	65 Silver Springs	78 Weribone	

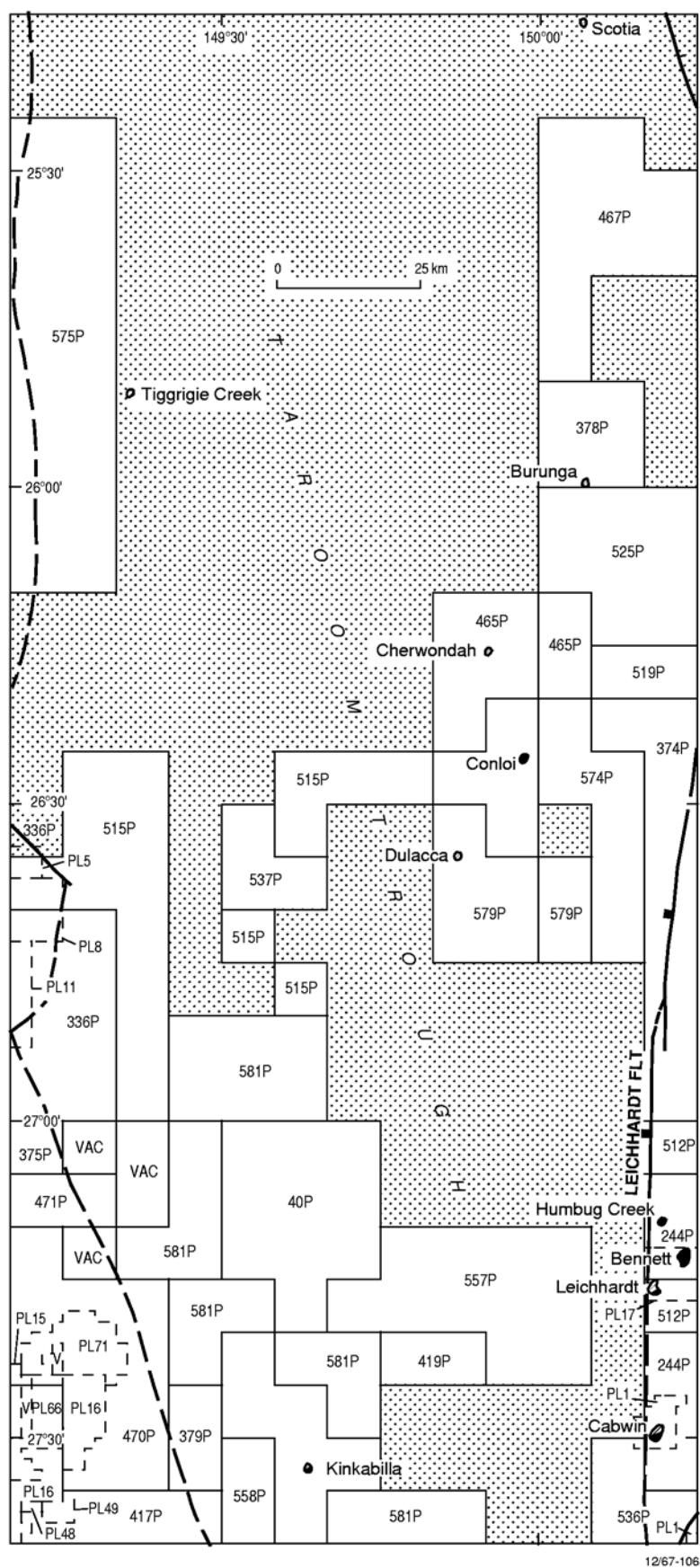


Figure 28. PETROLEUM DISCOVERIES, TAROOM TROUGH, BOWEN AND SURAT BASINS, QUEENSLAND

9. OIL AND GAS RESERVES

9.1 Oil

The largest oil accumulation discovered to date in the Bowen and Surat Basins is Moonie. Discovered early in the exploration history of the basins (1961)(Figure 29), the oil reservoir at Moonie (3859 megalitres (as at 30/06/96, QDME)) comprises in excess of 75 percent of the total initial recoverable oil found in the Bowen/Surat sequence (Figure 31). All other identified oil accumulations in the Bowen and Surat Basins are smaller than 350 megalitres, with the largest reserves found at Alton, Taylor and Fairymount (Figure 32). Approximately 90 percent of the identified oil accumulations in the two basins are smaller than 50 megalitres.

Since the discovery of Moonie in 1961, three decades of exploration has led to an increase of only 25 percent in the initial recoverable oil found in the Bowen and Surat Basins (Figure 29). To the north of Moonie on the same structural trend, a number of small, four-way-dip closures on the upthrown sides of thrust faults associated with the eastern basin margin have been drilled with only limited success and it appears that the Moonie accumulation is unique. It is likely that future oil discoveries in these basins will be small (less than 50 megalitres) and confined to the western flank of the Taroom Trough (St George-Bollon Slope and Wunger Ridge).

9.2 Gas

The discovery of the Moonie oil field in 1961 resulted in a steep rise in exploration drilling in the Bowen and Surat Basins during the 1960's. The increased pace of exploration led to a steady, incremental rise in proven gas reserves from the early 1960's through to the mid 1980's. Major gas discoveries were made in the Permian succession in the Denison Trough (Arcturus) and in Jurassic and Triassic sediments on the Roma Shelf (Grafton Range, Silver Springs/Renlim) (figure 33). Since the mid 1980's, however, although success rates have remained high (averaging around 20%) (figure 2), new gas discoveries have tended to be small. This has led to only a small increase in the proven gas reserves in the two basins since that time (figure 33).

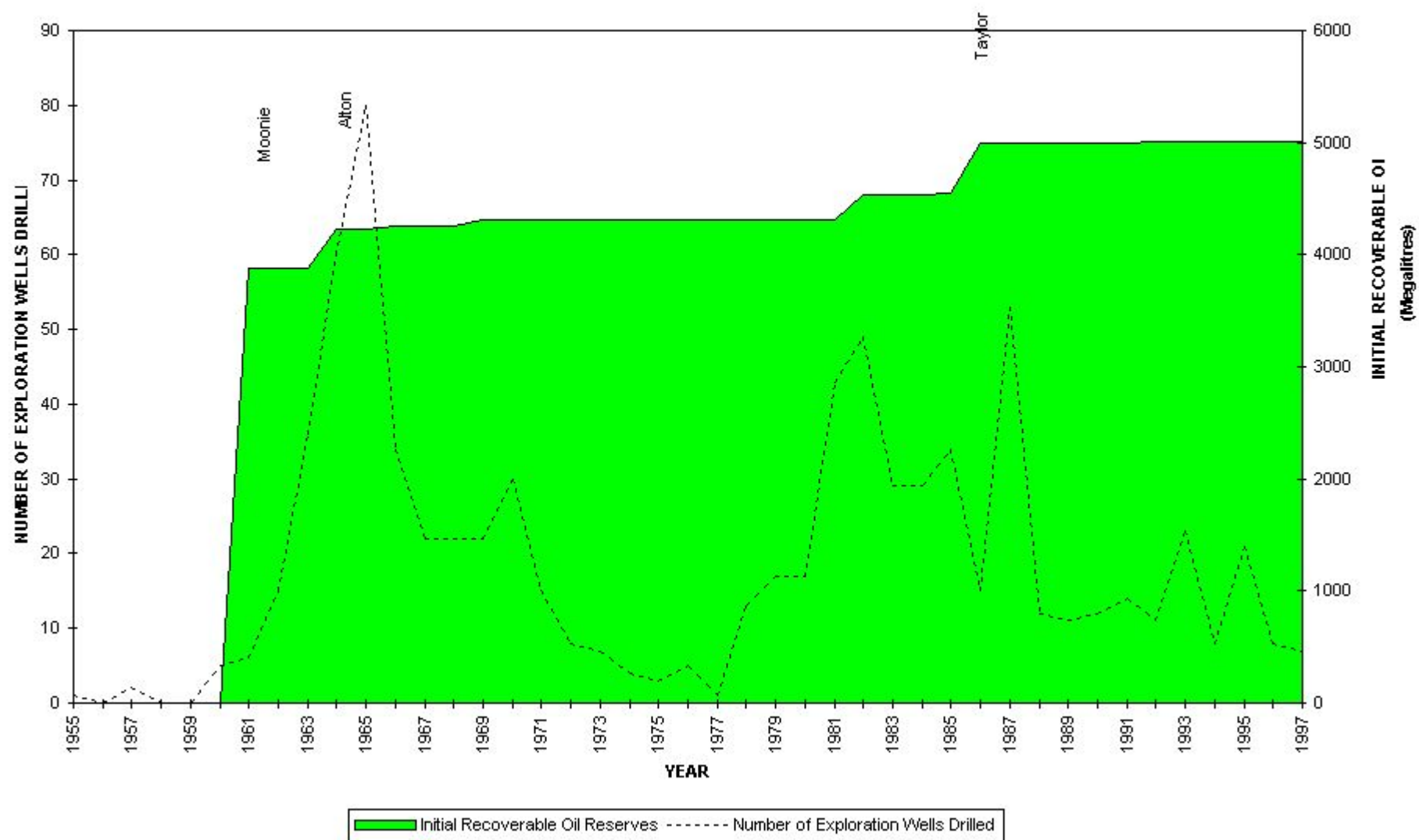
As of the June 30 1996, 20.1 billion cubic metres of recoverable gas had been discovered in the Bowen and Surat Basins. Over 60% of these gas reserves are reservoirised in accumulations lying on the western flank of the Taroom Trough (Roma Shelf, St George-Bollon Slope/Wunger Ridge) while the remainder are found in Permo-Triassic reservoirs in the Denison Trough to the north.

With the establishment of gas pipelines and infrastructure, commercial gas production from the accumulations in the western Taroom Trough commenced in the 1960's. To the north, in the Denison Trough however, the development of infrastructure lagged developments in the southern Bowen and Surat Basins. The State Gas Pipeline (figure 37) which runs from Wallumbilla near Roma, north to the Denison Trough then east to Gladstone was not completed until 1990. Consequently, commercial production from the Denison Trough gas accumulations has not occurred until relatively recently. This has led to the situation where, of the remaining 5.3 billion cubic metres of

identified gas in the Bowen and Surat Basins, over 50% of these remaining reserves are found in the Denison Trough (figures 35a and 35b). The State Gas Pipeline was recently sold to PGT Australia Pty Ltd.

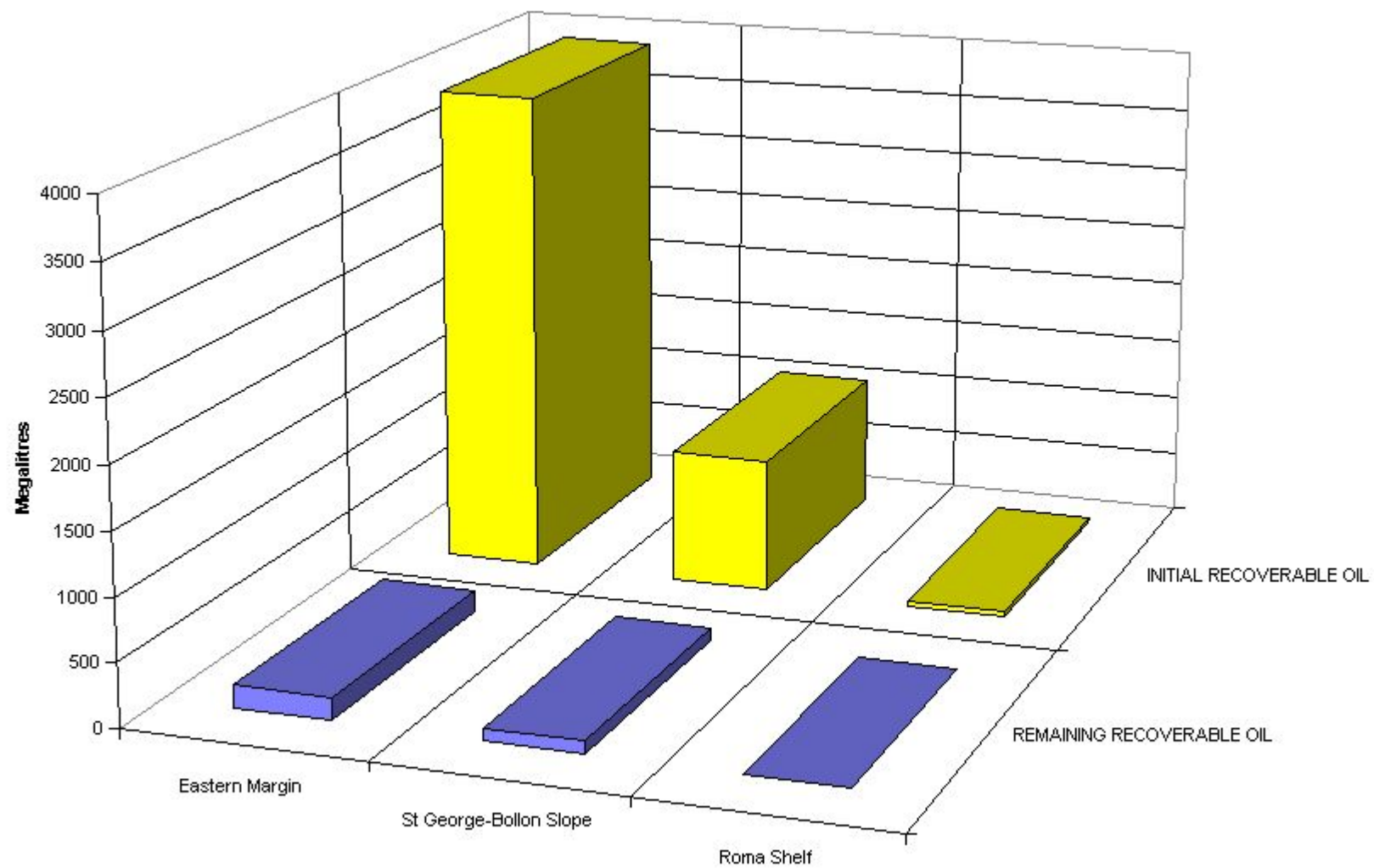
Many of the gas accumulations on the western flank of the Taroom Trough, particularly those that were discovered on the Roma Shelf early in the exploration history of the basins, are nearing depletion (figures 34, 36a and 36b). Most of the remaining gas in this area is reservoirised in the Showgrounds Sandstone (figure 35b), while in the Denison Trough, the most prolific gas producing unit is the Aldebaran Sandstone (figure 35a).

**EXPLORATION DRILLING/OIL RESERVES
BOWEN and SURAT BASINS (as at 30/06/96, QDME)**

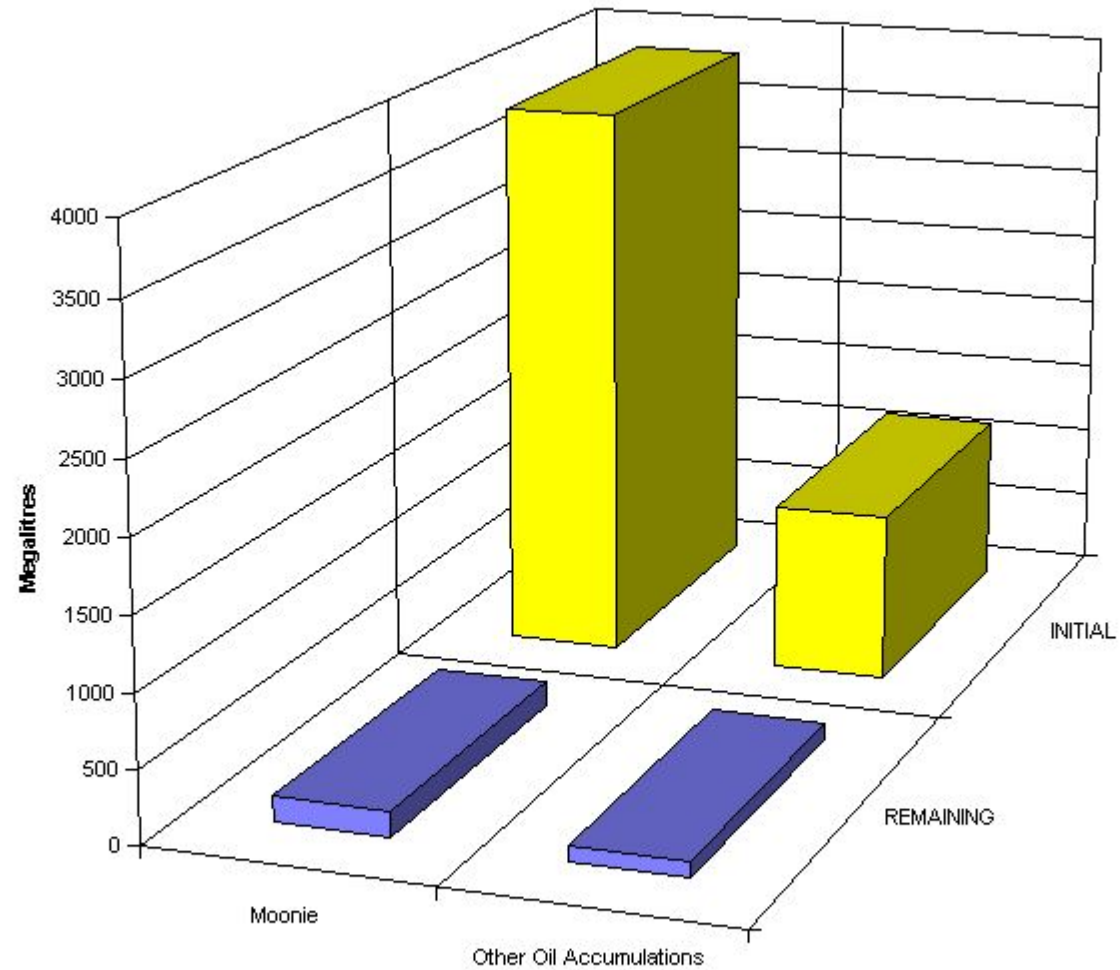


OIL RESERVES, Bowen and Surat Basins

(as at 30/06/96, QDME)

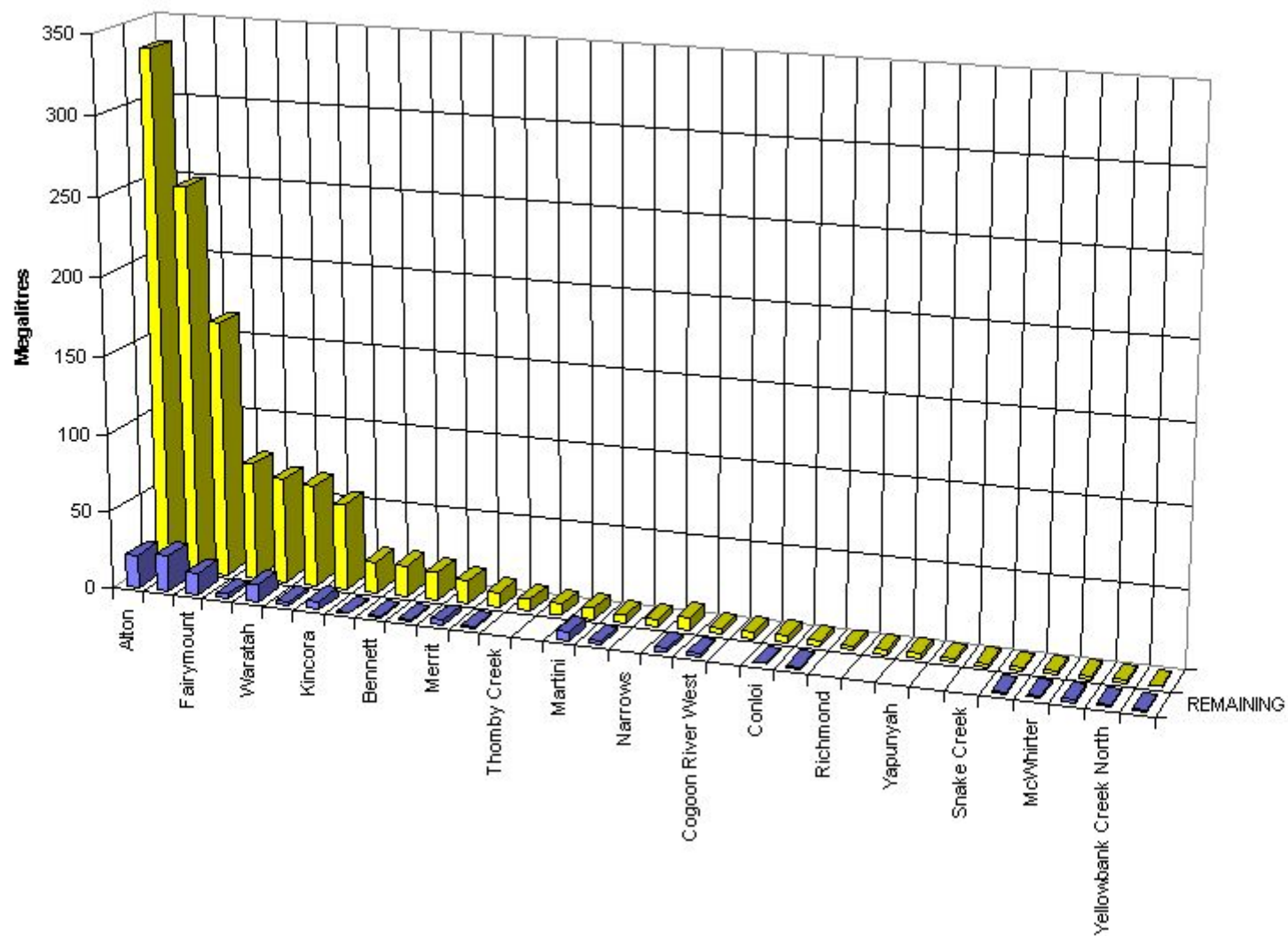


OIL RESERVES, Bowen and Surat Basins (as at 30/06/96, QDME)

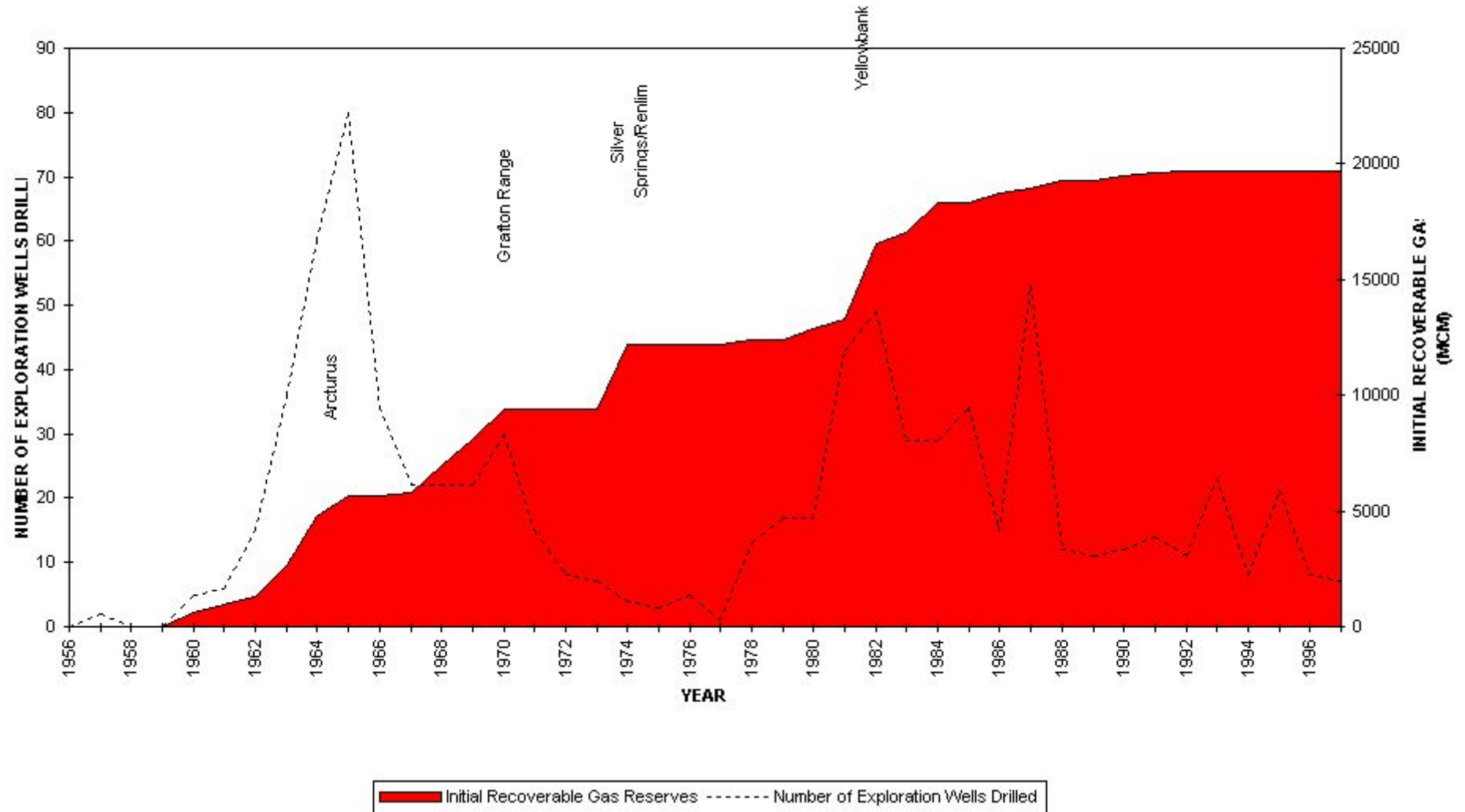


TOTAL REMAINING OIL RESERVES = 282 Megalitres

OIL RESERVES, Bowen and Surat Basins (excluding Moonie) (as at 30/06/96, QDME)



**EXPLORATION DRILLING/GAS RESERVES
BOWEN and SURAT BASINS (as at 30/06/96, QDME)**



GAS RESERVES, Bowen and Surat Basins

(as at 30/06/96, QDME)

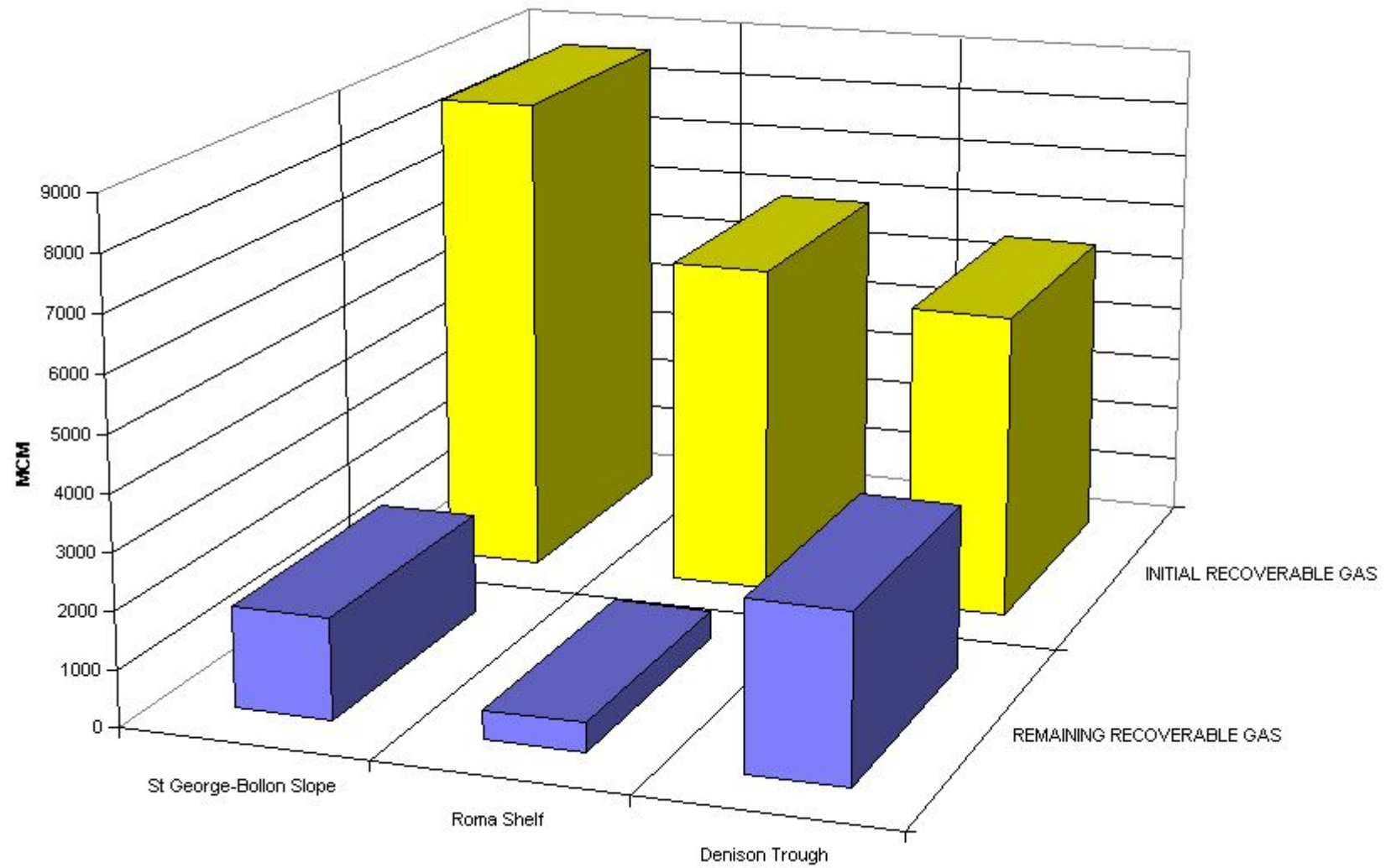
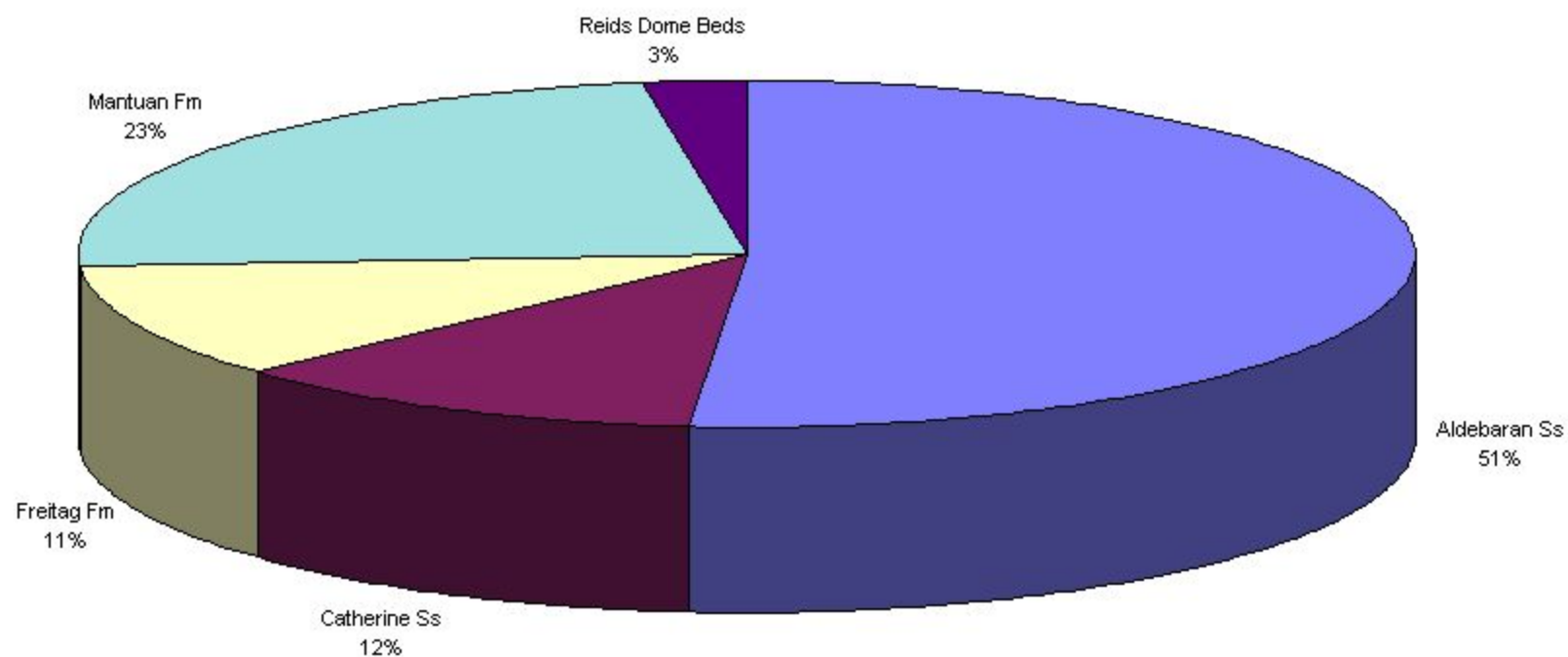


Figure 35a Remaining gas reserves, Denison Trough

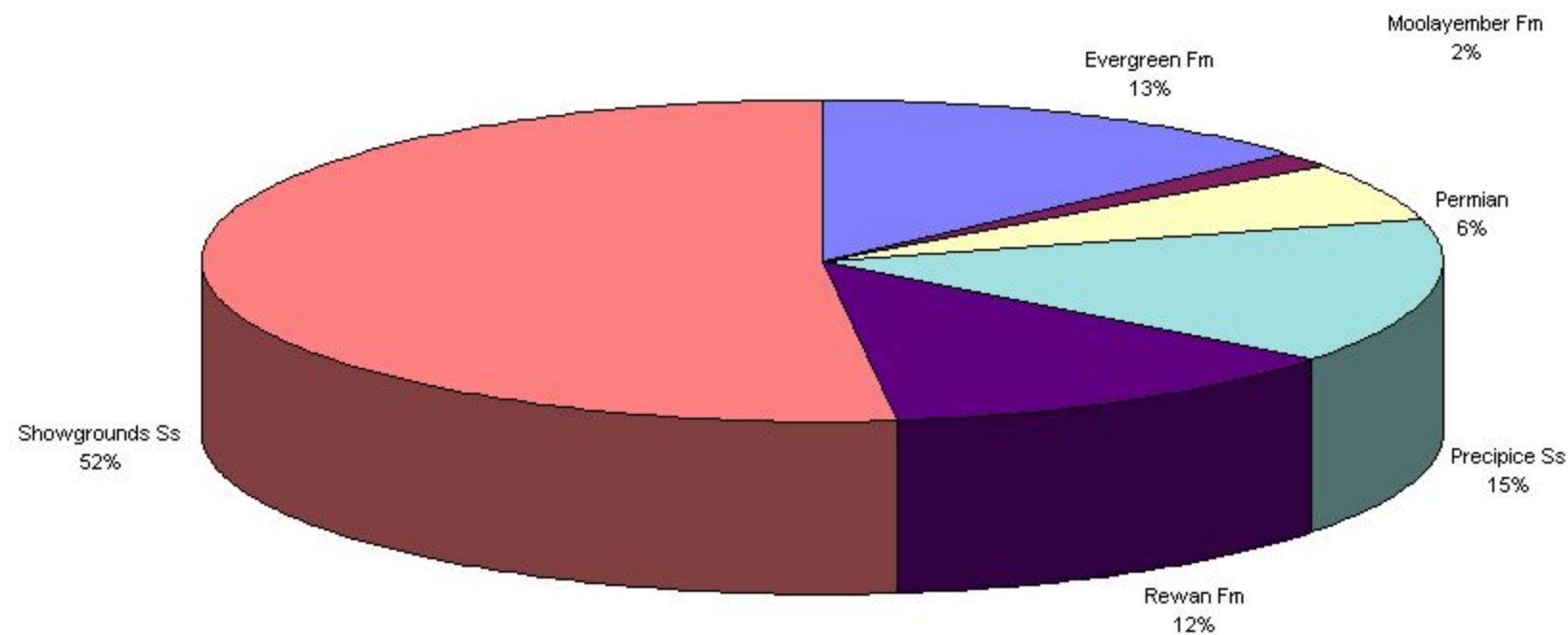
Figure 35b Remaining gas reserves, Roma Shelf and St George-Bollon Slope

REMAINING GAS RESERVES, Denison Trough (as at 30/06/96, QDME)



TOTAL REMAINING GAS RESERVES = 2931 MCM

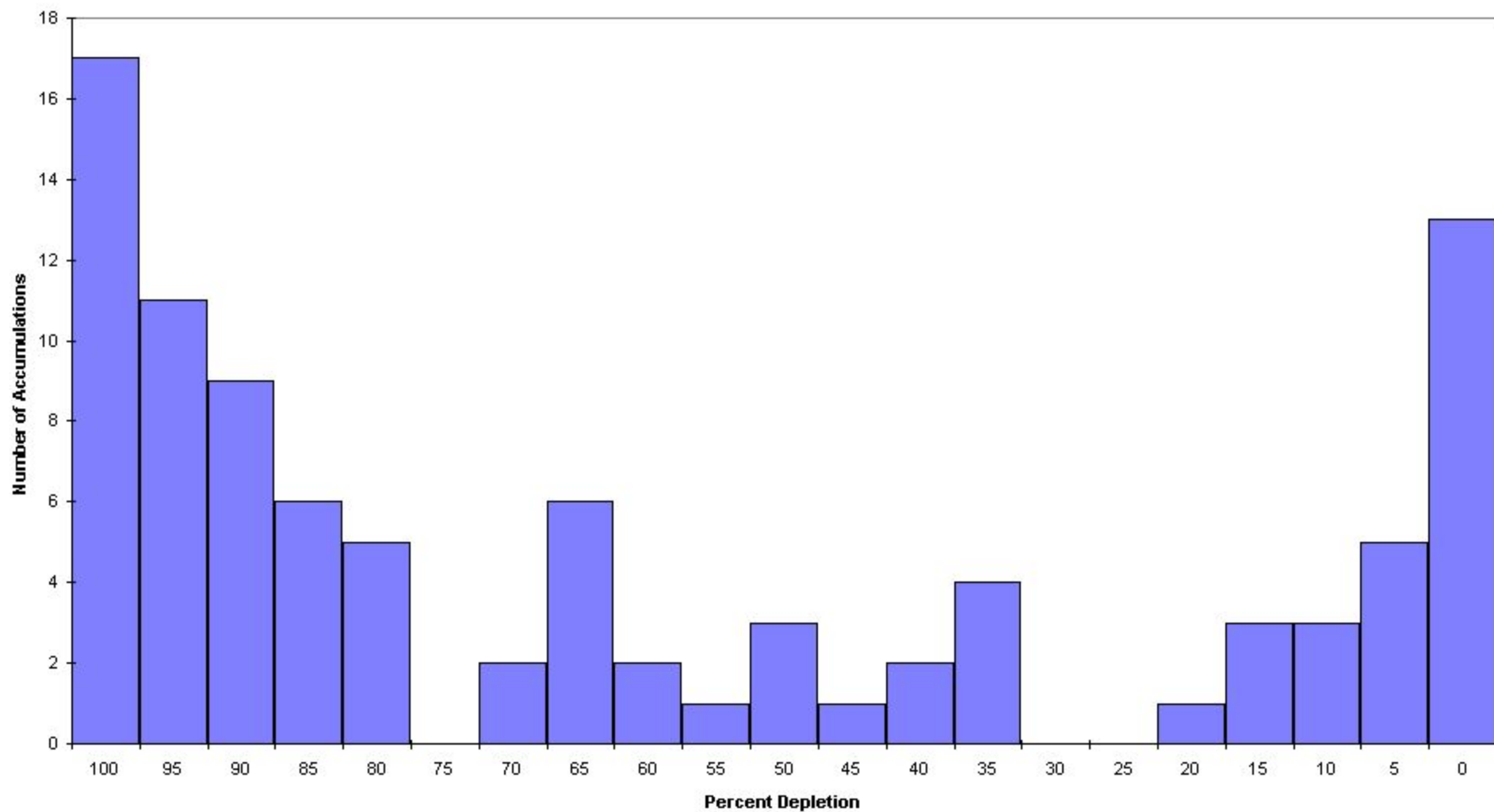
**REMAINING GAS RESERVES, Roma Shelf and St George-Bollon Slope
(as at 30/06/96, QDME)**



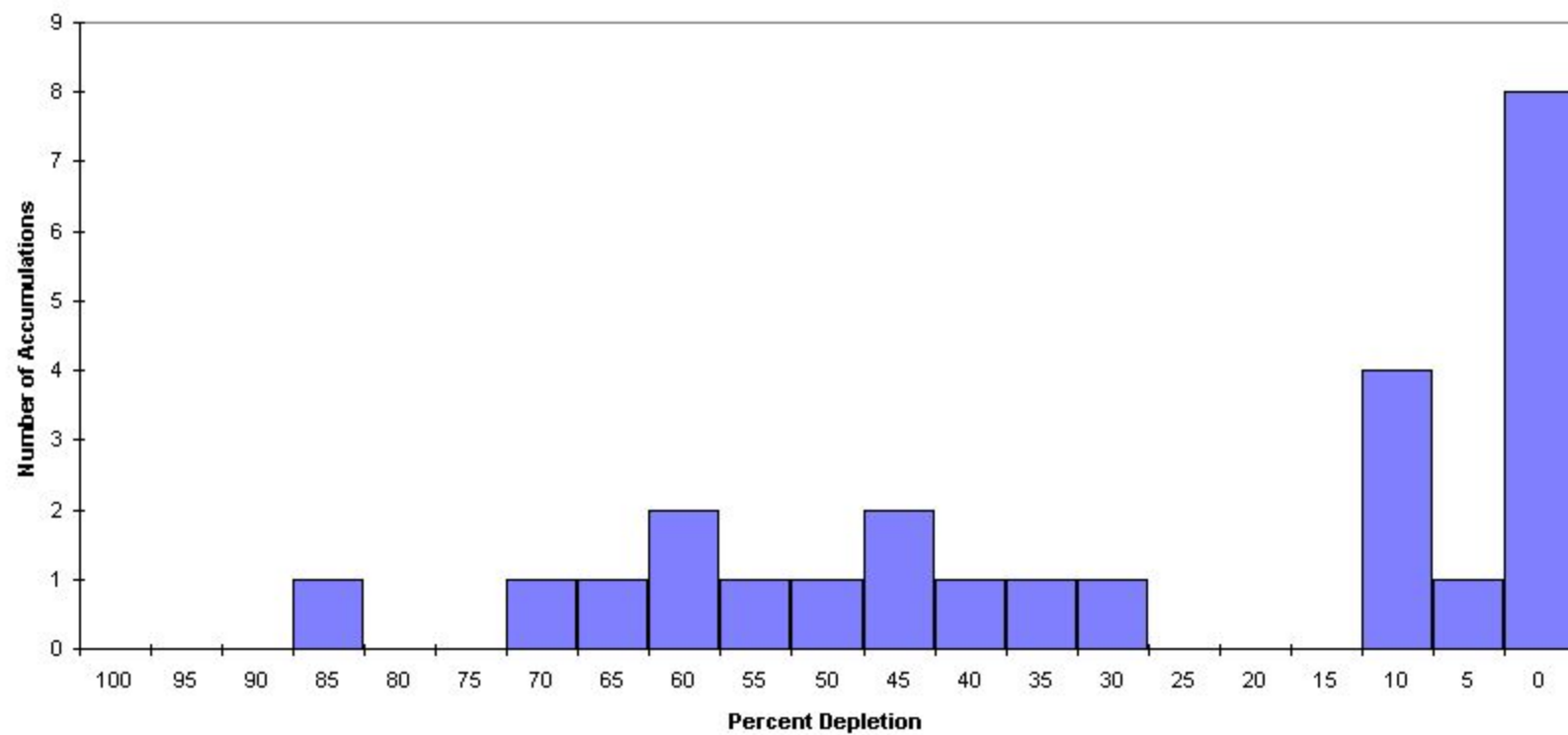
TOTAL REMAINING GAS RESERVES = 2298 MCM

Figure 36a Depletion of gas accumulations, Western Flank, Taroom Trough
Figure 36b Depletion of Denison Trough gas accumulations

Depletion of Gas Accumulations, Western Flank, Taroom Trough (as at 30/06/94)



Depletion of Denison Trough Gas Accumulations (as at 30/06/94)



10. INFRASTRUCTURE

10.1 Pipelines

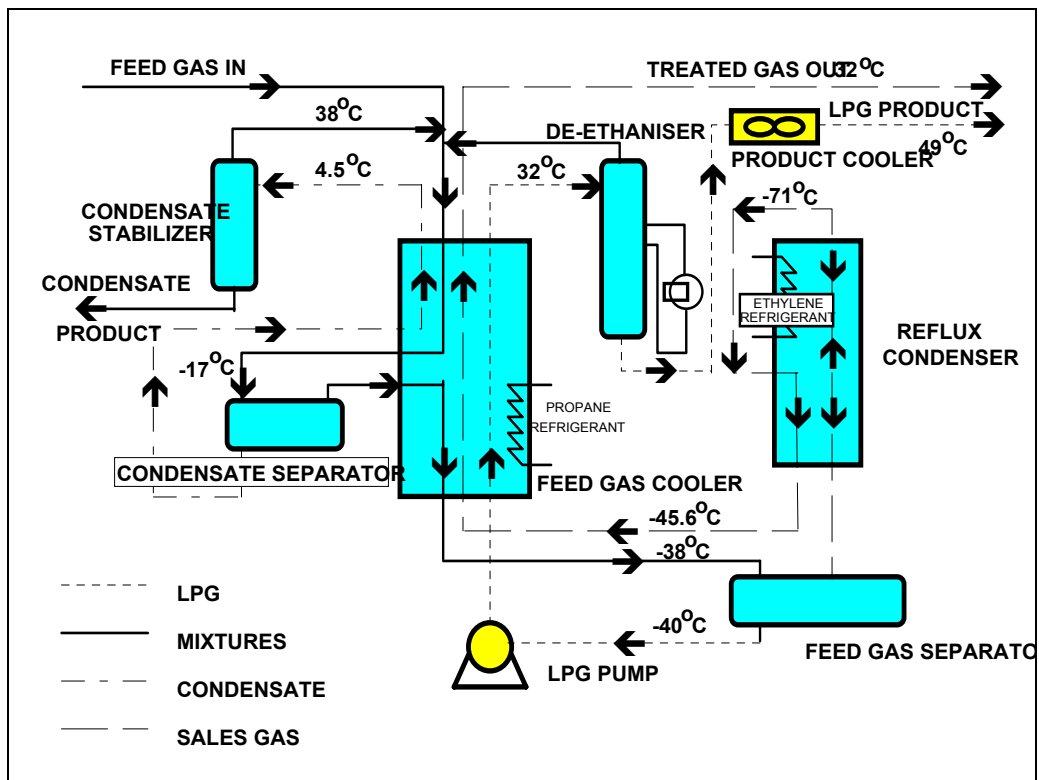
Information on oil and gas pipelines servicing the Bowen and Surat Basins is tabulated below. Figures 37 and 38 show the location of these pipelines.

Licence	Location/Route	Operator	Product	Length (km)	Size (mm)	Start up	Comment
PL-1	Moonie to Brisbane	Santos Ltd	Oil	306	273	1963	Transports Surat basin crude oil from Moonie to the Lytton terminal at Brisbane for either export or processing by the Ampol or BP refineries.
PL-2	Wallumbilla (Roma) to Brisbane	Santos Ltd	Gas	397 37	273 324	1969	The main source of domestic and commercial gas for the Brisbane area. Incorporates 6 compressor stations and 1 loop line (142 km of 406 mm line). Gas stream includes Surat, Bowen and Cooper-Eromanga Basin gas.
PL-3	Kincora to Wallumbilla	Oil Company of Australia Ltd	Gas	53	219	1976	Transports gas from the Kincora oil and gas field to Wallumbilla for further transport to the Brisbane gas market.
PL-4	Silver Springs to Wallumbilla	Santos Ltd	Gas	102	219	1978	Transports gas from the western Surat Basin gas fields to Wallumbilla where condensate, oil and LPG are stripped from the gas stream before transport to Brisbane.
PL-6	Jackson to Moonie	Santos Ltd	Oil	800	324	1984	Transports crude oil from the Cooper-Eromanga Basin to the Moonie-Brisbane oil pipeline.
PL-7	MLIA to Wallumbilla	Santos Ltd Santos Ltd	Propane Butane	14 14	60 60	1984 1984	Part of the southeast Queensland gas production system.
PL-10	Arcturus to Rolleston (North Denison Trough)	Oil Company of Australia Ltd	Gas	107	168	1990	Used to transport gas from the North Denison Trough to Brisbane in conjunction with the State gas pipeline. Some gas exported to SE Asia.
PL-11	Glentulloch to Westgrove (South Denison Trough)	Oil Company of Australia Ltd	Gas	41 25	168 219	1989	Transports gas from the Southern Denison Trough to Brisbane via the State gas pipeline. Some gas exported to SE Asia.
PL-20	Namarah to Yarrabend	Oil Company of Australia Ltd	Gas	45	168	1993	Ultimately gas is transported to Brisbane via the Western Surat Basin gas gathering system.
PL-22	Major to Boxleigh	Oil Company of Australia Ltd	Gas	16	89	1994	Ultimately gas is transported to Brisbane via the Western Surat Basin gas gathering system.
PL-24	Ballera to Roma	Epic Energy Pty Ltd	Gas	756	406	1996	Transports gas from the Ballera field (Cooper-Eromanga Basin) to Wallumbilla and thence to Brisbane. Built to address declining gas supplies from the Bowen and Surat Basins.
PL-30	Wallumbilla to Gladstone (State Gas Pipeline)	PGT Australia Pty Ltd	Gas	532	324	1990	Transports gas to Gladstone for use by the Gas Corporation of Queensland, ICI Ltd and Queensland Alumina Ltd.
PL-30	Gladstone to Rockhampton	PGT Australia Pty Ltd	Gas	98	219	1991	A spur line off the main Wallumbilla to Gladstone pipeline to supply commercial and domestic gas to the Rockhampton area.
	Marsden to Gold Coast	Algas Energy Ltd	Gas	60	150	1989	A branch line of the main Brisbane to Roma gas pipeline designed to supply gas to the Gold Coast.

10.2 Kincora LPG Plant

The Kincora LPG plant is an integrated part of Oil Company of Australia's oil and gas production facilities in the Surat Basin. The plant was commissioned in October 1985 and modified in 1986 to increase the design capacity from the original 15 000 tonnes per year of LPG to the present 20 000 tonnes. The plant maximum design feed gas capacity is 700 000 m³/day (25 MMSCF/d).

All natural gas produced from gas wells and solution gas produced from oil wells is routed through the plant. Because the solution gas arrives at low pressure it has to be compressed to the plant operating pressure. Natural gas from the gas wells is routed through the separation facilities where some water and condensate are separated. The solution gas and the gas from gas wells are then comingled, and after dehydration in a glycol drying unit, routed into the LPG extraction plant.



Kincora plant LPG extraction schematic

The feed gas is further dehydrated in the molecular sieve unit within the LNG plant. After this final dehydration the dry gas enters the LPG extraction section, where LPG and condensate are separated from the lean sales gas.

A dried feed gas enters the first refrigeration section of the plant where it is cooled by propane refrigerant down to -17 degrees C. At this temperature the heavy hydrocarbon fractions are liquefied and are collected as condensate in the condensate separator. The condensate then enters the condensate stabiliser where it is heated to give off dissolved gas. Residue is run off to storage. Dissolved gas is recycled back into the feed gas stream.

The gas stream from the condensate separator enters the second refrigeration section where it is cooled to -31 degrees C. The feed gas then routed through a reflux condenser where it is further cooled to -71 degrees C by ethylene refrigerant. At this temperature propane and butane condense as LPG, and is fed into storage tanks while lean gas is re-composed into a 200 mm diameter spur pipeline to Wallumbila, 55 km away.

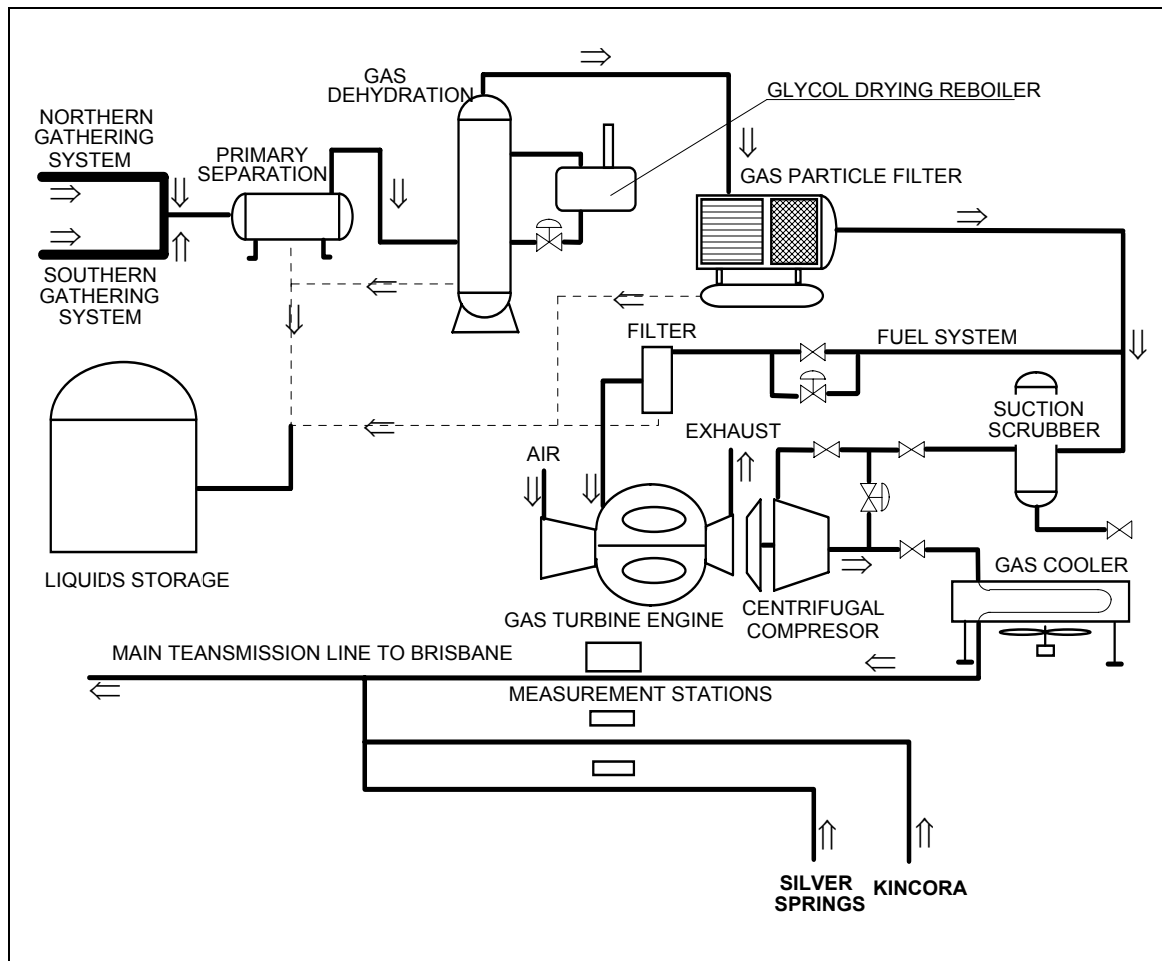
LPG storage facilities consist of three 80 tonnes storage tanks and truck loading ramp. LPG is trucked from Kincora to the Boral terminal at Bulwer Island in Brisbane.

Oil and condensate are stored in three clean oil tanks and two condensate tanks before being trucked to Moonie.

Water is stored in two water treating tanks. Any remaining oil in the water is separated by gravity before the water is pumped into evaporation ponds.

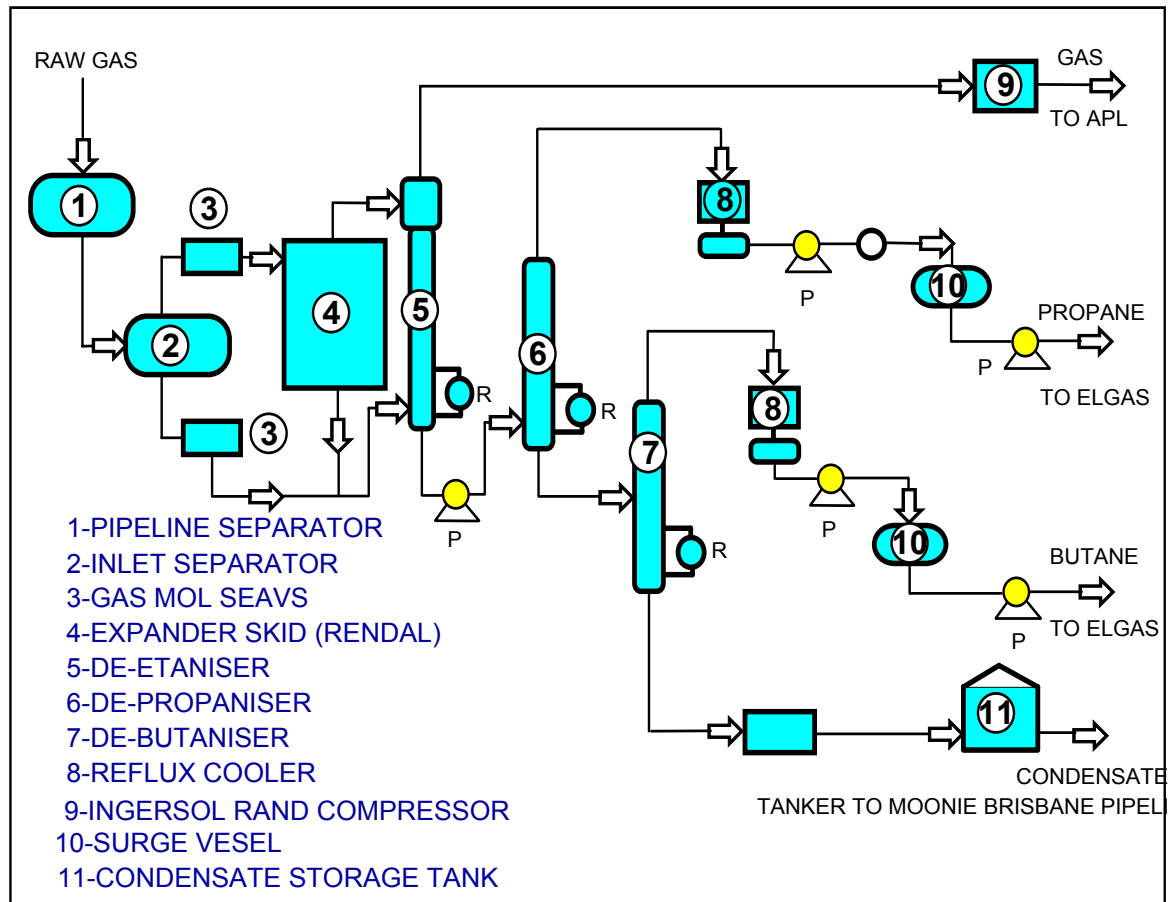
10.3 ML1A Pipeline Station

The schematic below shows the layout of the ML1A Pipeline station located approximately 400 km west of Brisbane. Here, the gas streams from the Northern gas gathering system, the Southern gas gathering system, Kincora and Silver Springs are comingled and transported to Brisbane.



10.4 Wallumbilla LPG Processing Plant

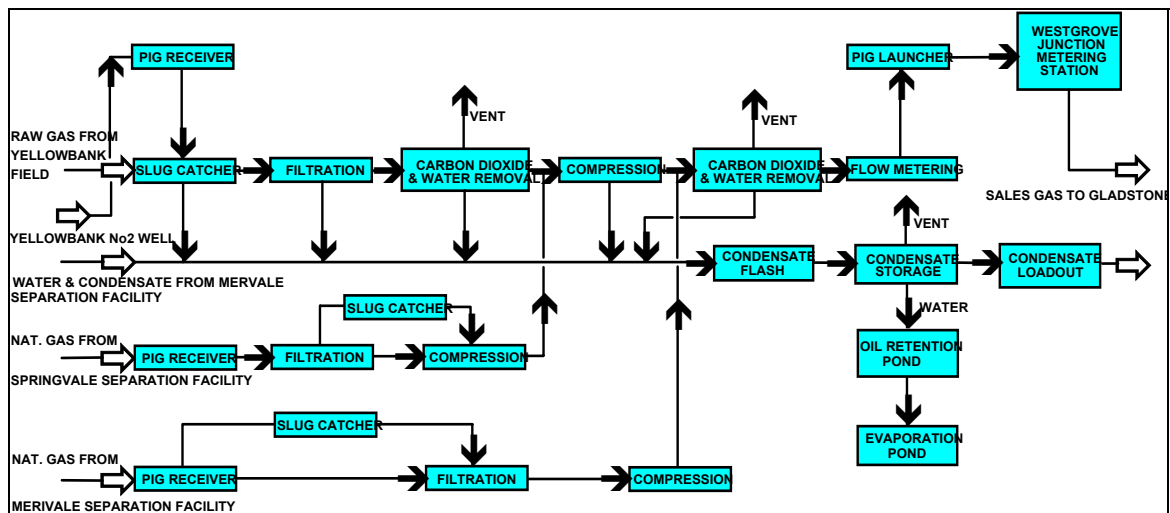
A schematic of the LPG processing plant located at Wallumbilla is shown below.



10.5 Denison Trough Central Treatment Plant

The Central Treatment Plant is processing gas from the southern Denison Trough fields (Springvale, Myrtleville, Merivale, Yellowbank). Due to the high CO₂ contents in the gas produced from the southern fields, infield dehydration facilities are installed to protect the gathering system and the gas plant from carbonic acid corrosion. The main components of the central gas treatment plant include slug catchers, gas filtration, dehydration and carbon dioxide removal by use of semi-permeable membranes, compresssion, condensate storage and loadout facilities and gas metering.

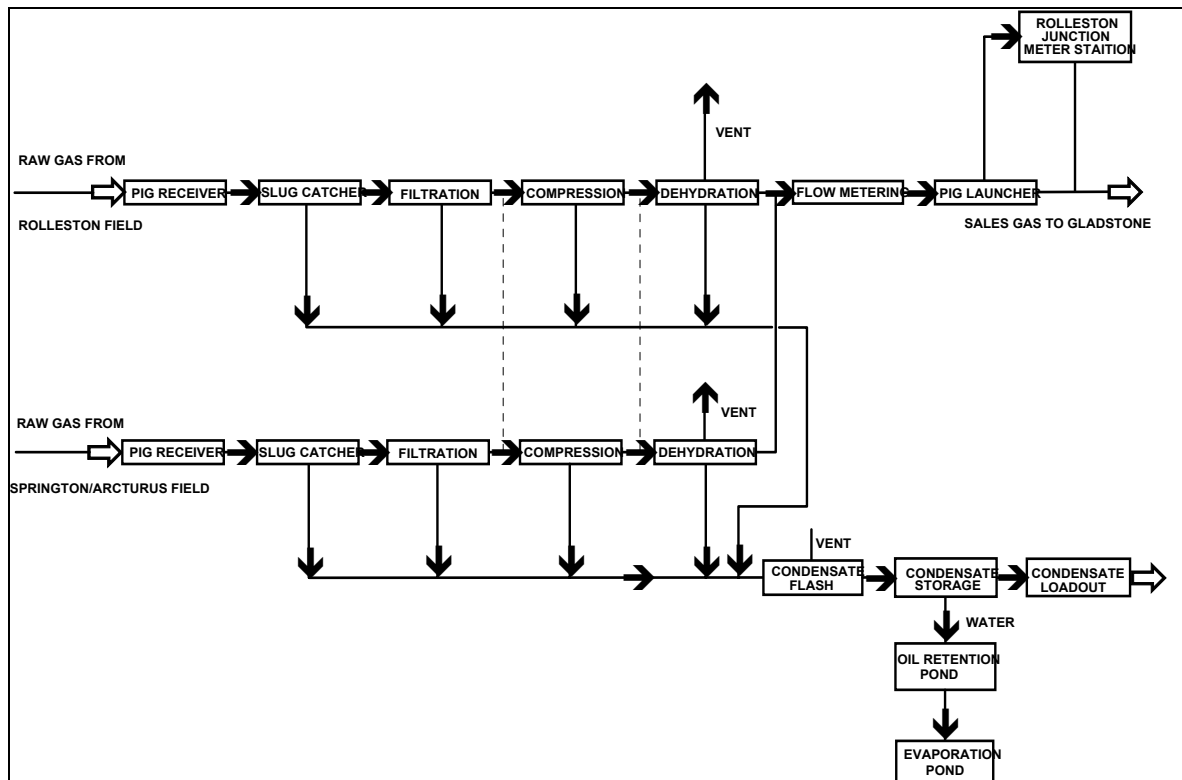
A schematic of the Central Treatment Plant is shown below.



10.6 Rolleston Gas Plant

The Rolleston gas plant is processing gas produced from the northern Denison Trough fields (Rolleston, Springton, Arcturus, Moorooloo).

A schematic of the plant is shown below.



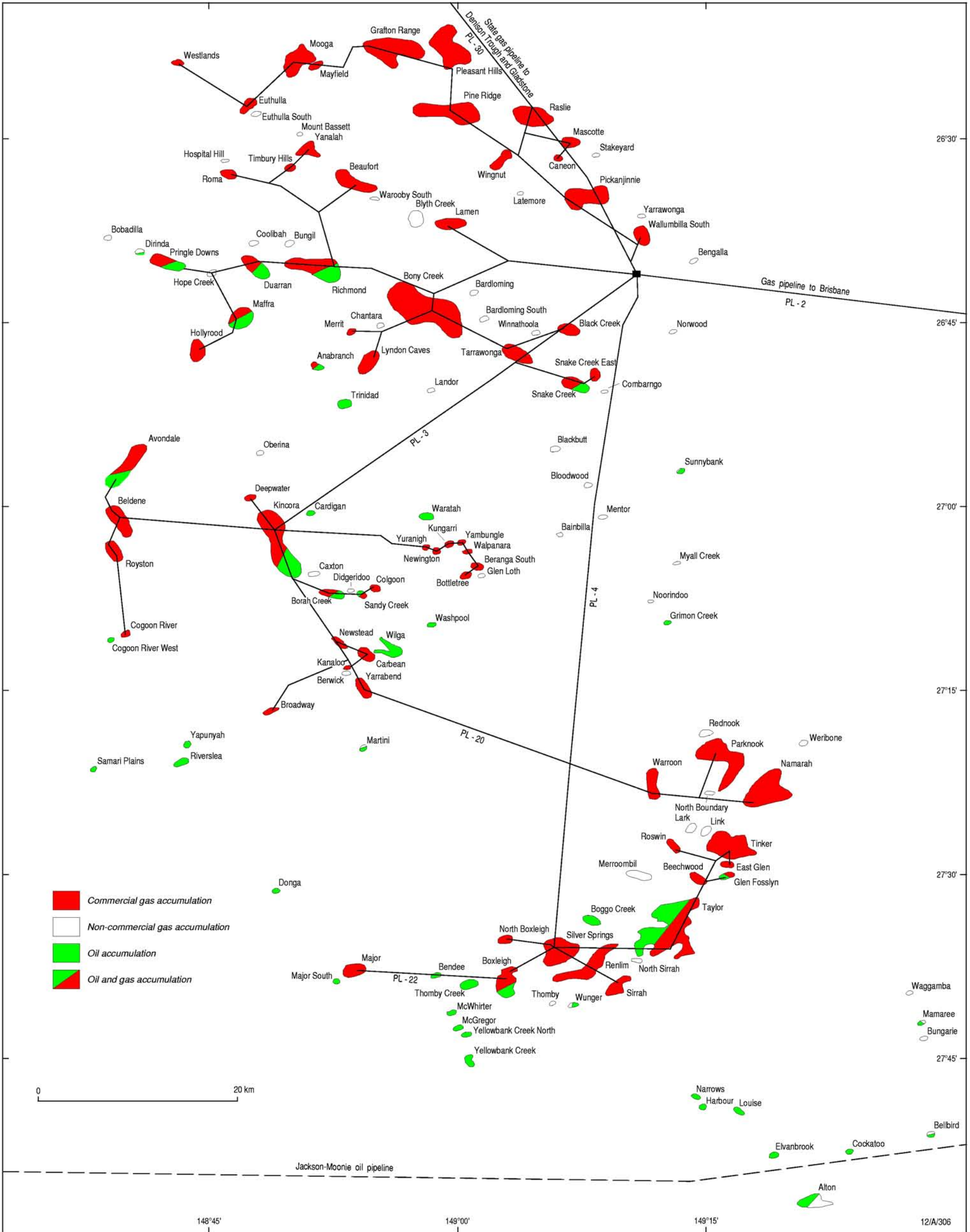


Figure 37. Gas pipelines - Western Bowen and Surat Basins

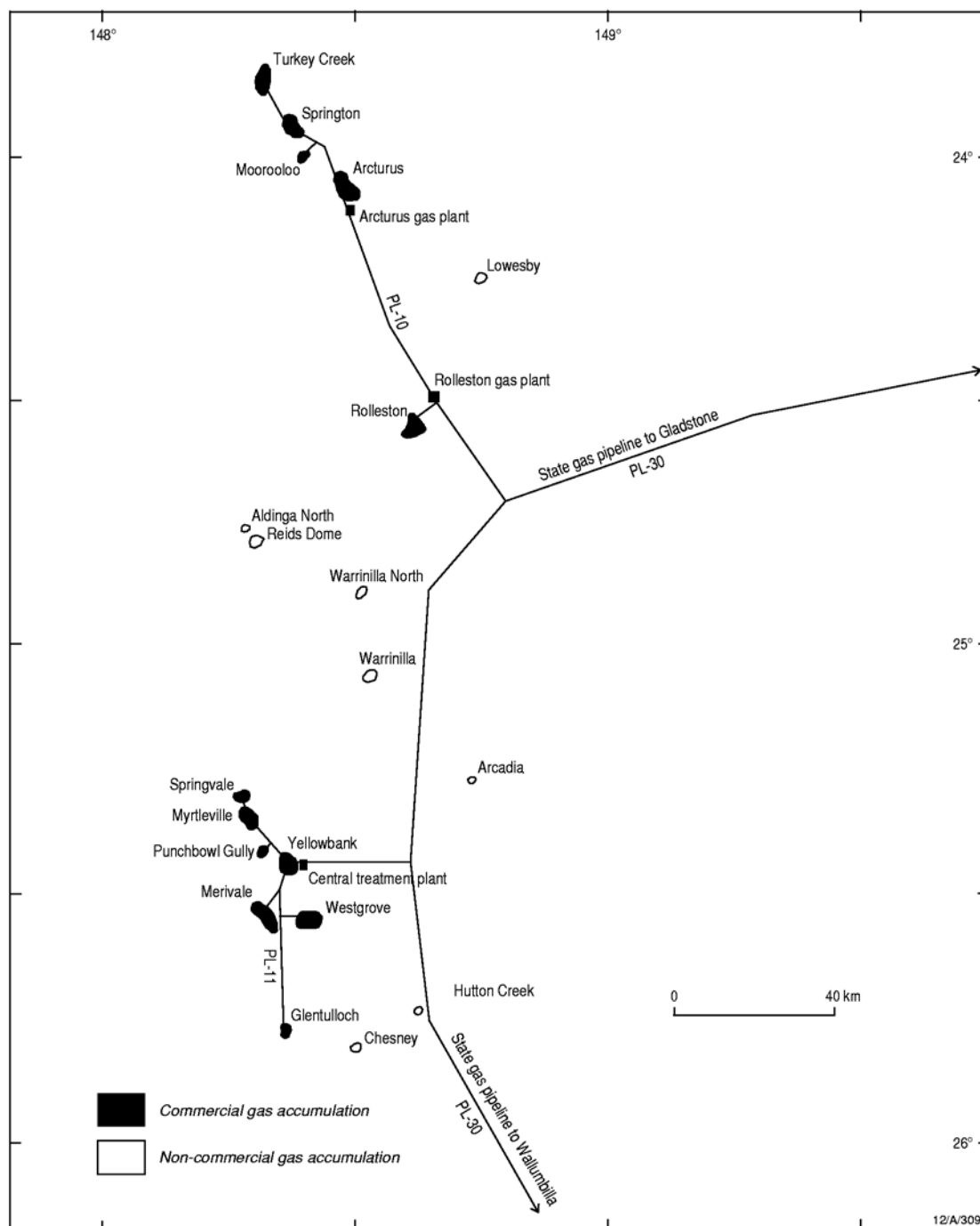


Figure 38. Gas pipelines - Denison Trough

		PETROLEUM ACCUMULATIONS, SURAT AND SOUTHERN BOWEN BASINS											
AGE	STRATIGRAPHIC UNIT	Pleasant Hills	Xyloleum	Xylex	Leichhardt	Broadway, Cogoon River, Didgeridoo, Landor, Royston, Westlands	Cardigan, Cogoon River West, Conloi, Mindagabie, Riverslea, Samari Plains	Anabranh	Colgoon, Grafton Range, Yarrabend	Bennett	Berwick	Beldene, Carbean, Caxton, Kanaloo, Newstead	
JURASSIC	Orallo Fm												
	Gubberamunda Ss												
	Westbourne Fm	GAS											
	Springbok Ss												
	Walloon Coal Msrs		GAS										
	Eurombah Fm												
	Hutton Ss			OIL	GAS								
	Evergreen Fm	GAS				GAS	OIL	OIL+GAS	GAS	OIL	GAS	GAS	
	Precipice Ss	GAS			OIL				GAS	OIL	GAS		
TRIASSIC	Moolayember Fm										GAS	GAS	
	Showgrounds Ss	GAS											
	Rewan Fm												
PERMIAN	Blackwater Group												
	Back Creek Group												
DEVONIAN	Timbury Hills Fm												

Producing field

Other discovery

Past Producer

AGE	STRATIGRAPHIC UNIT	Sandy Ck	Avondale, Borah Ck, Kincora	Pine Ridge	Alton	Pickanjinie	Pringle Downs	Blyth Ck, Bony Ck, Bungil, Burgoyne, Caneon, Chantara, Coolibah, Damper Ck, Deepwater, Dulacca, Euthulla Sth, Hollyrood, Hope Ck, Hospital Hill,	Lamen, Lyndon Caves, Mascotte, Mayfield, Mooga, Oberina, Rockwood, Stakeyard, Snake Ck East, Timbury Hills, Warooby, Warooby Sth, Yanalah	Duarran, Maffra, Merrit	Humbag Ck, Moonie, Rockwood Nth, Trinidad, Xyloil Sth	Richmond
JURASSIC	Orallo Fm											
	Gubberamunda Ss											
	Westbourne Fm											
	Springbok Ss											
	Walloon Coal Msrs											
	Eurombah Fm											
	Hutton Ss											
	Evergreen Fm	GAS	GAS	GAS	OIL+GAS	GAS	OIL+GAS					
	Precipice Ss			GAS		GAS		GAS	GAS	OIL+GAS	OIL	OIL+GAS
TRIASSIC	Moolayember Fm	OIL	OIL+GAS	GAS		GAS						OIL+GAS
	Showgrounds Ss			GAS	OIL+GAS	GAS						
	Rewan Fm					GAS						
PERMIAN	Blackwater Group											
	Back Creek Group											
DEVONIAN	Timbury Hills Fm						GAS					

Producing field
Other discovery
Past Producer

PETROLEUM ACCUMULATIONS, SURAT AND SOUTHERN BOWEN BASINS

AGE	STRATIGRAPHIC UNIT	Wingnut	Beaufort, Euthulla, Raslie, Tarrawonga	Winnathoola	Cabawin	Bardloming, Cherwondah, Mount Bassett, Roma, Tiggrigie Ck,	Mamaree, Martini, Wilga	Donga, Lancewood, Major Sth, Yapunyah	Bardloming Sth, Beechwood, Bungarie, Link, Major, Merroombil, Nth Boundary, Nth Boxdeigh, Roswin, Roswin West, Roswin Nth, Silver Springs, Sirrah, Thomby, Weribone	Waratah, Wunger
JURASSIC	Orallo Fm									
	Gubberamunda Ss									
	Westbourne Fm									
	Springbok Ss									
	Walloon Coal Msrs									
	Eurombah Fm									
	Hutton Ss									
	Evergreen Fm									
	Precipice Ss	GAS	GAS	GAS	GAS					
TRIASSIC	Moolayember Fm	GAS				GAS	OIL+GAS	OIL		
	Showgrounds Ss	GAS	GAS						GAS	OIL+GAS
	Rewan Fm			GAS						
PERMIAN	Blackwater Group				OIL+GAS					
	Back Creek Group									
DEVONIAN	Timbury Hills Fm									

Producing field
Other discovery
Past Producer

PETROLEUM ACCUMULATIONS, SURAT AND SOUTHERN BOWEN BASINS

AGE	STRATIGRAPHIC UNIT	Crossmaglen, Bendee, Boggo Ck, Cockatoo, Eluanbrook, Fairymount, Griman Ck, Harbour, Louise, McGregor, McWhirter, Narrows, Thomby Ck, Washpool, Yellowbank Ck, Yellowbank Ck Nth	Parknook, Rednook,	Glen Fosslyn	Warroon, Snake Ck	Waggamba	Boxleigh	Combarngo	Blackbutt, East Glen	Taylor	Back Creek, Bloodwood, Lark, Latemore, Mentor, Myall Ck, Tinker
JURASSIC	Orallo Fm										
	Gubberamunda Ss										
	Westbourne Fm										
	Springbok Ss										
	Walloon Coal Msrs										
	Eurombah Fm										
	Hutton Ss										
	Evergreen Fm										
	Precipice Ss										
TRIASSIC	Moolayember Fm										
	Showgrounds Ss	OIL	GAS	GAS	OIL + GAS	GAS	GAS	OIL+GAS	GAS	GAS	
	Rewan Fm		GAS	OIL	GAS						GAS
PERMIAN	Blackwater Group					GAS	OIL	GAS			
	Back Creek Group										
DEVONIAN	Timbury Hills Fm								GAS	OIL+GAS	

Producing field
Other discovery
Past Producer

PETROLEUM ACCUMULATIONS, SOUTHERN BOWEN BASIN

AGE	STRATIGRAPHIC UNIT	Kinkabilla	Sunnybank	Namarah	Burunga, Kungarri, Newington, Nth Sirrah, Yambugle, Yuranigh	Bellbird	Bainbilla, Bengalla, Beranga Sth, Bottletree, Glenloth, Latemore Sth, Norwood, Wallumbilla Sth, Walpanara, Walpanara East, Yarrawonga	Noorindoo	Bobadilla	Dirinda
JURASSIC	Orallo Fm									
	Gubberamunda Ss									
	Westbourne Fm									
	Springbok Ss									
	Walloon Coal Msrs									
	Eurombah Fm									
	Hutton Ss									
	Evergreen Fm									
	Precipice Ss									
TRIASSIC	Moolayember Fm									
	Showgrounds Ss									
	Rewan Fm	OIL+GAS	OIL+GAS	GAS						
PERMIAN	Blackwater Group		GAS		GAS	OIL+GAS				
	Back Creek Group						GAS	OIL + GAS		
DEVONIAN	Timbury Hills Fm			GAS					GAS	OIL+GAS

Producing field

Other discovery

Past Producer

PETROLEUM ACCUMULATIONS, SOUTHERN BOWEN BASIN

AGE	STRATIGRAPHIC UNIT	Yellowbank	Warrinilla	Lowesby	Turkey Ck	Springton	Arcturus
TRIASSIC	Moolayember Fm						
	Clematis Ss						
	Rewan Fm	GAS					
PERMIAN	Bandanna Fm		GAS				
	Black Alley Shale						
	Peawaddy Fm		GAS	GAS	GAS	GAS	GAS
	Catherine Ss				GAS	GAS	GAS
	Ingelara Fm						
	Freitag Fm		GAS			GAS	
	Aldebaran Ss	GAS				GAS	GAS
	Cattle Creek Fm		GAS				
	Reids Dome Beds	GAS					
DEVONIAN	Timbury Hills Fm						

Producing field

Other discovery

PETROLEUM ACCUMULATIONS, BOWEN BASIN, DENISON TROUGH

AGE	STRATIGRAPHIC UNIT	Rolleston	Punchbowl Gully	Moorooloo	Warrinilla Nth	Glentulloch, Chesney, Hutton Ck, Inderi, Myrtleville	Merivale, Springvale, Westgrove	Aldinga Nth, Arcadia, Reids Dome
TRIASSIC	Moolayember Fm							
	Clematis Ss							
	Rewan Fm							
PERMIAN	Bandanna Fm							
	Black Alley Shale							
	Peawaddy Fm	GAS	GAS					
	Catherine Ss			GAS				
	Ingelara Fm				GAS			
	Freitag Fm	GAS			GAS			
	Aldebaran Ss	GAS	GAS		GAS	GAS	GAS	
	Cattle Creek Fm							GAS
	Reids Dome Beds						GAS	
DEVONIAN	Timbury Hills Fm							

Producing field
Other discovery

PETROLEUM ACCUMULATIONS, BOWEN BASIN, DENISON TROUGH



Location map, Clarence-Moreton Basin

11. CLARENCE-MORETON BASIN

11.1 Basin Evolution and Stratigraphy

The Clarence-Morton Basin underlies an area of approximately 26 800 square kilometres and straddles the New South Wales/Queensland border between latitudes 26° 30' and 30° 00' south. Approximately 16 000 square kilometres of the Clarence-Morton Basin lies within New South Wales.

The Clarence-Morton Basin is a Mesozoic, intracratonic basin which developed as an arm of the Great Artesian Basin. To the west, sediments of the Clarence-Morton sequence interfinger with those of the Surat Basin over an area of basement high termed the Kumberilla Ridge (Figure 40). The remainder of the basin is bounded by granitic and metamorphic high blocks of Ordovician to Permian age (New England Fold Belt to the southwest, Coffs Harbour Block to the south, South Coastal High to the east and Yarraman/D'Aguilar Fault Blocks to the north). The primary synclinal axis of the basin (Logan Sub-basin) is oriented north-south around longitude 153° east. It is separated from the Laidley Sub-basin to the west by a north-south trending basement ridge, the Richmond Horst.

Palaeozoic basement rocks have been interpreted as pre-Permian accretionary wedge deposits associated with a westerly dipping subduction zone. Subduction ceased at the end of the Carboniferous. The Clarence-Morton Basin was initiated during the period of deformation and oblique extension with associated strike slip faulting which followed. These predominantly north-south oriented strike slip faults controlled sedimentation during the Middle Triassic when the main synclinal axis of the basin developed (Logan Sub-basin). The lacustrine and paludal sediments of the Nymboida Coal Measures were deposited on Palaeozoic basement at this time.

Fluvio-lacustrine to paludal and estuarine conditions, punctuated by influxes of volcanic detritus (Copes Creek Tuff and Chillingham Volcanics), continued into the Late Triassic with the deposition of the Ipswich Coal Measures, although a major angular unconformity separates this unit from the underlying Nymboida Coal sequences. A period of uplift, deformation and erosion took place in the Late Triassic after the deposition of the Ipswich Coal Measures. Tectonism ceased in the Carnian and was replaced by a period of thermal relaxation and gentle subsidence as the continental sediments of the Bundamba Group were deposited in the Clarence-Morton Basin.

Deposition of the Bundamba Group continued uninterrupted from the Late Triassic to the Early Jurassic. This unit is comprised of a thick (1000 to 1200 metres) sequence of fluvio-lacustrine conglomerates, sandstones, mudstones and siltstones with minor coal. Source, seal and reservoir rocks are all found within the Bundamba Group. The most prospective unit in the Bundamba Group is the Koukandowie Formation, which is found at the top of the group.

Fluvio-lacustrine to paludal conditions persisted into the Middle Jurassic with the deposition of the Walloon Coal Measures. Deposition of this unit was widespread and

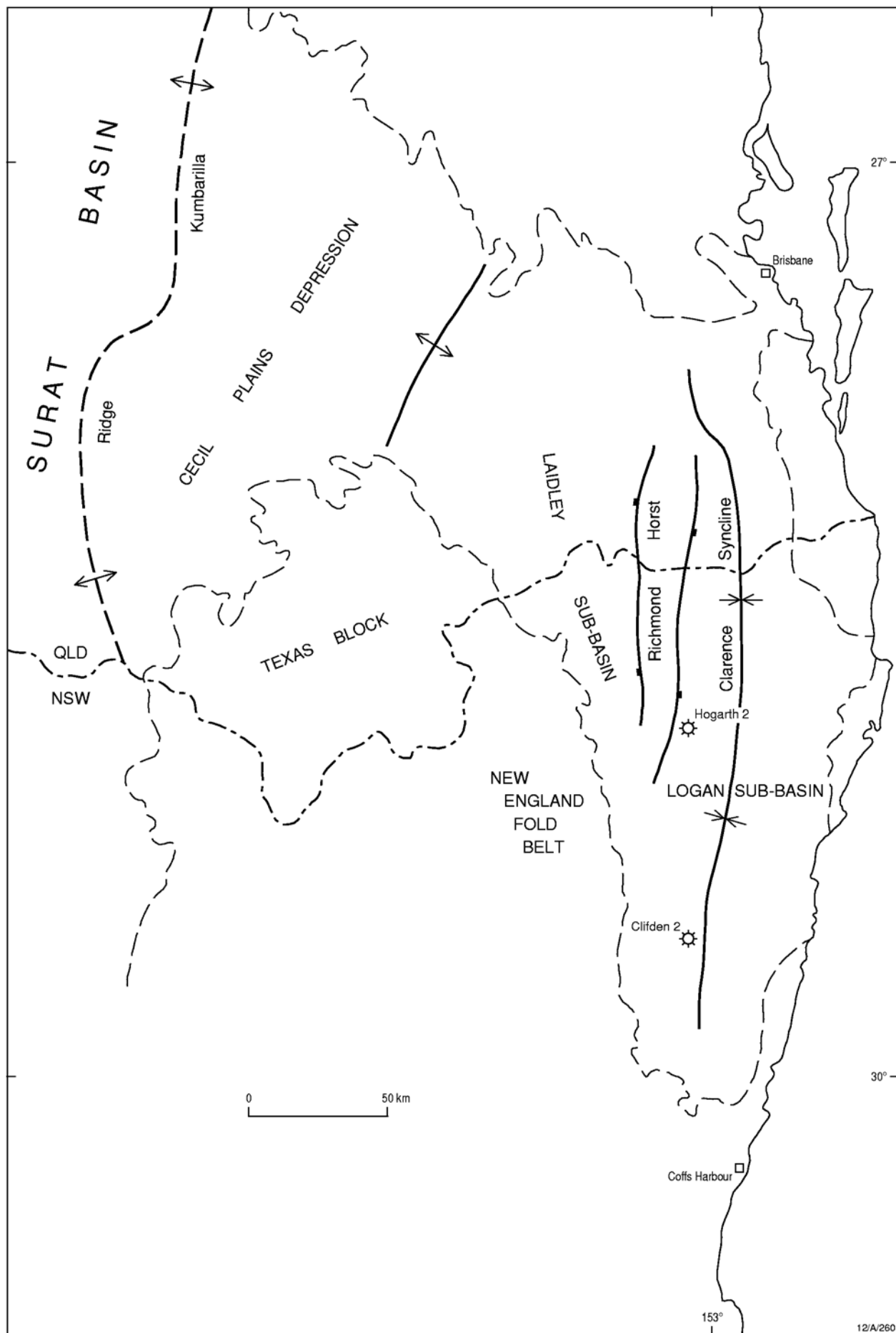


Figure 40. Tectonic elements and petroleum discoveries, Clarence-Morton Basin.

Age	Stratigraphic unit			Environment	Petroleum potential	Discoveries
Cretaceous Late Jurassic	Grafton Formation			Fluvio-lacustrine		 Hogarth 2 Clifden 2
	Kangaroo Creek Formation			Fluvio-lacustrine		
Middle Jurassic	Maclean Sandstone Member			Fluvio-lacustrine to paludal	Seal/Source Rock/Reservoir	
	Walloon Coal Measures					
Early Jurassic	Bundamba Group	Marburg sub-group	Koukandowie Formation	Shallow Marine ?	Seal/Source Rock	
			Heifer Creek Sandstone Member	Fluvio-lacustrine, minor paludal	Reservoir	
			Ma Ma Creek Member		Seal	
			Gatton Sandstone		Reservoir	
			Koreelah Cgl Mbr		Seal	
			Calamia Mbr			
Late Triassic			Ripley Road Sandstone	Fluvio-deltaic to lacustrine	Reservoir	
			Raceview Formation		Source Rock	
			Laytons Range Conglomerate			
Early Late Triassic	Ipswich Coal Measures			Fluvio-lacustrine to paludal and estuarine	Source/Rock Seal/Reservoir	
	Chillingham Volcanics					
Middle Triassic	Nymboida Coal Measures		Basin Ck Member	Lacustrine and paludal		
			Copes Ck Tuff			
			Bardool Conglomerate			
			Cloughers Ck			
Palaeozoic	Coff's Harbour Beds/ Neranleigh - Fernvale Beds				Basement	

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modified after Wells and O'Brien (1994)

Figure 41. Generalised stratigraphy, Clarence-Moreton Basin

it achieves its maximum thickness of up to 600 metres in the northern Clarence Syncline. Comprising claystone, coal and fine to medium grained grey lithic sandstone, the Walloon Coal Measures become sandier in the south of the basin. In some areas the Maclean Sandstone (a massive feldspathic sandstone), occurs at the top of the unit.

In the Late Jurassic to Early Cretaceous, the Kangaroo Creek Sandstone was deposited unconformably over the Walloon Coal Measures. Comprising medium to coarse grained quartzose sandstone, these fluvio-lacustrine sands exhibit good reservoir character. However, the Kangaroo Creek Sandstone is not considered a viable exploration objective due to the lack of a competent top seal. The Early Cretaceous Grafton Formation, a fluvio-lacustrine unit comprising clayey siltstone and friable sandstone, conformably overlies the Kangaroo Creek Sandstone.

A final episode of folding and faulting in the Late Cretaceous to Early Tertiary produced a number of structural closures in the basin, including the Clifden Dome and the Hogarth structure. During this period of uplift and erosion, basin modelling by Russell (1994) indicates that in the west of the basin, up to 700 metres of section may have been removed while to the east, over 3000 metres of Late Jurassic and Early Cretaceous sediments have been eroded. This period of compressive tectonism is characterised by high angle reverse faulting, the formation of four-way-dip closures and by the emplacement of both intrusive and extrusive igneous bodies throughout the basin in the Late Oligocene to Early Miocene. The Mt Warning central complex, the Main Range and Lamington Volcanics and the basaltic sills commonly intersected throughout the basin formed at this time.

11.2 Exploration History and Petroleum Discoveries.

The first indications of hydrocarbons in the Clarence-Morton Basin occurred in 1897 when a gas flow was recorded from a coal bore drilled near the town of Grafton. Further gas shows were encountered in the Grafton-1 water bore drilled in 1902 and in a scouting hole, Rosewood-1, drilled in 1907.

In the 1920's and 1930's, a handful of stratigraphic holes were drilled in the basin without encountering significant signs of hydrocarbons. A concerted petroleum exploration effort in the Clarence-Morton Basin did not commence until the 1950's when a number of exploration wells were drilled to test surface anticlines. Between 1958 and 1969 Clarence River Basin Oil Exploration Company NL drilled six wells on the most significant of these structures, the Clifden Dome. Located in the south of the basin, on the western flank of the Clarence Syncline, the Clifden-2 well flowed gas at 2830 m³/day after blowing out at a depth of 592 metres.

At Clifden, gas is reservoired in the Heifer Creek Sandstone Member of the Koukandowie Formation. The reservoir is a fluvial sandstone characterised by channel fill and point bar sequences (Ingram & Robinson, 1995). Porosity in this unit generally good (7.8% to 20.5%) but permeabilities are poor (0.1 - 70 millidarcies). The Clifden gas accumulation is not thought to be commercial.

Further exploration drilling on mapped surface anticlines was undertaken during the 1960's and early 1970's (seismic coverage in the basin was sparse and of poor quality at this time). Hogarth-2, drilled in 1970, approximately 80 kilometres north of the Clifden discovery to test a four-way-dip closure on the western flank of the Clarence-Logan Sub-basin, flowed gas on test at 14 000 m³/day from the Heifer creek Sandstone Member of the Koukandowie Formation. As with the Clifden discovery to the south, the Heifer Creek Sandstone reservoir at Hogarth shows good porosity but poor permeability and the accumulation is thought to be non-commercial. The only well drilled during this period that was sited using seismic data was Kyogle-1. Drilled to test the Kyogle Anticline in the northern Logan Sub-basin, the well encountered oil shows in the Marburg Subgroup and gas shows in the Walloon Coal Measures.

A fresh stimulus to exploration in the Clarence-Morton Basin was provided in the early 1980's by the release of three petroleum exploration permits covering the basin by the New South Wales government. A number of multifold seismic surveys were acquired at this time and all showed a significant improvement in data quality over the earlier analogue data shot in the basin. Several exploration wells were also drilled but all were plugged and abandoned as dry holes.

Currently, seismic coverage of the Clarence-Morton Basin is sparse. Data quality of the early seismic surveys acquired in the basin is poor, while the data quality of the most recent seismic surveys conducted in the far north and south of the basin is good to excellent. To date, only regional gravity and aeromagnetic data covers the basin.

11.3 Petroleum Potential.

11.3.1 Reservoirs and Seals.

Although the reservoir character of the late Jurassic to Cretaceous Grafton Formation and Kangaroo Creek Sandstone is good, the absence of a regionally extensive, competent top seal for these units has downgraded their potential as petroleum reservoirs and they are not generally considered to be viable exploration targets. The underlying Walloon Coal Measures, however, comprise an interbedded sequence of moderately good reservoir sands, seals and source rocks. Reservoir quality is extremely variable and although no petroleum accumulations have been identified in the Walloon Coal Measures to date, oil and gas shows have been noted in several wells while drilling this section.

Traditionally, the Heifer Creek Sandstone Member of the Koukandowie Formation has been considered the primary exploration target in the Clarence-Morton Basin. This sandstone is a proven hydrocarbon reservoir (non-commercial gas flows have been recorded from the Heifer Creek Sandstone at Hogarth and Clifden) and has been recognised as having the best reservoir character of any unit in the basin. The Heifer Creek Sandstone Member represents a sequence of channel fill and point bar sands which become increasingly cleaner and more quartzose towards the top of the member (Ingram & Robinson, 1995). The upper 111 metres of the unit was cored in the Hogarth-4 well. Here, porosities ranged from 7.8% to 20.5% and permeabilities from 0.13 to 69 millidarcies.

However, reservoir quality is highly variable reflecting the rapid lateral facies changes that occur in this unit. The Shannon-1 well, drilled within a few hundred meters of the Hogarth-2 gas discovery, encountered a tight, non-productive Heifer Creek Sandstone reservoir - apparently the unit had shaled out at this location, indicating many Heifer Creek Sandstone traps may have a stratigraphic component. Seal for Heifer Creek Sandstone accumulations is likely to be provided by intraformational siltstones and claystones which become more common towards the top of the Koukandowie Formation.

The Gatton Sandstone, a thick, Early Jurassic, fluvio-lacustrine unit within the Bundamba Group may show some reservoir potential, but subsurface data is sparse. An early Bureau of Mineral Resources (BMR) borehole, BMR Warwick-7, drilled on the western margin of the basin showed good porosity (up to 25.9%) and permeability (up to 961 millidarcies) in this unit. Towards the basin's depocentres, however, diagenetic silica and carbonate and authigenic clays are thought to severely degrade reservoir quality in the Gatton Sandstone. Top seal for Gatton Sandstone reservoirs may be provided by the lithic sandstones, claystones and siltstones of the overlying Ma Ma Creek Member.

Further reservoir potential is thought to exist in the Late Triassic, fluvio-lacustrine to deltaic, Ripley Road Sandstone. As with the Gatton Sandstone, subsurface data on this unit is sparse. Log derived porosities are in the order of 15% to 25% but permeabilities are low due to the presence of siliceous and calcareous cements and swelling clays. Hydrocarbons have yet to be recovered from the Ripley Road Sandstone but oil and gas shows were noted within this unit in the Sextonville-1 well. Where present, the siltstones, claystones and lithic sandstones of the Early Jurassic Calamia Member may provide a competent top seal for Ripley Road Sandstone reservoirs.

Although the Middle to Late Triassic Ipswich and Nymboida Coal Measures comprise an interbedded sequence of sandstone, siltstone, claystone, coal and conglomerate, the units are thought to have only limited reservoir potential due to poor overall primary porosity and permeability. Source rocks present within the Ipswich and Nymboida Coal Measures are gas prone and presently mature to overmature for hydrocarbon generation. Consequently, these units may have limited potential as gas reservoirs, particularly in the vicinity of major fault zones where fracturing may have enhanced primary porosity.

11.3.2 Source Rocks and Maturation.

O'Brien and others (1994) submitted 82 borehole and some outcrop samples from the Clarence-Morton Basin for total organic carbon content (TOC) analysis and Rock Eval pyrolysis. They established that the most prospective source rock sequences in the basin lie within the Walloon Coal Measures and the Koukandowie Formation. TOC values in excess of 5% are common in the Walloon Coal Measures and most samples from this unit are hydrogen rich, reflecting the abundance of liptinite in the organic matter (O'Brien and others, 1994). Rock Eval pyrolysis analyses show that the Walloon Coal Measures contain predominantly Type II and Type III organic matter indicating that this unit is capable of generating both oil and gas. Similarly, the

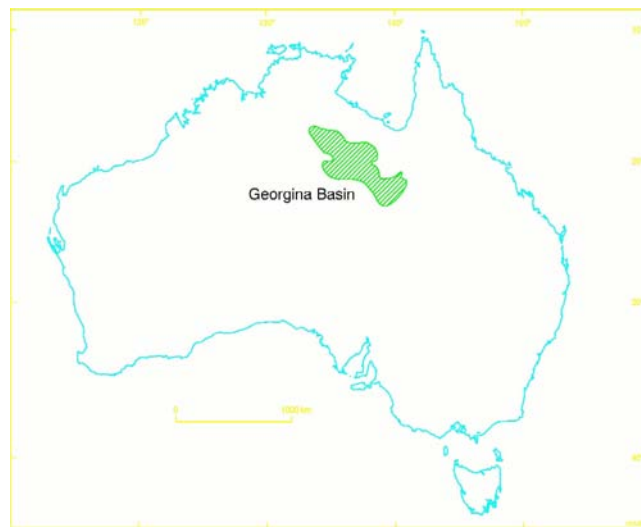
Koukandowie Formation (although showing slightly lower TOC values than the Walloon Coal Measures, on average), is a potential oil and gas source.

Source rock data from the Triassic, Ipswich and Nymboida Coal Measures are sparse. The limited data available suggests that the coals and organic rich shales within these units are generally overmature and contain predominantly humic (gas prone) organic matter. Consequently it is unlikely that the Middle Triassic coal sequences of the Clarence-Morton Basin have sourced significant quantities of oil.

Both vitrinite reflectance data and Tmax values obtained from Rock Eval pyrolysis shows that present day thermal maturity in the Clarence-Morton Basin increases in a systematic fashion across the basin from west to east. Both the Walloon Coal Measures and the Koukandowie Formation are immature to marginally mature ($<0.75\%$ Ro), in the Cecil Plains Depression and Laidley Sub-basin, are mature (between 0.75% Ro and 1.0% Ro) on the western flank of the Logan Sub-basin and overmature ($>1.0\%$ Ro) in the eastern Logan Sub-basin. Maximum thermal maturities are attained in the far southeast of the Clarence-Morton Basin.

Similar maturation trends are observable in Triassic source rocks. The Ipswich and Nymboida Coal Measures are immature to marginally mature in the Cecil Plains Depression, mature in the Laidley Sub-basin and overmature in the Logan Sub-basin. The increased thermal maturation of sediments in the east of the basin reflects both the greater burial depths and elevated palaeogeothermal gradients prevalent in this area.

Maturation modelling by O'Brien and others (1994) indicates that prospective Jurassic source rocks began generating oil at approximately 100 Ma in the middle of the Cretaceous. The timing of this phase of petroleum generation is well suited with respect to the major trap-forming, tectonic events which occurred in the Late Cretaceous to Early Tertiary.



Location map, Georgina Basin

12. GEORGINA BASIN

12.1 Basin Evolution and Stratigraphy.

The Georgina basin covers approximately 325 000 square kilometers of the Northern Territory and Queensland between latitudes 18° and 25° south (Figure 42). In the south of the basin, a thick (up to 1000 metres and 5000 metres in the Dulcie and Toko Synclines respectively) sequence of marine and continental, Palaeozoic clastics were deposited (Harrison, 1978). In the northern half of the basin, sedimentary cover is limited to a Palaeozoic sequence less than 500 metres thick. The sparse data available suggests that this area is also characterised by a lack of structure. Consequently, the Georgina Basin north of 22° south is probably non-prospective for petroleum.

Sedimentation in the Georgina Basin commenced in the Early Cambrian with the deposition of the glaciogene and marine sediments of the former Field River Beds over Proterozoic, igneous and metamorphic basement. Shallow marine conditions prevailed over most of the basin through the remainder of the Cambrian and into the Middle Ordovician, with breaks in sedimentation occurring in the Upper Cambrian and Early Ordovician. During this time, several transgressive and regressive sequences of extensively dolomitised limestone, shale, siltstone and sandstone was deposited in the Toko and Dulcie Synclines. These sequences contains prospective source rock intervals in the Marqua Beds and Georgina Limestone (Cambrian) and in the Ninmaroo Formation (Early Ordovician)(Figure 43).

Potential petroleum reservoirs have also been identified in the Upper Cambrian to Early Ordovician section. The Georgina Limestone has been extensively dolomitised and in places exhibits excellent vugular porosity. A drill stem test taken in a dolostone within the Georgina Limestone, in the Netting Fence-1 well, indicated excellent permeabilities, (although no hydrocarbons were recovered). Flushing of Georgina Limestone reservoirs with meteoric waters may be a problem in shallower areas of the basin, but is probably less of a concern at depth in the basin depocentres (Toko and Dulcie Synclines). Electric logs run in the Netting Fence-1 and Ethabuka-1 wells indicated good vugular and intergranular porosity were also present in the Early Ordovician Ninmaroo and Kelly Creek Formations, while in Ethabuka-1, drilled on the western flank of the Toko Syncline, gas flowed from sandstone stringers at the base of the Coolibah Formation.

Marine sedimentation continued throughout the Middle Ordovician with sandstone and siltstone replacing carbonates as the dominant lithology. Reservoir potential exists in the Carlo Sandstone (sealed by fine grained sediments in the overlying Mithaka Formation) and to lesser extent in the Ethabuka Beds. Where Mithaka Formation sediments are absent, top seal for Carlo Sandstone reservoirs may be provided by tight siltstones at the base of the Ethabuka Beds. Fine grained clastics deposited in lagoonal or tidal shelf depositional environments within the Mithaka Formation are thought to have fair to good source potential.

Towards the end of the Middle Ordovician, marine sedimentation in the Georgina Basin was terminated by widespread uplift and erosion. To the west of the basin, the

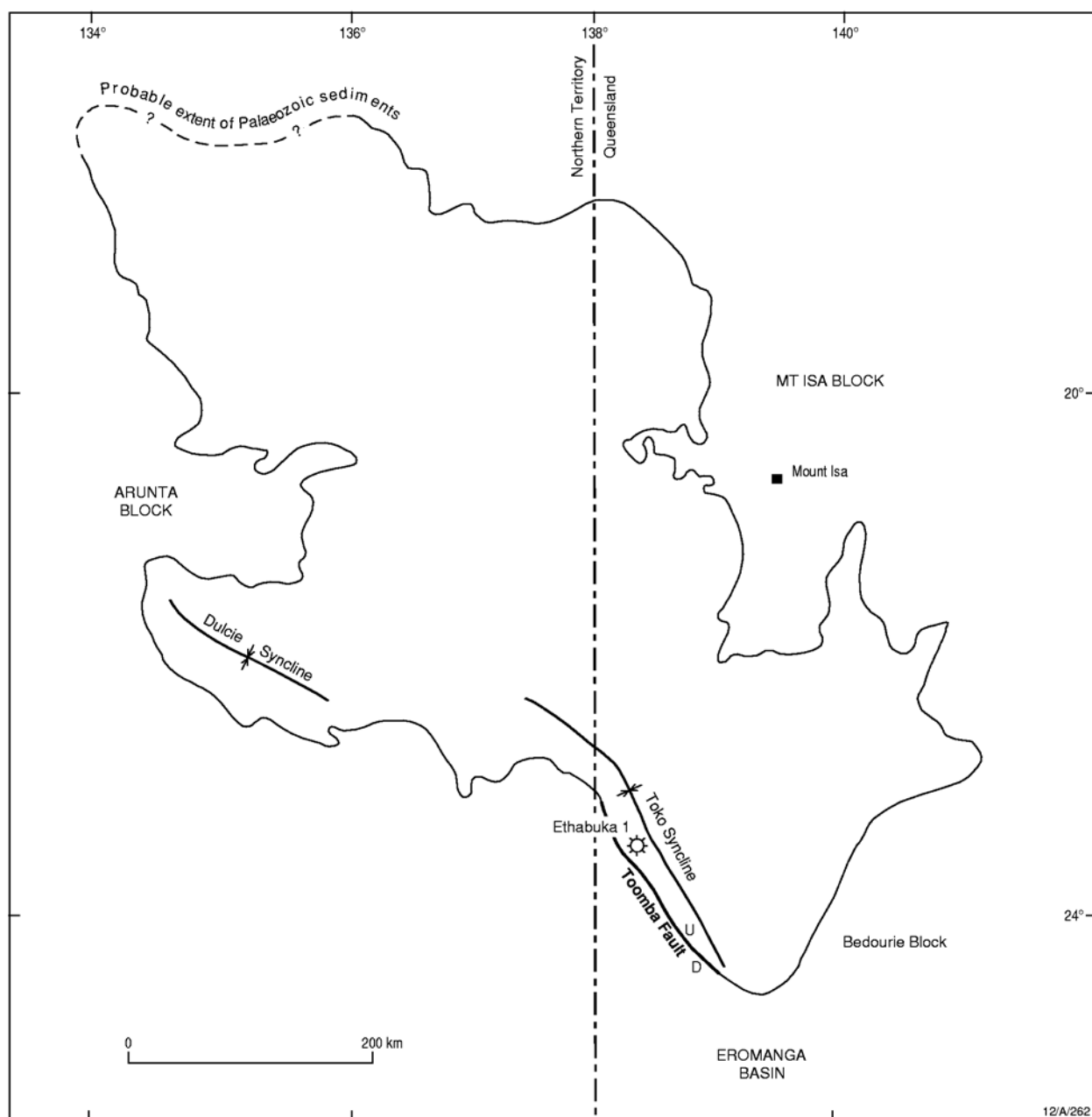


Figure 42. Tectonic elements, Georgina Basin

Arunta Block was uplifted and on the southwest basin margin, movement occurred on the northwest trending, en echelon, basin-bounding faults (Toomba Fault, figure 42).

Non-marine sedimentation resumed in the Devonian when alluvial fans, cross-bedded fluvial sandstones and conglomerates were deposited on the Ordovician erosional surface (Cravens Peak Beds and Dulcie Sandstone). Although the Devonian fluvial deposits have some reservoir potential, the absence of a competent regional seal to the Cravens Peak Beds and the Dulcie Sandstone imparts a significant risk to any exploration targets at this level. Over most of the basin, the shallow marine clastics of the Cretaceous, Hooray Sandstone rest unconformably on Devonian sediments and provide a thin veneer of Mesozoic cover to the underlying Palaeozoic section.

12.2 Exploration History, Petroleum Discoveries and Petroleum Potential

Exploration in the Georgina Basin began in the 1950's after a waterbore drilled near Ammaroo homestead in the Northern Territory gave indications of gas. Initial exploration was undertaken by the Bureau of Mineral Resources (BMR), Geology and Geophysics. During the late 1950's and 1960's the BMR drilled fourteen stratigraphic wells, mapped the basin at a scale of 1:250 000, conducted an aeromagnetic survey and acquired a limited amount of reconnaissance seismic data. Since that time, further reconnaissance seismic data has been acquired by BMR, Phillips-Sunray, Alliance Oil Development Australia N.L. (AOD) and the French Petroleum Company (FPC).

A seismic survey conducted by AOD in 1970, north of latitude 24° south, defined a large (130 square kilometres), anticlinal closure on the southwestern flank of the Toko Syncline, northeast of the Toomba Fault (Ethabuka/Mirrica structure). Ethabuka-1, drilled in 1973 to test this structure, flowed gas at a rate of approximately 5600 m³/day from what were interpreted to be a number of sandstone stringers towards the base of the Early Ordovician, Coolibah Formation. Mechanical difficulties encountered during the drilling of Ethabuka-1 prevented the well from reaching its prognosed total depth and the well was plugged and abandoned at 1960 metres in the Kelly Creek Formation. Consequently, potential targets in the Ninmaroo Formation and Georgina Limestone remain untested in the Ethabuka/Mirrica structure.

To date, a total of 22 exploration wells have been drilled in the Georgina Basin (most on surface anticlines or four-way-dip closures identified on seismic), of which only one (Ethabuka-1) has recovered hydrocarbons. A number of wells, however, did contain encouraging hydrocarbon shows. These include Netting Fence-1 (bitumen shows throughout the Ordovician and Cambrian section), Huckitta-1 (fluorescence in Cambrian limestones), Lucy Creek-1 (minor gas shows in the Marqua Beds) and Lake Nash-1 (bitumen shows in a Cambrian limestone).

After the initial phase of exploration in the 1950's and 1960's, when it was realised that the northern Georgina Basin is characterised by a thin Palaeozoic and Proterozoic section and a lack of structure, exploration focussed on the Toko and Dulcie Synclines. The main basin-bounding fault on the southwestern margin of the Toko Syncline (Toomba Fault) has been interpreted as a high-angle reverse fault (Harrison, 1978). Draper (1976) indicated that major uplift associated with the Toomba Fault

Age	Stratigraphic unit	Environment	Petroleum potential	Discoveries
Early Cretaceous	Hooray Sandstone	Marine		
Devonian	Dulcie Sst	Fluvial	Reservoir	
Ordovician	Middle	Ethabuka Beds	Shallow marine	
		Mithaka Formation	Lagoonal or tidal flat	
		Carlo Sandstone	Marine	
	Early	Nora Formation		
		Coolibah Formation		
		Kelly Creek Formation		
		Tomahawk Beds		
Cambrian	Upper	Ninmaroo Formation		
		Arrinthrunga Formation		
	Middle	Georgina Limestone		
		Steamboat Sandstone		
		Marqua Beds		
		Thorntonia Limestone		
	Early	Former Field River Beds		
Proterozoic	Granite	Igneous	Basement	

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Figure 43. Generalised stratigraphy, Georgina Basin, Toko Syncline and environs

probably occurred around the Middle Devonian. Consequently, the anticlinal closures associated with the upthrown side of the Toomba Fault in the Toko Syncline, (which have comprised the primary exploration targets in the Georgina Basin to date), probably formed no later than Carboniferous times.

Source rock data is sparse in the Georgina Basin. Limited TOC measurements suggest that the Marqua Beds and Ninmaroo Formation may have some source potential (Metter, 1977 and Wiltshire, 1978). Bioherms within the Georgina and Thornton Limestones and fine grained argillaceous facies within the Nora and Mithaka Formations may also have generated hydrocarbons. With the absence of vitrinite reflectance and thermal alteration index data, the thermal maturity of these source rocks is uncertain. Conodont alteration studies and oil extract analyses suggest that source rocks within the Toko Syncline are either overmature and generating dry gas or in the late stages of oil generation (Harrison, 1978).

With a thick Palaeozoic section containing proven source, reservoir and cap rocks, future exploration in the basin is likely to focus on the Toko Syncline. As many of the more robust anticlinal closures associated with the reverse faulting on the southwest margin of the Toko Syncline have been tested, future drilling may have to target stratigraphic traps on the flanks of the syncline where Cambrian and Ordovician sediments thin and pinch out.



13. GUNNEDAH BASIN

13.1 Basin Evolution and Stratigraphy

The Gunnedah Basin covers an area of approximately 15 000 square kilometres between latitudes 29°30' and 32°00' south in northern New South Wales. Sedimentation in the Gunnedah Basin was continuous with the Sydney Basin to the south and the Bowen Basin to the north. The basin contains a moderately thick Permo-Triassic section (up to around 1000 metres), which thins to the west and is unconformably overlain by the Jurassic to Cretaceous Surat Basin sequence.

The basin is bounded to the east by the New England Fold Belt and Hunter-Mooki Thrust Fault System and to the west by the Lachlan Fold Belt. The northern and southern boundaries of the Gunnedah Basin are less well defined. The northern boundary to the basin has been arbitrarily placed at around latitude 29°50' south, which is thought to correspond to a shallow basement ridge over which the Permo-Triassic section has been partly eroded. The southern boundary to the basin has traditionally been taken as the Mt Coricudgy Anticline, a northeast-southwest orientated anticline located around 32°30' south. However, the Mt Coricudgy Anticline appears to have had minimal impact on depositional patterns in the Gunnedah and Sydney Basins and sedimentation is continuous between the two depocentres.

One of the most significant structural features in the Gunnedah Basin is the north-south trending Boggabri Anticline/Ridge (Figure 44). A positive structural feature in the basin during the Early to Middle Permian, the Boggabri Ridge gave rise to two major depocentres within the Gunnedah Basin at this time. To the east of the ridge, adjacent to the Hunter-Mooki Thrust Fault, up to 1000 metres of Early Permian sediments were deposited in the Maules Creek Sub-basin (Hamilton and others, 1988). To the west, in the West Gunnedah Sub-basin, the Early Permian section is considerably thinner and onlaps the western flank of the Boggabri Ridge.

Sedimentation in the Gunnedah Basin commenced in the Early Permian when the Leard Formation, a fluvial, peletoidal claystone was deposited in palaeo-topographic lows on the eroded, igneous and metamorphic rocks of the New England and Lachlan Fold Belts. The top of the Leard Formation grades upwards into a lacustrine facies, termed the Goonbri Formation, which comprises interbedded siltstone, claystone sandstone and minor coal. A lake margin facies identified within the Goonbri Formation is arenaceous but a more distal lacustrine facies contains organic rich siltstones which are thought to be good quality source rocks (Etheridge, 1987).

Alluvial conditions continued into the middle of the Early Permian with the deposition of the Maules Creek Formation. This unit comprises predominantly conglomerate with subordinate interbeds of sandstone, siltstone, claystone and coal. Sediments of the Maules Creek Formation were probably derived from the Boggabri Ridge and other areas of elevated basement. The thickest Maules Creek sequence is found east of the Boggabri Ridge, adjacent to the Hunter-Mooki Thrust Fault System.

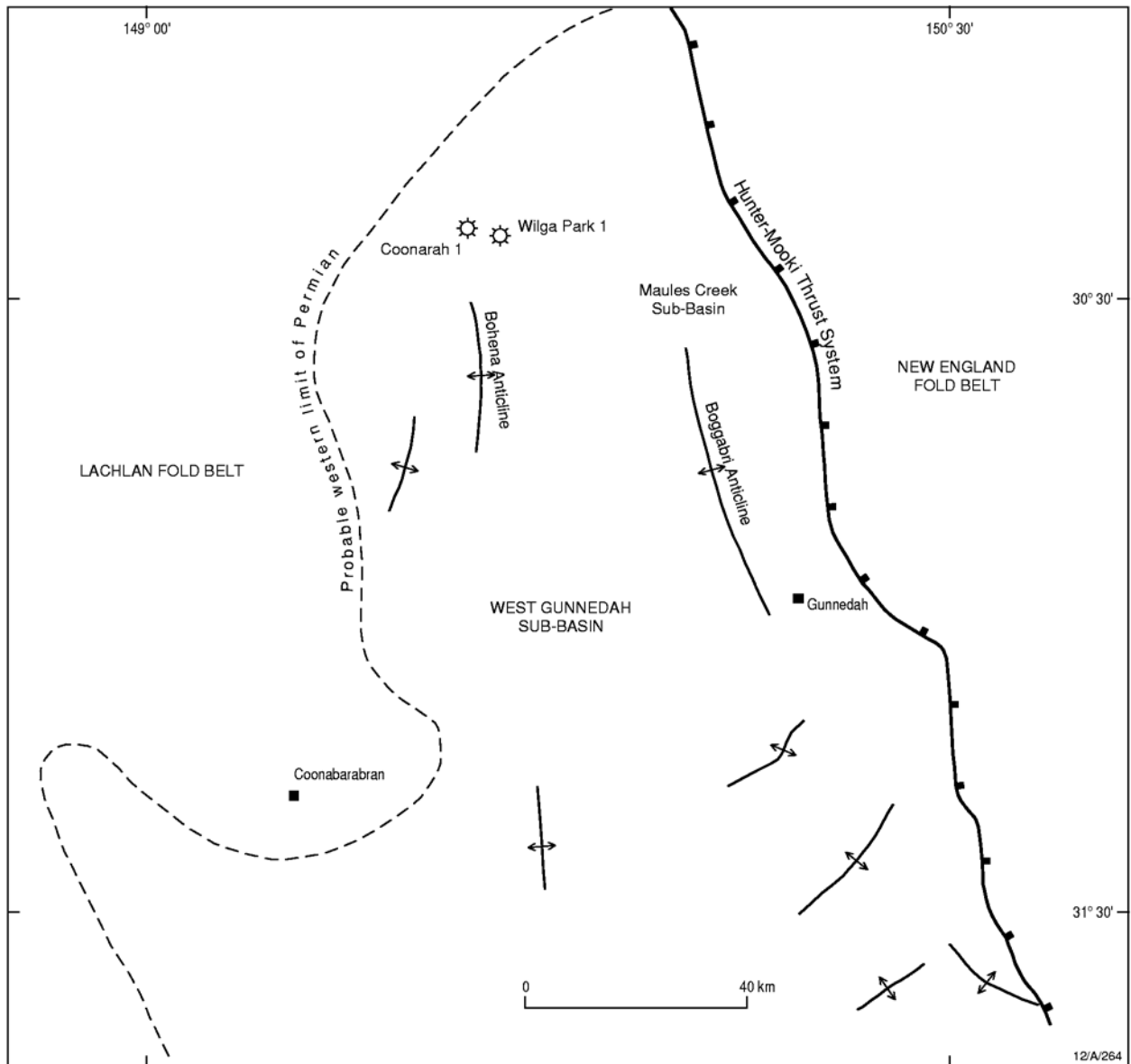


Figure 44. Tectonic elements, Gunnedah Basin

Towards the end of Maules Creek Formation times, a relative rise in sea level caused widespread inundation and marine shelf conditions subsequently prevailed over most of the Gunnedah Basin. The Porcupine and lower Watermark Formations were deposited at this time. These units are comprised principally of lithic sandstones and minor conglomerates and siltstones. Although the Porcupine and lower Watermark Formations have traditionally not been regarded as primary exploration targets due to poor reservoir character, gas flowed from the Porcupine Formation in the Wilga Park-1 well.

Shallow marine conditions in the Gunnedah Basin persisted throughout the remainder of the Early Permian, although as the Early Permian seas retreated, the marine shelf facies of the lower Watermark Formation was succeeded by a prodelta and deltafront facies in upper Watermark Formation times. This delta system transgressed the Gunnedah Basin in a southwesterly direction towards the end of the Early Permian (Hamilton and others, 1988). The delta-front facies identified within the upper Watermark Formation is characterised by an upward coarsening sequence of siltstones and sandstones which may have potential as petroleum reservoirs. Regression continued into the beginning of the Late Permian when the lithic sandstones, siltstones, claystones and coals of the Black Jack Group (lower delta-plain facies) were deposited. The fine grained argillaceous sediments at the base of the Black Jack Group may be potential source rocks and provide a competent top seal to the pro-delta and delta-front reservoir sandstones in the underlying upper Watermark Formation.

A brief but widespread transgression saw shallow marine conditions return to Gunnedah Basin at the beginning of the Late Permian. The Arkarula Sandstone was deposited at this time. A subsequent lowering of relative sea level saw marine conditions restricted to the basin depocentre while to the west, fluvial systems deposited quartzose sandstones derived from the Lachlan Fold Belt along the western margins of the basin. Referred to as the Brigalow Formation (previously, the unit was informally named the 'Western Sands Member' of the Black Jack Formation), both this unit and the Arkarula Sandstone show excellent reservoir potential.

With the change to non-marine conditions, brackish, coal-swamp environments also developed over large areas of the Gunnedah Basin and gave rise to the deposits of the Hoskissons Coal sequence. These peat swamp sediments were eventually submerged as the environment changed from coal-swamp to predominantly lacustrine. A further influx of fluvial material derived from the Lachlan Fold Belt to the northwest then transgressed the basin. Medium to coarse grained, quartzose sandstones with excellent reservoir potential (Clare Sandstone) were deposited at this time.

Fluvial sedimentation continued for the remainder of the Late Permian as the fine grained clastics and coals of the upper Black Jack Group were deposited. Sedimentation was terminated at the end of the Permian when compressional tectonics initiated a period of folding and erosion which resulted in the removal of the upper part of the Black Jack Group in the northern Gunnedah Basin. Erosion was most pronounced on the northeastern basin margin where the Permian section has been almost entirely removed (Hamilton and others, 1988). This compressional regime also

Age		Stratigraphic unit	Environment	Petroleum potential	Discoveries		
Jurassic		SURAT BASIN SEQUENCE					
Triassic	Middle	Napperby Formation	Shallow Marine		Coonarah 1/1A		
			Lacustrine ?	Seal/Source Rock			
	Early	Digby Formation	Fluvial	Reservoir			
Permian	Late	BLACK JACK GROUP	Fluvial		Wilga Park 1		
			Clare Sandstone	Fluvial to Lacustrine		Reservoir	
			Hoskissons Coal	Peat Swamp		Seal/Source	
			Brigalow Fm	Arkarula Sandstone		Fluvial/Shallow Marine	Reservoir/Source
				Lower Delta Plain		Seal/Source	
	Early	Watermark Formation	Pro-delta and Delta-front	Reservoir			
			Marine Shelf				
		Porcupine Formation					
		Maules Creek Formation	Aluvial Plain				
		Goonbri Formation	Lacustrine	Source			
		Leard Formation	Fluvial				
		Boggabri Volcanics and Werrie Basalt	Flows, pyroclastics, minor marine sediments	Basement			

12/A/31

12/A/310

Figure 45. Generalised stratigraphy, Gunnedah Basin

resulted in high angle reverse faulting on the eastern basin margin (Hunter-Mooki Thrust Fault System).

Triassic sedimentation commenced with the deposition of thick alluvial conglomerates, comprised predominantly of pebble sized acid volcanic clasts derived from the New England Fold Belt to the east. These coarse alluvial clastics of the lower Digby Formation fine upwards and become increasingly quartzose towards the top of the unit. The upper Digby Formation is typically comprised of medium to coarse grained, quartzose sandstone and shows excellent reservoir character. In 1993, a gas flow of around 9600 m³/day was recorded from the upper Digby Formation in the Coonarah-1/1A well. Upper Digby Formation reservoirs are sealed by a basal lacustrine facies of the overlying Napperby Formation, which is conformable with the Digby Formation in the south of the basin, but disconformable with this unit in the north. The dark grey, finely laminated siltstones of the lower Napperby Formation are replaced by coarsening upwards sequences of sandstone and siltstone as the lacustrine environment present at the beginning of the Middle Triassic was transgressed by fluvial deltas.

The compressional regime initiated in the Late Permian culminated in the Late Triassic with folding, wrenching and thrust faulting, particularly towards the eastern basin, margin along the Hunter-Mooki Thrust Fault System. Uplift and erosion was widespread in the basin, particularly along the Boggabri Ridge and in the southeast of the basin, where up to 2000 metres of Permo-Triassic section may have been removed (Hamilton and others, 1988). Jurassic sediments of the Surat Basin sequence rest unconformably on the Permo-Triassic erosional surface and are discussed in Section 5.

13.2 Exploration History and Petroleum Discoveries

Exploration in the Gunnedah Basin commenced in the 1960's when the New South Wales Department of Mineral Resources (NSW DMR) embarked on a stratigraphic drilling program to evaluate the basin's coal reserves. Since that time, in excess of 120 fully cored stratigraphic wells have been drilled in the Gunnedah Basin.

A number of small seismic, gravity and magnetic surveys were also conducted during the 1960's. Most of these were undertaken by Alliance Petroleum Australia N.L. and Mid-Eastern Oil N.L., but data is predominantly single fold and of poor quality. In 1980, the NSW DMR acquired 476 kilometres of regional seismic data which highlighted a number of possible structural leads in the basin. Hartogen Energy Ltd, who by the early 1980's had acquired exploration acreage in the Gunnedah Basin, conducted a number of small seismic surveys to further delineate these leads.

In 1985 Hartogen drilled the Wilga Park-1 well approximately 15 kilometres southwest of Narrabri, to test an anticlinal closure defined by seismic. The well flowed gas at around 28 000 m³/day (composed of 0.43% Helium) from a sandstone in the Early Permian Porcupine Formation. Although four-way dip closure is present at Wilga Park, the trap is thought to have a strong stratigraphic component and gas reserves are small. Source rock and thermal maturation data from Wilga Park-1 indicate that the entire Permo-Triassic section in this locality is mature to overmature

and probably capable of generating only dry gas. The elevated thermal maturities found at Wilga Park are thought to be due to the presence of a 6 metre thick diorite sill which has intruded the main sandstone reservoir. The discovery at Wilga Park provided considerable impetus for further exploration in the basin.

Since that time, the only significant hydrocarbon discovery made in the Gunnedah Basin has been at Coonarah-1/1A. Drilled in 1993 to test an anticlinal closure 11 kilometres west of Wilga Park-1, the well flowed gas at around 9600 m³/day from the Early Triassic upper Digby Formation. Unfortunately, in the vicinity of the Coonarah feature, the medium to coarse grained, quartzose, fluvial sandstones within the upper Digby Formation which are thought to have excellent reservoir potential, have been intruded by a 14.3 metre thick igneous intrusion of either Late Triassic to Early Jurassic or Tertiary age. The gas accumulation at Coonarah is reservoirised in an underlying conglomeratic facies and analysis shows it comprises 1.14% helium. The Coonarah-1 well was abandoned at 531 metres in the top of the Black Jack Group due to mechanical difficulties. Coonarah-1A, sited 5 metres away from the original well, intersected the same gas bearing interval within the Digby Formation and reached a depth of 650 metres in the Early Permian Watermark Formation. Coonarah-2, spudded 1.8 kilometres northeast of Coonarah-1/1A, intersected tight gas sands in the upper Digby Formation together with an additional zone of tight gas above the Hoskisson Coal within the the Black Jack Group. A drillstem test taken over the tight gas zone within the Black Jack Group flowed gas to surface at a rate too small to measure.

Numerous gas shows have been recorded in bores and wells while drilling the Black Jack Group. Most of these shows are thought to be coalbed methane associated with Late Permian coal sequences. A core taken in the Boggabri Volcanics in the Bohena-1 well, drilled on a surface anticline (Bohena Anticline) in the West Gunnedah Sub-basin in 1963, bled dark brown oil and gas. The source of the oil is thought to be a thin marine or possibly lacustrine mudstone which is underlain and overlain by thick pyroclastic flows.

13.3 Petroleum Potential

13.3.1 Traps

Exploration targets tested to date in the Gunnedah Basin comprise four-way dip closures that have formed as a direct response to the compressional regime that was initiated in the Late Permian and culminated in Late Triassic. These anticlines become more common towards the eastern basin margin as the Hunter-Mooki Thrust Fault System is approached and the compressional deformation reaches a maximum. In the northern Gunnedah Basin, anticlines are oriented north-south, paralleling the the major thrust fault system to the east.

To the south, however, the Hunter-Mooki Thrust Fault System changes direction to a north-northwest/south-southeasterly orientation, and in response to left lateral wrenching, compressional anticlines, oriented northeast-southwest, have developed in front of the main thrust zone (Hamilton and others, 1988). Unfortunately, the uplift and erosion that was particularly pronounced in the southern Gunnedah Basin towards

the end of the Triassic has eroded the crests of these structures, removing many of the prospective reservoir sequences. A number of these surface anticlines were unsuccessfully tested by exploration drilling in the 1960's (New Windy, Quirindi and Mirrabooka anticlines).

13.3.2 Reservoirs and Seals

In general, sediments derived from elevated areas to the east of the Gunnedah Basin (New England Fold Belt) have a high volcano-lithic content. Consequently, the lithic sandstones of the Early Permian Maules Creek Formation, Porcupine Formation and lower Watermark Formation have only limited reservoir potential. In upper Watermark Formation times, however, a fall in relative sea level saw the predominantly marine shelf environment replaced by pro-delta and delta-front facies. Marine reworking of the original lithic sandstones has improved reservoir quality in the upper Watermark Formation. Porosities between 15% and 16% and permeabilities between 4 millidarcies and 10 millidarcies have been recorded in distributary mouth bar and barrier beach bar sandstones identified within the upper Watermark Formation (Hamilton and others, 1988). These reworked marine sands are sealed by siltstones and claystones of a lower delta plain facies deposited at the base of the Black Jack Group at the end of the Early Permian.

In the Late Permian, volcano-lithic detritus derived from the New England Fold Belt continued to comprise a significant component of sediments deposited in the Gunnedah Basin (Black Jack Group). However, a shallow marine sandstone unit towards the base of the Black Jack Group (Arkarula Sandstone) shows extensive marine reworking which has resulted in improved reservoir character. A tidal sand ridge identified within the Arkarula Sandstone exhibits porosities of between 16% and 18% and permeabilities of between 6 millidarcies and 31 millidarcies (Hamilton and others, 1988). Seals for Black Jack Group reservoirs are provided by intraformational shales, siltstones and claystones which developed either in fluvio-lacustrine/peat swamp environments or during brief marine transgressions.

As the shallow marine conditions present during the deposition of the Arkarula Sandstone were replaced by fluvial, lacustrine and peat swamp environments, a number of fluvial sand pulses transgressed the basin from the west. These sediments were derived from the Lachlan Fold Belt, are generally arenaceous, quartzose and exhibit good reservoir properties. The Brigalow Formation (Figure 45) comprises medium to coarse grained, occasionally conglomeratic, quartzose sandstone. The unit achieves a maximum thickness on the western basin margin (around 20 m) and thins towards the basin depocentre. Reservoir properties are extremely variable, with permeabilities varying between 10 millidarcies and several darcies and porosity averaging around 15-20% (Hamilton and others, 1988). Authigenic quartz has partly occluded primary porosity in some areas, while in others, pore filling clays (kaolinite, smectite, illite) have reduced permeability. In spite of this, Brigalow Formation is regarded as a primary exploration target in the Gunnedah Basin.

The Clare Sandstone of the Black Jack Group (Figure 45) also represents a Late Permian influx of quartzose, fluvial sand from the western basin margin. Reservoir potential is generally good throughout most of this unit (11-20% porosity and

permeability of up to 277 millidarcies) except in the southeast of the basin, where lithic material derived from the New England Fold Belt may have degraded reservoir quality. Intraformational siltstones and claystones seal Clare Sandstone reservoirs.

Higher in the sequence, fluvial sandstones in the Early Triassic upper Digby Formation, which are also thought to have been derived from the Lachlan Fold Belt to the west, also exhibit good reservoir character. These sands are thickest towards the western basin margin (up to 25 metres) and thin eastwards. Porosities of up to 13% and permeabilities of over 700 millidarcies have been measured in these sands. In the northeast of the basin, however, Early Triassic erosion has removed the prospective upper Digby Formation sands, while to the southeast, lithic detritus derived from the New England Fold Belt has degraded reservoir quality. Upper Digby Formation reservoirs are sealed by the siltstones and claystones of a lacustrine facies at the base of the overlying Napperby Formation.

13.3.3 Source Rocks and Maturation

Hamilton and others (1988), undertook geochemical analyses of core and cuttings samples from five wells drilled in the Gunnedah Basin. Total organic carbon (TOC) measurements, solvent extract analysis and maceral descriptions were carried out on approximately 65 samples from these wells. A number of potential source rock intervals were identified in the the Permo-Triassic section. These include the fine grained, lacustrine sediments of the Early Permian Goonbri Formation (TOC values of between 1.6% and 7.6% ; dominant maceral is liptinite with moderate amounts of amorphous sapropel) and the shale prone lacustrine facies at the base of the Middle Triassic, Napperby Formation (TOC values average around 1.5% ; dominant maceral is liptinite with moderate amounts of both amorphous sapropel and exinite).

Isolated samples from the Maules Creek, Porcupine, and Watermark Formations and the Arkarula Sandstone (one, two, four and two samples respectively) indicate these units may have some source potential. However the small sample sizes preclude generalisations about overall source quality within these units. In spite of the fact that the Late Permian Black Jack Group exhibits relatively high TOC values, the source potential of this formation is thought to be low due to the predominance of lignite and biodegraded terrestrial organic matter (Hamilton and others, 1988). However, the coal rich sediments deposited in peat swamp environments within the Black Jack Group (such as the Hoskissons Coal) can not be discounted as sources of oil and gas.

Hamilton and others (1988) also made vitrinite reflectance measurements on samples from seven wells in the Gunnedah Basin and combined these results with vitrinite reflectance data obtained by Russell and Middleton (1981) and Etheridge (1981) from a further ten wells. They also attempted to assess thermal maturity using spore-pollen discoloration (TAI) and maturation indicators from GCMS analysis of source rock extracts (Methylphenanthrene Index). These studies indicate that Jurassic and Triassic source rocks are immature over most of the northern Gunnedah Basin and it is only towards the south (south of Boggabri) that the Triassic section becomes marginally mature (between 0.5% and 0.7% R_o). The Permian section is marginally mature over much of the basin. To the west of the Boggabri Ridge in the Maules Creek Sub-basin and in the southeastern Gunnedah Basin, however, Permian source rocks are probably

marginally mature to mature. In the vicinity of igneous intrusives which are common throughout the Gunnedah Basin, elevated thermal maturities can be expected.



Location map, McArthur Basin

14. McARTHUR BASIN

14.1 Basin Evolution and Stratigraphy

The McArthur Basin can be generally described as a thick sequence of Proterozoic sediments underlying the Northern Territory and Queensland between Arnhem Land in the northwest and Mt Isa and Tennant Creek in the south. In the south, Proterozoic sequences are overlain by the Palaeozoic rocks of the Georgina Basin, while to the southwest, a thin, undifferentiated Cainozoic, Mesozoic and Cambrian section covers the Proterozoic sediments. Historically however, the term 'McArthur Basin' has been used to loosely describe the Proterozoic sediments found in the vicinity of the McArthur River. Consequently, the McArthur Basin is not in fact a discrete tectono-stratigraphic unit but part of an extensive, relatively undeformed, platform sequence which flanked the eastern margin of the North Australian Craton during the Proterozoic.

The dominant structural feature of the McArthur Basin is the Batten Trough (Figure 46). Oriented north-south, this feature is thought to represent a syndepositional half-graben filled with up to 10 kilometres of sediment (Powell & others, 1987). The trough is flanked to the west by the Bauhinia Shelf and to the east by the Wearyan Shelf. Maximum subsidence in the basin took place on the eastern margin of the Batten Trough (adjacent to the Emu Fault Zone). Other structural features that appear to have had a major influence on depositional patterns within the McArthur Basin during the Proterozoic include east-west orientated basement ridges such as the Urapunga Tectonic Ridge (Figure 46).

The McArthur Basin sequence has been subdivided into four sedimentary groups - the Tawallah Group, the McArthur Group, the Nathan Group and the Roper Group. The Tawallah Group is the oldest of these units and is regarded as economic basement for petroleum exploration in the area. The basal two thirds of this Group comprises a predominantly fluvial sequence of sandstones, conglomerates, siltstones and shales, while higher in the section, shallow marine and continental depositional environments prevailed.

The Batten Trough developed at this time but only appears to have influenced sedimentation patterns in the north of the basin (Womer, 1986). It is possible that the trough evolved as an extensional basin in response to right-lateral movement along major northwest trending strike slip faults (Jackson & others, 1988).

Up to 6000 metres of McArthur Group sediments rest unconformably on the Tawallah Group. Comprised of shallow water carbonates, shales, siltstones, sandstones and minor volcanics, Powell & others (1987) showed the sequence has been deposited during seven distinct sedimentary cycles in depositional environments ranging from shallow marine through to sabkha, fluvial and continental. The bounding faults along the margins of the Batten Trough played a major role in influencing sedimentation patterns during this time, although towards the end of the deposition of the McArthur Group their influence waned and the east-west trending basement ridges (such as the Urapunga Tectonic Ridge) became active during deposition.

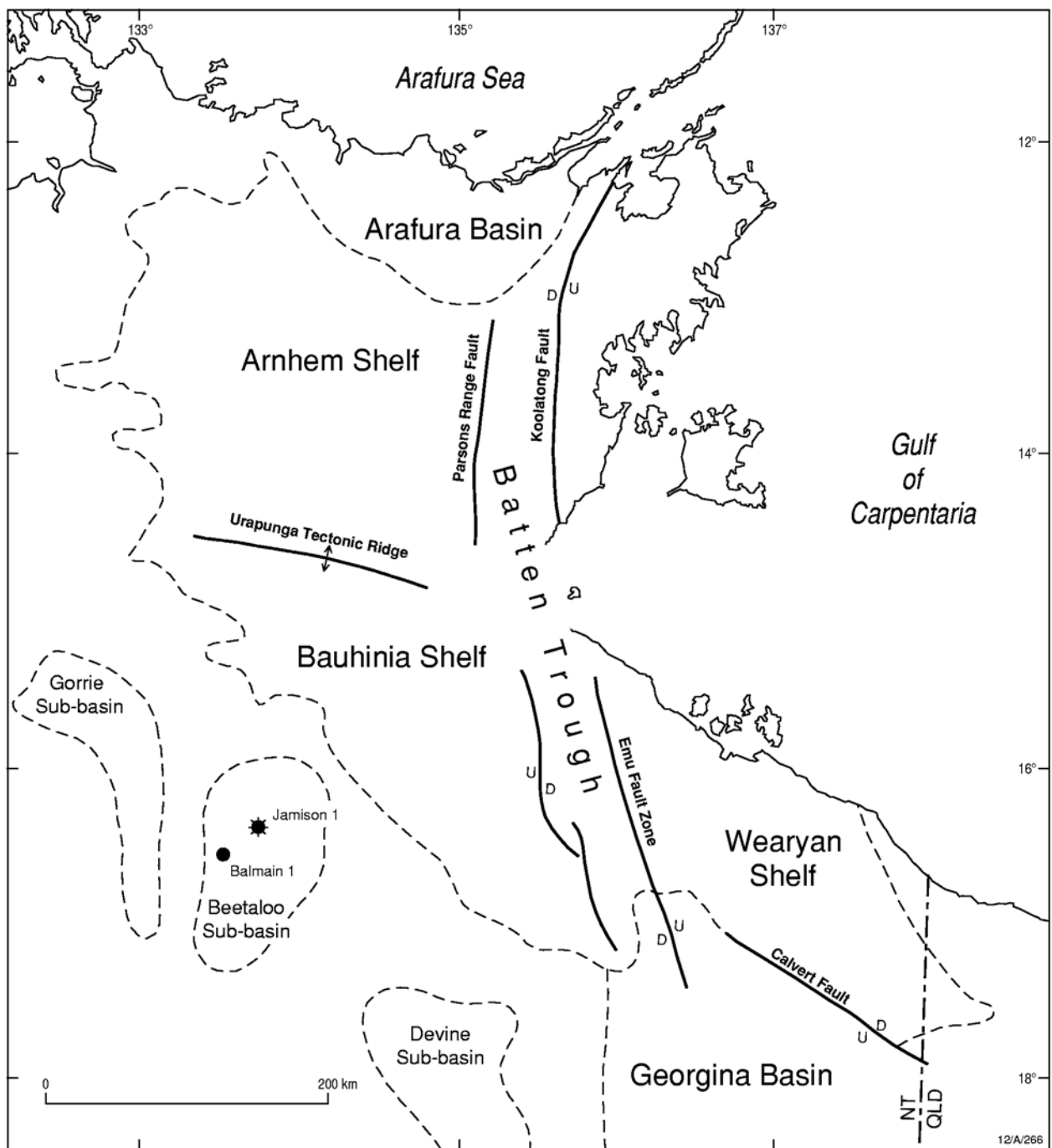


Figure 46. Tectonic elements and petroleum discoveries, McArthur Basin and environs.

Age		Stratigraphic unit		Environment	Petroleum potential	Discoveries
Proterozoic	Roper Group	Chambers River Formation		Shallow marine	Seal	Jamison 1 ☀
		Burkarlorkmi Sst			Reservoir	
		McMinn Fm	Kyalla Member		Source/Seal	
			Moroak Sst Member		Reservoir	
		Velkerri Formation		Deep water marine	Source/Seal	
		Bessie Creek Sst		Tidal shelf	Reservoir	
		Corcoran Formation			Source/Seal	
		Abner Sandstone		Shallow marine shelf	Reservoir	
		Crawford Formation				
		Mainoru Formation				
		Limmen Sandstone		Fluvial		
		Mantungula Formation		Marine		
				Continental		
		Dungaminnie Formation		Shallow marine		
	Nathan Group	Balbarini Dolomite		Fluvial and continental		
		Amos Formation		Continental		
		Looking Glass Formation				
		Stretton Sandstone		Marine and fluvial	Reservoir	
		Yalco Formation		Continental		
		Lynott Formation		Marine	Source	
		Reward Dolomite		Sabkha		
		Barney Creek Formation		Shallow marine	Source	
		Teena Dolomite		Continental	Reservoir	
		Emmerugga Dolomite		Sabkha		
		Myrtle Shale		Continental		
		Leila Sandstone		Fluvial ?		
		Tooganinie Formation		Sabkha		
		Tatoola Sandstone		Marine shelf		
		Amelia Dolomite		Sabkha		
		McArthur Group	Mallapunyah Formation		Continental	
			Masterton Sandstone		Shallow marine	
					Fluvial	
	Tawallah Group		?			

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Figure 47. General stratigraphy, McArthur Basin

A widespread unconformity at the top of the McArthur Group separates this unit from sediments of the overlying Nathan Group. The latter comprises a sequence of fine clastics, evaporites and stromolitic dolostones deposited in lacustrine, supratidal and sabkha environments (Balbarini Dolomite and Dungaminnie Formation). A period of uplift and erosion in the Late Proterozoic (possibly associated with further movement on the bounding faults of the Batten Trough) terminated deposition of the Nathan Group.

The sediments of the overlying Roper Group are lithologically distinct from those of the Nathan and McArthur Groups. They are comprised predominantly of quartzose sandstones interbedded with siltstones and shales deposited in a marine environment. Jackson and others (1988) recognised several sedimentary cycles within the Roper Group, all commencing with deep water marine sediments, grading upwards to higher energy shallow marine facies. Thought to be Carpentarian or Early Adelaidean in age, the Roper Group sediments appear to have been deposited in a basin whose depocentre was probably several hundred kilometres to the southwest of the Batten Trough. Consequently, it is possible that the sediments of the Roper Group were not deposited in the same sedimentary basin as the underlying Nathan and McArthur Groups. Some recent authors have informally named the thick sequence of Roper Group siliclastics to the southwest of the Bauhinia and Wearyan Shelves the “Roper Basin”. On the basis of gravity data, they have further subdivided this basin into three main depocentres - the Gorrie, Beetaloo and Devine Sub-basins.

A period of tectonism during the Late Proterozoic caused widespread deformation of the Roper Group and resulted in extensive folding of these sediments on the Bauhinia Shelf. Since that time, the McArthur Basin has been relatively stable tectonically. The sediments of the Roper Group were then covered by a thin veneer of Cambrian sandstones and carbonates, Mesozoic clastics and Tertiary carbonates. The Phanerozoic section is generally less than 100 metres thick (Womer, 1986) and in many parts of the McArthur Basin, has been subsequently removed by Late Tertiary erosion. Phanerozoic sediments in the McArthur Basin are considered non-prospective for petroleum due to insufficient levels of thermal maturity.

14.2 Exploration History and Petroleum Discoveries

Initial exploration in the McArthur basin area began in the late 1960's when the Bureau of Mineral Resources, Geology and Geophysics Australia (BMR) undertook reconnaissance gravity survey work in the area. In the mid-1970's the BMR followed this with a number of relatively shallow stratigraphic boreholes in the vicinity of the Arnhem Shelf in the northwest of the basin (BMR Cahill-1 to 77 and BMR Pine Creek-1 to 32).

Following permitting of McArthur Basin exploration acreage (OP191 and OP198) at the beginning of the 1980's, Amoco and partners undertook an extensive program of stratigraphic drilling in the McArthur Basin. During the course of 1981 and 1982 they drilled 24 stratigraphic boreholes which culminated in 1984 with the spudding of Amoco's first petroleum exploration well in the basin, Broadmere-1. Designed to test Roper Group sandstones in a large anticlinal structure delineated by seismic, the Broadmere-1 well was dry. Further stratigraphic drilling was carried out by Amoco

and partners in the Batten Trough adjacent to the Emu Fault Zone (stratigraphic boreholes GR1 to GR11) and by the BMR during 1980 to 1985 (Urapunga-1 to 6, Bauhinia Downs-3 and 4, Mount Young-1 and 2). A number of shallow stratigraphic bores have also been drilled by BHP, CRA Exploration and Shell.

Between 1987 and 1991, Pacific Oil & Gas Pty Ltd drilled 17 stratigraphic wells and acquired limited seismic data in an area to the southwest of the Bauhinia Shelf. All of the wells were designed to test the thick Roper Group section to the southwest of the McArthur Basin proper, in the informally named Gorrie and Beetaloo Sub-basins of the Roper Basin. A further 5 exploration wells were drilled by this company in the same area between 1991 and 1993.

One of the stratigraphic wells drilled by Pacific Oil & Gas Pty Ltd, Jamison-1, recovered a small quantity of 34.6° API oil and flowed relatively dry gas from the Proterozoic Bukarlorkmi Sandstone. Interpreted to be a tidal shelf sand, this unit exhibits core porosities of between 8.4% and 12.4% and permeabilities ranging from 13 to 121 millidarcies. The reservoir is sealed by mudstones of the overlying Chambers River Formation. Jamison-1 confirmed the existence of the of the Beetaloo Sub-basin (which had been inferred from gravity studies) and that Roper Group sediments thicken to the southwest away from the Bauhinia Shelf. Mason-1, drilled 6 kilometres to the northwest as a structural follow up to Jamison-1, was plugged and abandoned with minor oil and gas shows after it was subsequently found that the well was drilled off structure.

In 1992, Balmain-1 was drilled a few kilometres to the northeast to test a lateral resistivity anomaly that was thought to correspond to the hydrocarbon saturated zone identified by the Jamison-1 well within the Bukarlorkmi Sandstone. However at Balmain-1, the Bukarlorkmi Sandstone is water saturated and considerably thinner than in the Jamison-1 and Mason-1 areas. A small quantity of oil was recovered on test from a fine grained sandstone ("Hayfield Sand") towards the base of the Chambers River Formation. This sand grades upwards into interbedded, finely laminated siltstone and mudstone which provide a seal for the accumulation.

Minor hydrocarbon shows within sediments of the Roper Group were also encountered in the Elliott-1, Ronald-1 and Mason-1 wells. In the Batten Trough to the northwest, the most significant hydrocarbon show occurred in the GR9 corehole drilled by Amoco in the early 1980's. Located towards the eastern basin margin adjacent to the Emu Fault Zone, an unmeasured gas flow was recorded from a thin (approximately 11 metres thick), porous dolomite near the base of the Barney Creek Formation (McArthur Group). Both bitumen and live oil were also noted in cores taken throughout the Barney Creek Formation in this well.

14.3 Petroleum Potential

14.3.1 Reservoirs and Seals

A number of units within the McArthur Group are considered to be prospective petroleum reservoirs. These include the Teena Dolomite, which was identified as a potential reservoir due to the vugular porosity observed within this unit in outcrop by Amoco in the early 1980's. Similarly, the Yalco Formation, which comprises a thick sequence of interbedded dolomites, dololutites and minor quartz sandstones and organic rich shales also exhibits vugular porosity. Scanning electron microscope (SEM) work carried out by Womer (1986) indicated that the emplacement of bitumen commonly observed within vugues of the Yalco Formation probably post-dated the growth of diagenetic quartz within the pore spaces but preceded the emplacement of sparry dolomite which has partially occluded secondary porosity within this unit. Porosity and permeability are highly variable in the Yalco Formation ranging from 0.8 - 18% and 0.0001 - 1792 millidarcies respectively. Any petroleum accumulations reservoirised within the Yalco Formation would require impermeable dolomites and intraformational shales to provide a competent top seal as the overlying Stretton Sandstone is predominantly a reservoir facies.

Traces of bitumen are also commonly found in the in the fluvial sandstones and conglomerates of the Stretton Sandstone. This unit exhibits excellent reservoir character in part (porosities of between 5.2% and 16.4% and permeabilities of between 0.00047 and 122.7 millidarcies) although reservoir quality is highly variable. As with the Yalco Formation, Womer (1986) has indicated that the migration of petroleum into the the Stretton Sandstone post-dated the formation of quartz overgrowths. Breaching and flushing of reservoirs with meteoric waters has subsequently degraded the petroleum to bitumen and precipitated sparry dolomites in the pore voids. Lack of a competent top seal may be a problem for Stretton Sandstone reservoirs which is conformably overlain by the Looking Glass Formation.

The latter unit comprises interbedded algal dolomites, cherty stromatolitic dolomites and minor dolomitic siltstone. Bitumen staining is commonly found where porosity is developed in the Looking Glass Formation. Although reservoir quality is highly variable in this unit, the best porosity appears to be associated with an unconformity surface and weathered layer at the top of the formation where dissolution of dolomite and chert has formed vugues (Womer, 1986).

A number of potential reservoir sequences have also been identified within the Roper Group. However, whereas porosity within the Nathan and McArthur Groups is almost entirely vugular and has resulted from the dissolution of dolomites, within the clastics of the Roper Group porosity is predominantly intergranular. The best potential reservoirs have been identified in the Abner Sandstone, Bessie Creek Sandstone, Moroak Sandstone Member, Bukalorkmi Sandstone and the Broadmere sandstone Member of the Cobanbirini Formation (the lateral equivalent to the McMinn and Velkerri Formations in the Batten Trough). In all Roper Group reservoirs, reservoir quality deteriorates to the southwest. This reflects the increased thickness, depth of burial and increasing silicification of Roper Group sediments in this direction.

Although porosities of up to 12% and permeabilities of up to 800 millidarcies have been recorded in the upper Abner Sandstone (Hodgson Sandstone Member), reservoir quality in this unit is highly variable due to variations in grain size and sorting (Jackson and others, 1988). Hodgson Sandstone Member accumulations are likely to be sealed by the shelfal mudstones of the overlying Munyi Member. The best quality reservoir sands in the Roper Group are found in the Bessie Creek Sandstone. Here, porosity ranges between 4% and 22% and permeability between 0.1 and 3594 millidarcies. In this unit, porosity has, in part, been enhanced by the removal of clay intraclasts which has led to the development of secondary vugular porosity.

Reservoir quality in the Moroak Sandstone and its lateral equivalent, the Broadmere Sandstone Member, is variable, although permeabilities of up to 1000 millidarcies have been recorded in these units. Where it has been intersected on the Bauhinia Shelf, the Broadmere Sandstone has been described as fine to medium grained, occasionally coarse, well to very well sorted quartzose sandstone. However, much of the primary porosity has been occluded by quartz overgrowths. Work undertaken by Womer (1986) on the bitumen shows recorded throughout the Broadmere Sandstone Member indicates that hydrocarbons migrated into this unit contemporaneously with the formation of quartz overgrowths.

The Jamison-1 well, drilled 300 kilometres southeast of Katherine, flowed oil and gas on test from what has been interpreted to be a tidal shelf sand towards the top of the Roper Group (Bukalorkmi Sandstone). This unit has been described from core as a white to light grey, very fine to coarse, subangular to subrounded sandstone exhibiting massive to crudely planar and cross-bedded stratification. In cores, porosity ranges between 8.4% and 12.4% and permeability from 13 to 121 millidarcies. The Bukalorkmi Sandstone reservoir is sealed by siltstones and shales of the overlying Chambers River Formation. A subsequent exploration well, Balmain-1, drilled a few kilometres to the southwest, recovered oil from a thin, fine grained sandstone towards the base of the Chambers River Formation. Here, porosities were moderately good (8.9% to 13.5%) but permeability was poor (0.04 to 20 millidarcies).

14.3.2 Source Rocks and Maturation.

Powell and others (1987) analysed 1130 core and cuttings samples from 55 locations in the McArthur Basin for total organic carbon content (TOC) and Rock Eval pyrolysis. This study identified potential source rock intervals both in the Roper Group (McMinn and Velkerri Formations) and in the McArthur Group (Yalco, Lynott and Barney Creek Formations). TOC values in excess of 5% were recorded from organic rich intervals in the Barney Creek and Velkerri Formations and these units probably constitute the most prospective source rocks in the basin. Hydrogen indices calculated from Rock Eval pyrolysis data indicate that the Barney Creek Formation contains predominantly Type I organic matter while in the Velkerri, Yalco and McMinn Formations, Type II organic matter predominates.

Determination of thermal maturation levels of the Proterozoic sediments of the McArthur Basin is difficult - vitrinite reflectance techniques and spore colouration measurements are inapplicable due to the absence of vascular land plants in the

Proterozoic. Tmax values (which are also influenced by organic matter type) are also thought to be unreliable in sediments of this age, particularly as many of the samples analysed contain traces of 'out of place' hydrocarbons (bitumen) which have resulted from previous episodes of petroleum generation and expulsion. Despite these difficulties, Powell and others (1987) calculated methyl phenanthrene indices and made reflectance measurements on lamalginites, non-fluorescing lamalginites and bitumen in a number of samples. These results, together with Tmax data, were calibrated against a calculated vitrinite reflectance scale and thermal maturation trends determined.

This work showed that potential source rocks within the McArthur Group (Yalco, Lynott and Barney Creek Formations) are probably marginally mature to mature on the Bauhinia Shelf and on the flanks of the Batten Trough but become mature to overmature towards the axis of the Batten Trough. Similarly, Roper Group source rocks (McMinn and Velkerri Formations) are probably marginally mature over most of the Bauhinia Shelf but attain full thermal maturity in the Batten Trough and to the southwest, where Roper Group sediments thicken into the Beetaloo Sub-basin.

Timing of petroleum generation in the McArthur Basin is difficult to determine due to the large time scales involved and the lack of data on palaeo-geothermal gradients. Maturation modelling by Powell and others (1987), however, indicates that McArthur Group source rocks have probably undergone two phases of petroleum generation - the first corresponds to the time of maximum burial of the McArthur Group sediments (approximately 1600 Ma) and the second to the time of maximum burial of the Roper Group sediments (approximately 1400 Ma). Expulsion of hydrocarbons from Roper Group source rocks is thought to have occurred in a single phase corresponding to the time of maximum burial for this unit (1400 Ma).



Location map, Sydney Basin

15. SYDNEY BASIN

15.1 Basin Evolution and Stratigraphy.

The Sydney Basin is an elongate, north-south orientated sedimentary basin straddling the New South Wales coastline between latitudes 32 degrees and 36 degrees south. Approximately ninety percent of the basin lies onshore (44 000 square kilometres). The offshore extension of the Sydney Basin underlies 5000 square kilometres of the continental shelf. Onshore, in excess of 4000 metres of Permo-triassic clastic sediments have been deposited in the major depocentres of the basin (Bradley and others, 1985). Offshore, Permian and Triassic sediments may exceed 9000 metres in thickness (Stewart and others, 1995).

The Sydney Basin is the southernmost depocentre of a major foreland basin system (Bowen-Gunnedah-Sydney Basin) which extends from central Queensland to southern New South Wales. Permo-triassic sedimentation is continuous between the Sydney Basin and the Gunnedah Basin to the north, making the position of the northern basin boundary somewhat arbitrary. Historically, this boundary has been placed at the Mt Coricudgy Anticline, an area where the Permo-triassic section thins over a basement high. Due to the absence of any major change in stratigraphy immediately to the north of the Mt Coricudgy Anticline, later workers have placed the northern basin boundary further north, at the Liverpool Range.

To the west and south, sediments of the Sydney Basin onlap the Ordovician to Devonian sediments and acid volcanics of the Lachlan Fold Belt, while to the northeast, the basin is bounded by the Hunter-Mooki Thrust and the adjacent New England Fold Belt. Offshore, the southeastern margin of the Sydney Basin has been placed at the edge of the continental shelf. The main structural features evident in the offshore Sydney Basin are the Offshore Uplift, the Offshore Syncline and the Newcastle Syncline (Figure 48).

Sedimentation in the Sydney basin commenced in the Early Permian when a widespread marine inundation transgressed a gently subsiding shelf from the southeast and deposited a sequence of sandstones, siltstones and conglomerates on the rocks of the Lachlan Fold Belt (Wasp Head and Pebbly Beach Formations, in the south). This transgression was briefly interrupted in the early Permian when a wedge of terrestrial sediments derived from the New England Fold Belt prograded across the northern Sydney Basin (Greta Coal Measures). After the deposition of this unit, marine sedimentation resumed in the northern part of the basin and continued in the south until early in the Late Permian. The Snapper Point Formation, Wandrawandian Siltstone and Berry Siltstone were deposited in the south at this time. Marine conditions were briefly interrupted at the beginning of the Late Permian when a thin, regressive/transgressive sand sheet (Muree and Nowra Sandstones) was deposited over much of the basin.

In the offshore Sydney Basin, the Offshore Uplift (which is thought to be a volcanic arch/fault-propagation fold that has been a topographic high since the Late Carboniferous (Stewart and others, 1995)), was progressively onlapped from the east

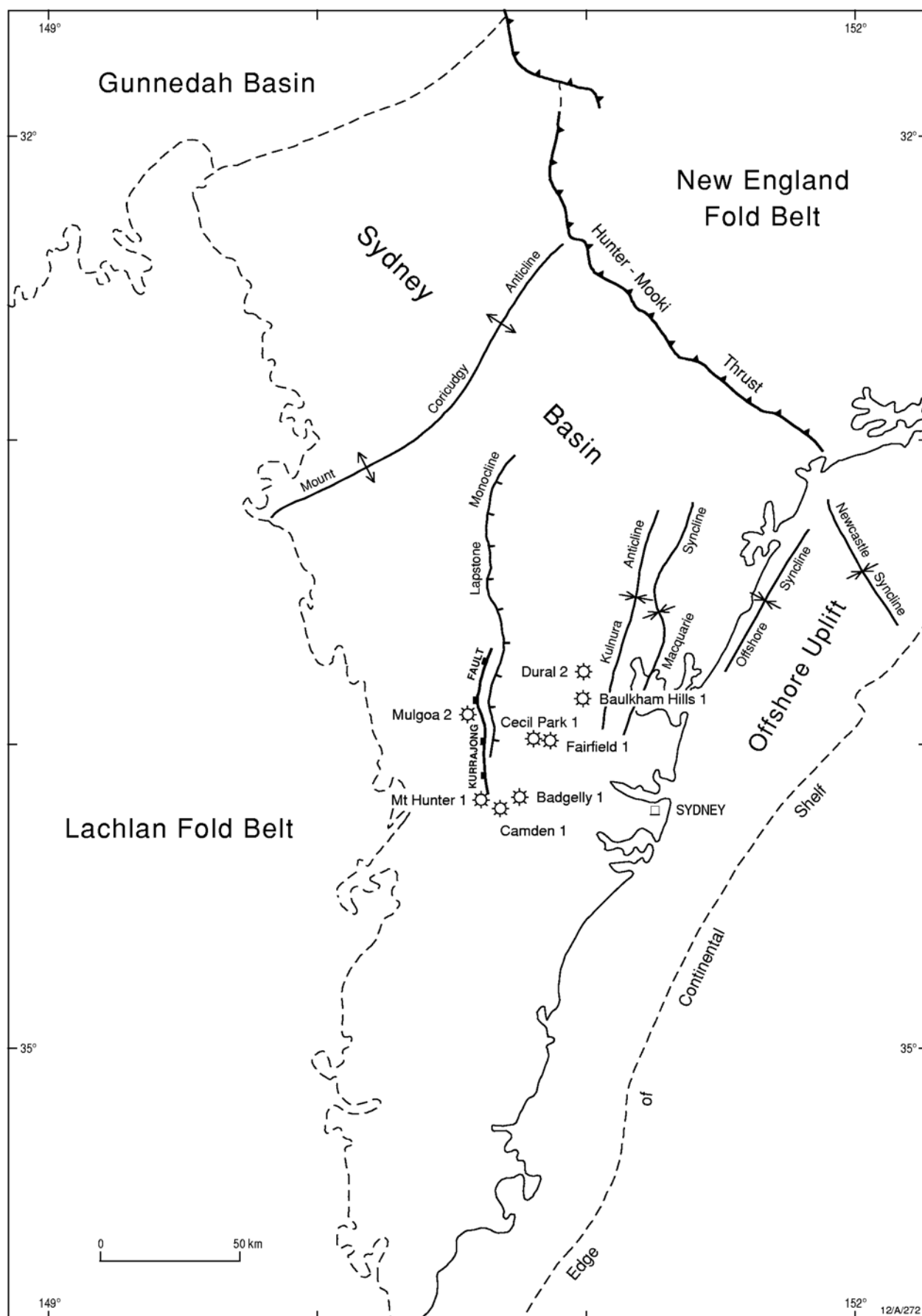


Figure 48. Tectonic elements and petroleum discoveries, Sydney Basin.

Age	Stratigraphic unit		Environment	Petroleum Potential	Discoveries	
Middle Triassic	WIANAMATTA GROUP		Paralic			
	Hawkesbury Sandstone		Upper Alluvial Plain			
	Early Triassic	Narrabeen Group	Newport Formation			Lower Delta Plain
Garie Formation			Lower Alluvial Plain	SEAL		
Bald Hill Claystone				RESERVOIR		
Bulgo Sandstone				SEAL		
Stanwell Park Claystone				RESERVOIR		
Scarborough Sandstone			Upper Delta Plain	RESERVOIR		
Wombarra Claystone				SEAL		
Coalcliff Sandstone			Upper to Mid Delta Plain	RESERVOIR		
Bulli Coal	SOURCE / RESERVOIR					
Eckersley Formation	SOURCE					
Late Permian	Illawarra Coal Measures	Wongawilli Formation	Lower Delta Plain	SOURCE / SEAL		
		Kembla Sandstone		RESERVOIR		
		Allans Creek Formation		SOURCE		
		Darkes Forest Sandstone		RESERVOIR		
		Bargo Claystone		SOURCE / SEAL		
		Tongarra Coal		SOURCE / SEAL RESERVOIR		
		Wilton Formation				
		Erins Vale Formation				
		Pheasants Nest Formation				
		Shoalhaven Group		Budgong Sandstone	Delta Front	RESERVOIR
				Berry Siltstone	Prodelta	
				Nowra Sandstone	Marine Shelf	
	Wandrawandian Siltstone		RESERVOIR			
	Snapper Point Formation					
	Pebbly Beach Formation			Alluvial Fan		
Clyde Coal Measures						
Wasp Head Formation	Shallow Marine	SOURCE				

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Figure 49. Generalised stratigraphy, southern Sydney Basin

by Late Permian coal measures and then by the coarse clastics of the Narrabeen Group. This basement high probably provided a local source of sediment during this period but may have been finally submerged during the Middle Triassic.

The Hunter-Mooki Thrust system had become active during the mid Permian. By Late Permian times, continued activity on the thrust system and uplift of the New England Fold Belt terminated marine sedimentation throughout the basin. A thick regressive sequence of terrestrial clastics (Illawarra Coal Measures from the south and west; Newcastle, Tomago, Wollombi and Wittingham Coal Measures from the north and northwest) transgressed the basin. This overall regressive sequence is occasionally punctuated by brief marine incursions (Darkes Forest Sandstone and Bargo Claystone in the south).

At the end of the Late Permian, further activity on the Hunter-Mooki Thrust system and renewed uplift in the New England area brought to an end the coal swamp environments which prevailed over most of the basin. A thick sequence of coarse grained, lithic clastics (Narrabeen Group) then prograded across the basin in a number of fluvio-deltaic systems, with derived sediments from high blocks to the north, west and southeast. Towards the end of Narrabeen Group times, uplift to the southwest of the basin resulted in an increase in sediment supply and an influx of quartzose sandstones from the southwest. This culminated in the Middle Triassic with the deposition of the Hawkesbury Sandstone - a widespread unit which was deposited on an alluvial flood plain in a meandering to braided stream environment.

At the end of Hawkesbury Sandstone times, marine conditions briefly returned to the basin. A decrease in sediment supply and continuing basin subsidence saw the shallow marine shales and minor sandstones of the lower Wianamatta Group deposited over much of the basin (Bradley and others, 1995). These sediments were in turn transgressed by prograding alluvial floodplain deposits of the upper Wianamatta Group.

Although no sediments of Jurassic or Cretaceous age are preserved in the onshore Sydney Basin, maturation data suggests that a thick Jurassic to Early Cretaceous section (up to several kilometres thick) was probably deposited then removed by uplift and erosion in the Late Cretaceous. This Late Cretaceous extensional tectonism, which was preceded by a period of vulcanism characterised by shallow alkaline intrusives, was associated with a rifting event which separated the Australian continental plate from the Lord Howe Rise. Johnson and Veevers (1984) have suggested that this rifting event may have been initiated as early as 95 Ma. A compressive tectonic regime returned to the Sydney Basin in the Tertiary, with further uplift, erosion and rejuvenation of existing structure.

15.2 Exploration History and Petroleum Discoveries.

During the late nineteenth century, a number of coal bores drilled in the Sydney Basin encountered flows of natural gas. This provided the encouragement needed to drill the first petroleum exploration well in the basin in 1910. Between 1910 and 1938, 14 exploration wells were drilled on the basis of surface geology. Details of the drilling results from these early wells are scant, but all recorded gas shows and one,

(Maskell's Farley) recorded oil staining. None of these early wells penetrated economic basement and many were subsequently found to have been drilled outside structural closure and are not considered to be valid tests. In what can probably be termed the only commercial gas production in the Sydney Basin, a borehole drilled in the Balmain Colliery in 1937 produced gas at around 4300 m³/week. The hydrocarbons produced were used as motor fuel during the course of World War II.

A second phase of petroleum exploration began in the mid 1950's when drilling based on limited seismic data commenced. Since that time, 69 petroleum exploration wells have been drilled in the onshore Sydney Basin. To date, no wells have been drilled offshore. Most of the wells drilled in the basin recorded gas shows and 8 wells drilled between 1958 and 1964 flowed gas at a measurable rate from Narrabeen Group sediments (Badgelly-1, Baulkham Hills-1, Camden-1, Cecil Park-1, Dural-2, Fairfield-1 and Mt Hunter-1(Appendix 6)). Several follow up holes to the Camden-1 well were drilled by Australian Oil and Gas Corporation Ltd (AOG) to test Narrabeen Group sediments in the Camden area. Many recorded gas flows from the Bulgo Sandstone with the highest flow rates measured in the Camden-10 well (14 160 m³/day). In addition, the Baulkham Hills-1 and Dural-2 wells flowed gas from the Illawarra Coal Measures and small gas flows (maximum rate of 1020 m³/day) were also noted in the Shoalhaven Group in Dural-2.

Although no oil discoveries have yet been made, several encouraging oil shows have been noted in a number of wells drilled in the Sydney Basin. The most significant of these shows are tabulated below :

Table 1. Oil shows, Sydney Basin.

WELL	T.D. DATE	UNIT	AGE	SHOW
Balmain-1	1937	Newcastle Coal Measures	Permian	Oil shows between 1110m and 1210m.
Maskell-Farley-1	1937	Dalwood Group	Permian	Oil Staining.
Camberwell-1	1965	Dalwood Group Branxton Formation	Permian	Fluorescence and 'pin point' oil bleeding.
Loder-1	1963	Branxton Formation Greta Coal Measures Farley Formation	Permian	Fluorescence.
Jerry's Plains-1	1969	Mulbring Siltstone Branxton Formation Greta Coal Measures	Permian	Fluorescence.
Terrigal-1	1968	Gosford Formation Patonga Claystone	Triassic	Fluorescence and oil staining.
Longley-1	1973	Tuggerah Formation Duralong Shale	Triassic	Traces of oil and minor oil bleeding.
Picton-1	1982	Coal Cliff Sandstone	Triassic	Light, honey yellow crude bleeding from core.

Most of the wells in which oil shows occur are located in the northeastern, onshore Sydney Basin.

As well as petroleum exploration wells, several thousand shallow, coal exploration boreholes and 38 methane drainage exploration holes have been drilled in the basin. Many of the petroleum exploration wells that have been drilled did not penetrate the

complete sedimentary sequence and were terminated in the Triassic. Consequently, the deeper parts of the onshore Sydney Basin and the entire offshore area have yet to be tested by drilling.

Seismic coverage of the Sydney Basin is sparse and irregular consisting primarily of regional scale reconnaissance surveys. Seismic acquisition commenced in the onshore areas early in the 1960's. This predominantly analogue, single fold data is of poor to fair quality. More modern, multifold data recorded between 1969 and 1971 is of better quality, particularly when subjected to modern reprocessing techniques. Offshore marine seismic surveying began in 1965. However, this early offshore data, much of it acquired by the Bureau of Mineral Resources (BMR) between 1971 and 1988, is only of poor to fair quality. The best quality seismic data obtained to date in the offshore Sydney Basin has been by Santos Ltd in 1991 with their Seaspray Marine seismic survey. Over 600 kilometres of good quality, 60 fold, airgun data was acquired at this time. Regional gravity and magnetic surveys have been undertaken over most of the basin, initially by the BMR and more recently in the offshore by Santos Ltd in 1990.

15.3 Petroleum Potential.

15.3.1 Reservoirs and Seals.

Potential reservoir sands have been identified throughout the Permo-triassic section in the Sydney Basin. Within the Triassic Narrabeen Group, braided and meandering stream, fluvial sandstones (Bulgo Sandstone, Scarborough Sandstone and Coal Cliff Sandstone) are sealed by fine grained flood plain and lower delta plain deposits (Bald Hill Claystone, Stanwell Park Claystone and Wombarra Claystone). Although sandstone porosity in the Narrabeen Group is variable, porosities of up to 20% have been recorded in some of the cleaner, more quartzose units. However, in many instances, primary porosity has been occluded by the growth of authigenic clays derived from lithic volcanic detritus. Consequently, permeabilities are generally low (less than 10 millidarcies) and reservoir quality only moderately good, particularly as many of the clay platelets lining the pore throats appear to be highly mobile (reservoir permeabilities routinely decrease during testing). Wireline log analysis has indicated that 'tight' gas sand reservoirs have probably been penetrated by the Dural South-1 well (Nowra Sandstone and Snapper Point Formation) and by Jerry Plains-1 (Farley Formation). It has long been recognised that some of these Narrabeen Group reservoirs may benefit from stimulation techniques such as fracturing, but attempts by Australian Oil and Gas Corporation Limited to fracture Narrabeen Group reservoirs in the Cecil Park-1 and Badgelly-1 wells proved unsuccessful.

Reservoir potential has also been identified in the Permian sequence. Gas flows have been measured from the Illawarra Coal Measures and the Shoalhaven Group (Baulkham Hills-1 and Dural-2) and gas shows were encountered in most of the wells that penetrated the Permian section. The Late Permian coal sequences comprise interbedded sandstone, coal, siltstone and claystone with potential reservoirs and seals at many levels. Unfortunately, as with the overlying Narrabeen Group, many of the sandstones contain a significant lithic component and exhibit poor permeability. However, occasional marine incursions into the Sydney Basin during the Late

Permian have reworked some of these fluvial sediments, enhancing their porosity (Darkes Forest Sandstone).

In the Early Permian, with the exception of the Greta and Clyde Coal Measures, sedimentation was predominantly marine. This sequence contains several reworked marine sandstones which show good reservoir character (Muree, Nowra and Cessnock Sandstones). These units are sealed by the Mulbring Siltstone, Berry Siltstone and siltstones of the Branxton Formation, respectively. In the Newcastle area, marine sands within the Early Permian Farley Formation also show some reservoir potential but a higher lithic content in this unit has degraded reservoir quality in part.

Offshore, the Middle Triassic Hawkesbury Sandstone, sealed by siltstones of the overlying Wianamatta Group, is the primary exploration target. In many areas of the onshore Sydney Basin, however, uplift and erosion has removed effective top seal for the Hawkesbury Sandstone.

15.3.2 Source Rocks and Maturation.

Only limited source rock data is available from the Sydney Basin. Total organic carbon (TOC) and coal maceral analyses of samples from the Late Permian coal sequences indicate that these units (Tomago, Newcastle, Wollombi, Wittingham and Illawarra Coal Measures) are good potential gas sources with TOC values up to 20% and inertinite as the dominant maceral. However, a significant proportion of the dispersed organic matter in the Wollombi and Early Permian Greta Coal Measures is comprised of exinite, indicating that these units cannot be discounted as sources of oil. Fine grained sediments deposited during the brief marine incursions that took place in the basin during the Late Permian may also have some potential as oil sources.

Originally, the gas recovered from the overlying, Triassic Narrabeen Group reservoirs was thought to have been sourced from Late Permian coals. Although these gases are methane rich, analysis shows the presence of significant quantities of ethane and higher molecular weight homologues. Consequently, it is more likely that Narrabeen Group reservoirs have been charged with gases sourced from Triassic shales and claystones (Dooralong Shale, Wombarra Claystone, Stanwell Park Claystone) rather than from the underlying Permian coals.

Offshore, source rock quality is speculative due to the lack of well control. However, the Late Permian coal measures are probably sources of both oil and gas in the offshore Sydney Basin, with the possibility of a more oil prone, Late Permian source rock facies developed to the east where deltaic and marine influences may be more pronounced. Although the Jurassic section has been entirely removed by uplift and erosion from the onshore Sydney Basin, Jurassic source rocks may be preserved in offshore grabens and synclines.

As with source rock data, maturation data is also sparse. Limited vitrinite reflectance measurements and spore colour alteration indices (TAI) indicate that the Permian sequences are overmature and presently generating dry gas in the central and eastern Sydney Basin, mature for oil generation on the western flank and immature to

marginally mature on the northern and southern flanks of the basin. Triassic source rocks (Narrabeen Group) are probably only overmature in the deepest depocentres of the basin. Elsewhere, Narrabeen Group sediments lie within the oil window over the central and eastern portion of the basin and are immature to marginally mature in the far north and southwest.

Timing of hydrocarbon generation is somewhat speculative, primarily due to the difficulty in estimating the thickness of the Jurassic section that has been deposited then eroded from the onshore portion of the basin. Grybowski (1992) undertook geohistory analysis of the East Maitland-1 well, located approximately 100 kilometres north of Sydney near the northern basin margin. This modelling indicates that Early Permian source rocks probably commenced generating hydrocarbons as early as the Triassic but in many areas, did not attain peak thermal maturity until the Late Jurassic. Oil and gas generation in the Late Permian coal measures probably began in the Late Jurassic while hydrocarbon generation within source rocks of the Triassic Narrabeen Group was not initiated until the middle of the Cretaceous and was probably restricted to major depocentres.

The compressional tectonic regime which prevailed throughout the Permo-triassic in the Sydney Basin has produced a number of anticlinal and fault dependent closures, particularly in the north of the basin, adjacent to the Hunter-Mooki Thrust. The formation of these structures is well timed with respect to hydrocarbon generation from Early Permian source rocks, although any oil accumulations lying near basin depocentres run the risk of late gas flushing. The effects of Late Cretaceous rifting were most pronounced in the offshore Sydney Basin. Here, basin extension has produced numerous fault dependent and associated four-way-dip closures. These late formed traps may hold hydrocarbons generated from both Permian and Triassic source rocks. However Tertiary compression has caused folding, faulting and rejuvenation of existing structure and faults and may have breached some earlier formed petroleum traps.

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HYDROCARBON ACCUMULATION SUMMARIES

ACCUMULATION SUMMARIES

BOWEN AND SURAT BASINS

ALDINGA NORTH

PRESENT OPERATOR: Victoria Petroleum NL
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: 195 km north-northwest of Roma
STATE: Queensland
PETROLEUM TITLES: ATP333P
BASIN: Bowen
SUB-BASIN: Denison Trough
DISCOVERY WELL: Aldinga North-1
 Longitude (E): 148.3144
 Latitude (S): -24.7880
 Date total depth reached: 30 OCT 93
 Ground level: 294.0 m
 Kelly bushing: 296.0 m
 Operator: Victoria Petroleum NL
 Total Depth: 1630 mKB
NUMBER OF WELLS DRILLED: 1
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: 450' Sand
CONTENTS: Gas
FORMATION: Cattle Creek Formation
AGE: Permian
LITHOLOGY: Sandstone
DEPOSITIONAL ENVIRONMENT: Shallow marine.

TEST DATA FROM THE DISCOVERY WELL (Aldinga North-1):

DST 1, Cattle Creek Formation
Flowed gas at 34 000 m³/day.

DST 2, Cattle Creek Formation
Flowed gas at 34 000 m³/day.

ALTON

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	160 km south-southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 2
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Alton-1
Longitude (E):	149.3717
Latitude (S):	27.9383
Date total depth reached:	17 JUL 64
Ground level:	217.0 m
Kelly bushing:	221.0 m
Operator:	Union Oil Development Corporation
Total Depth:	2234 mKB
NUMBER OF WELLS DRILLED:	10
STRUCTURE/TRAP:	Structural/Stratigraphic. Permeable sandstone lenses draped over a basement high.
AREAL CLOSURE:	10.1 km ²
RESERVOIR UNITS:	2
DRIVE:	Weak water drive and solution gas drive.
PETROLEUM BEARING UNIT No.1:	Evergreen Formation(multiple reservoirs)
CONTENTS:	Oil and Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : light gray, medium grained, well sorted, sublabile to quartzose with a trace of carbonaceous material and mica.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine.
FORMATION TOP (mKB):	1810 m
POROSITY:	17% (average)
PERMEABILITY:	240 md (average)
PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	2076.3 m

TEST DATA FROM THE DISCOVERY WELL (Alton-1):

DST 1, 1847.1-1865.4 m, Evergreen Formation
Flowed 1150 bbl/day of 54.5 degree API oil and 353 m³/day of gas.

Production Test, 1847.3-1865.6 m, Evergreen Formation
Flowed 480 bbl/day of oil.

DST 2, 2078.7-2088.8 m, Showgrounds Sandstone
Flowed 708 m³/day of gas and recovered 38 m of yellow-green 45° API oil.

DST 3, 2181.5-2233.6 m, Back Creek Group
Recovered 36.6 m of gas cut mud.

DST 4, 2184.4-2233.6 m, Back Creek Group
Recovered 18.0 m of mud with a trace of oil.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	334	313	21

COMPOSITIONAL DATA :

OIL :

FLUID PROPERTIES	Oil Showgrounds Ss	Oil Evergreen Fm
API Gravity @ 60°F	49.4°	54.2°
Base	Paraffin	Paraffin
Sulphur (% wt)(ppm)	<0.10%	< 0.10 ppm
Initial GOR (ft ³ /bbl)	520	475
Pour Point	6°C	6°C
Specific Gravity	0.767	0.762
Colour	-	-
Viscosity (cp@100°F)	-	0.33
Bubble Point (psig)	-	-

COMPOSITIONAL DATA CONTD :

GAS :

GAS PROPERTIES	Associated Gas Showgrounds Ss	Associated Gas Evergreen Fm
Methane	37.30	45.40
Ethane	22.70	21.20
Propane	22.50	18.93
Isobutane	7.60	6.03
N-butane	4.90	3.61
Isopentane	1.09	2.42 (C ₅ +))
N-pentane	0.84	na
Hexanes +	0.64	na
N ₂ + O ₂	0.20	2.08
CO ₂	0.43	0.33
H ₂ S	-	-
Specific Gravity	1.111	1.044
BTU/ft ³ (gross)	1885	1730

STRATIGRAPHY (Alton-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	329.8
	Wallumbilla Fm	430.7
	Bungil Fm	670.0
	Mooga Sandstone	877.8
JURASSIC	Orallo Fm	911.7
	Gubberamunda Sandstone	1127.8
	Westbourne Fm	1439.6
	Walloon Coal Measures	1550.2
	Hutton Sandstone	1686.2
	Evergreen Fm	1851.7
	Precipice Sandstone	1937.3
TRIASSIC	Moolayember Fm	1943.4
	Snake Creek Mudstone Mbr	2121.4
	Showgrounds Sandstone	2144.9
PERMIAN	Blackwater Group	2168.0
CARBONIFEROUS	Volcanics	2302.2

* Picked by Geological Survey of Queensland

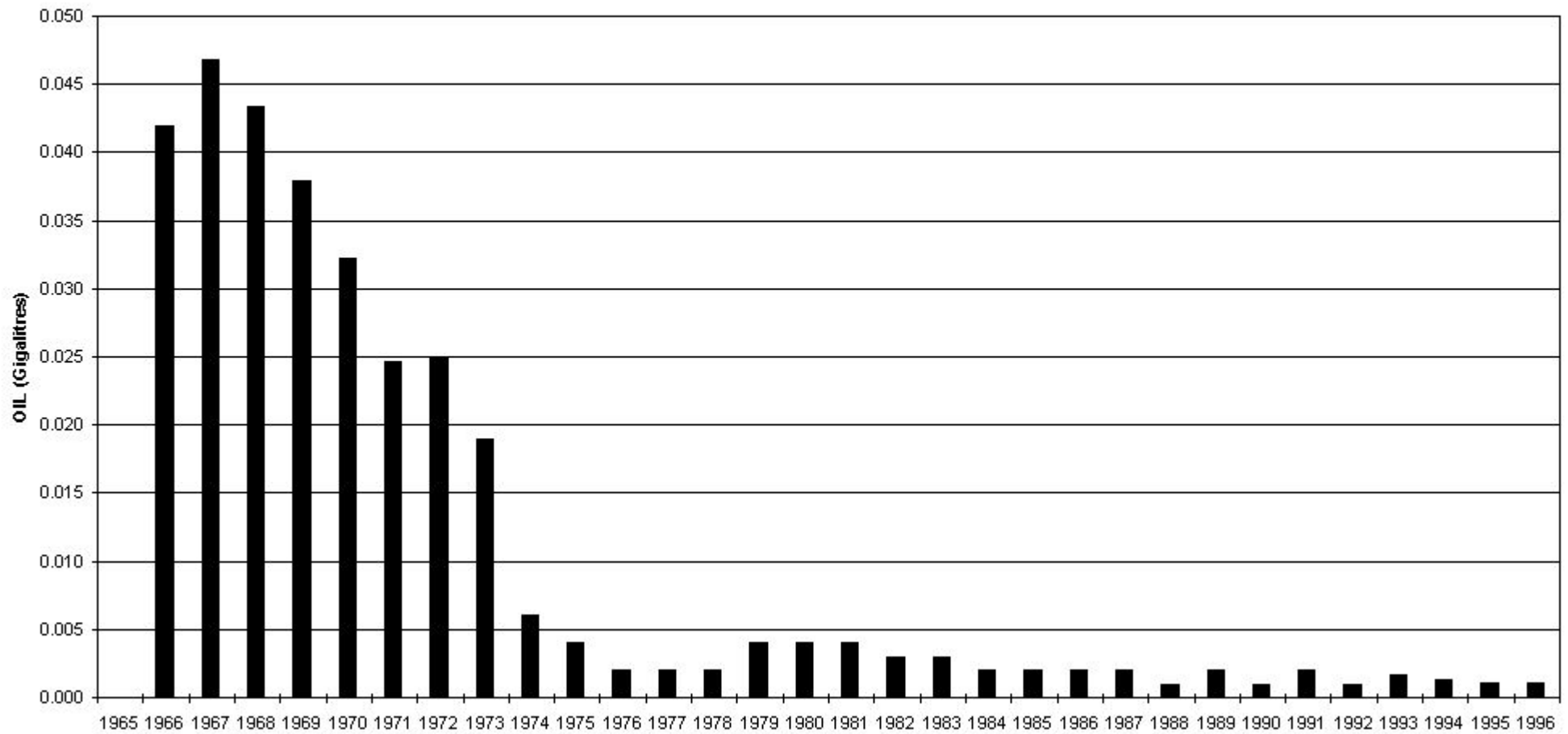
POROSITY AND PERMEABILITY DATA (Alton-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1712.7	11.0	0.0	0.0	Hutton Sandstone
1714.0	14.5	0.0	0.0	Hutton Sandstone
1861.5	16.5	98.0	8.0	Evergreen Fm
1862.7	19.0	551.0	258.0	Evergreen Fm
1864.5	15.5	0.0	0.0	Evergreen Fm
1997.8	11.0	0.0	0.0	Moolayember Fm
2084.6	15.5	0.0	0.0	Moolayember Fm
2086.4	17.5	5.0	3.0	Moolayember Fm
2087.0	15.0	3.0	3.0	Moolayember Fm
2088.8	7.0	0.0	0.0	Moolayember Fm
2231.2	7.0	0.0	0.0	Blackwater Group

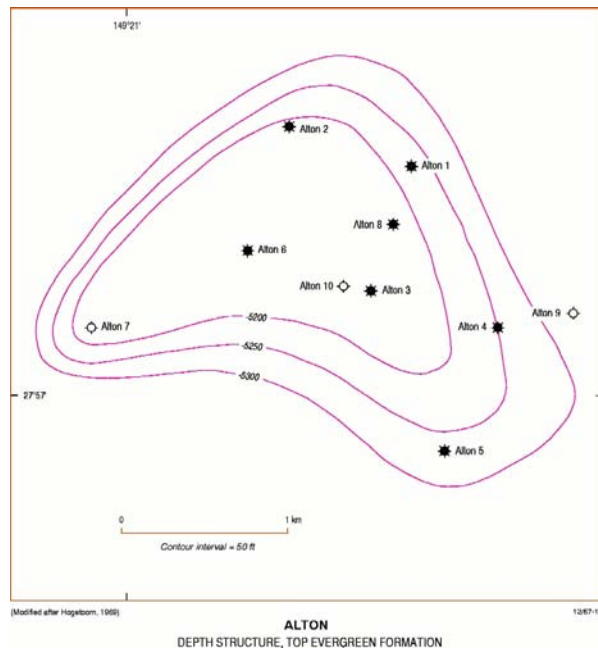
GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	TOC	VITRINITE REFLECTANCE (%)	FORMATION
Alton-6	1868.5	1.80	0.54	Evergreen Fm
Alton-1	2097.0		0.69	Blackwater Group
	2115.3		0.71	Blackwater Group
	2170.1		0.72	Back Creek Group
	2225.8		0.73	Back Creek Group
Alton-4	2200.8	6.80	0.74	Back Creek Group

ALTON, OIL PRODUCTION (Evergreen Formation)
Discovered 17 July 1964 Production commenced 1 January 1966
Total Wells = 10 (4 Producers; 4 Shut In; 2 Plugged and Abandoned)



ALTON MAP



ANABRANCH

PRESENT OPERATOR: Santos Ltd
 TYPE: Oil and Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 27 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 9
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Anabbranch-1
 Longitude (E): 148.8642
 Latitude (S): -26.8139
 Date total depth reached: 26 MAR 65
 Ground level: 286.5 m
 Kelly bushing: 289.9 m
 Operator: CSR Ltd
 Total Depth: 1392 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Stratigraphic trap on the axis of a minor nose.
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Boxvale Sandstone Member
 CONTENTS: Oil and Gas
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Shallow marine.
 FORMATION TOP (mKB): 1278.0 m

TEST DATA FROM THE DISCOVERY WELL (Anabbranch-1):

DST 2, 1277.1-1284.7 m, Evergreen Formation (Boxvale Ss)
 Recovered 405.4 m of oil. Estimated
 flow rate of 16 bbl/day of oil. Flowed gas
 at 30 000 m³/day.

DST 1, 1341.1-1390.2 m, Moolayember Formation
 No gas to surface. Tight.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	3	2	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	36.90
Ethane	11.40
Propane	17.50
Isobutane	8.80
N-butane	8.30
Isopentane	8.30
N-pentane	3.30
Hexanes +	6.10
N ₂ + O ₂	4.00
CO ₂	0.74
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Anabranh-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	205.4
	Mooga Sandstone	321.0
JURASSIC	Orallo Fm	391.7
	Gubberamunda Sandstone	573.0
	Westbourne Fm	652.3
	Walloon Coal Measures	832.1
	Eurombah Fm	1046.1
	Hutton Sandstone	1097.9
	Evergreen Fm	1228.3
TRIASSIC	Moolayember Fm	1342.0
CARBONIFEROUS	Granite	1385.6

* Picked by Geological Survey of Queensland

ARCADIA

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other Discovery
 LOCATION: 148 km north of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 337-P
 BASIN: Bowen
 SUB-BASIN: Comet Platform
 DISCOVERY WELL: Arcadia (OSL 3)
 Longitude (E): 148.7500
 Latitude (S): -25.2833
 Date total depth reached: 01 DEC 39
 Ground level: 399.3 m
 Operator: OSL
 NUMBER OF WELLS DRILLED: 3
 STRUCTURE/TRAP: Faulted anticline
 AREAL CLOSURE: Approx. 12.0 km² (on Bandanna Fm)
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Cattle Creek Formation
 CONTENTS: Gas
 FORMATION: Cattle Creek Formation
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Shallow marine

TEST DATA FROM THE DISCOVERY WELL (Arcadia (OSL 3)):

Production Test, 361.8 m, Flowed gas at 7079 m ³ /day.	Cattle Creek Formation
Production Test, 813.8 m, Flowed gas at 65 100 m ³ /day.	Cattle Creek Formation
Production Test, 880.0-1205.5 m, Flowed gas at 21 800 m ³ /day.	Cattle Creek Formation

STRATIGRAPHY (Arcadia (OSL-3)) :

AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Rewan Formation	00.0
	Bowen Group (Upper Unit)	54.9
	Bowen Group (Middle Unit)	544.1
	Bowen Group (Lower Unit)	1827.0

* Picked by Oil Search Ltd.

ARCTURUS

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	285 km north-northwest of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 41
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Arcturus-1
Pool(s):	Mantuan Fm, Peawaddy Fm, Catherine Ss.
Longitude (E):	148.5000
Latitude (S):	-24.0611
Date total depth reached:	17 NOV 64
Ground level:	179.8 m
Kelly bushing:	184.1 m
Operator:	Associated Freney Oil
Total Depth:	1891 mKB
DISCOVERY WELL:	Arcturus-6
Pool(s):	Aldebaran Ss
Longitude (E):	148.2956
Latitude (S):	-24.0400
Date total depth reached:	06 SEP 91
Ground level:	183.3 m
Kelly bushing:	187.6 m
Operator:	Central Queensland Natural Gas
Total Depth:	1314 mKB
NUMBER OF WELLS DRILLED:	6
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	23 km ²
RESERVOIR UNITS:	4
PETROLEUM BEARING UNIT No.1:	Mantuan Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone : white to gray, fine to medium grained, subrounded, moderately well sorted with a calcareous matrix.
DEPOSITIONAL ENVIRONMENT:	Shallow marine.
FORMATION TOP (mKB):	527.0 m
POROSITY:	25% (average from sonic log)
PERMEABILITY:	20 md (average)
PETROLEUM BEARING UNIT No.2:	Peawaddy Fm (multiple reservoirs)
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone : fine to medium grained, subrounded, well sorted, argillaceous, quartzose with occasional coal streaks.
DEPOSITIONAL ENVIRONMENT:	Shallow marine.
FORMATION TOP (mKB):	528.5 m
POROSITY:	20% (average)
PERMEABILITY:	20 md (average)

PETROLEUM BEARING UNIT No.3:	Catherine Sandstone (multiple reservoirs)
CONTENTS:	Gas
FORMATION:	Catherine Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	713.8 m
POROSITY:	20 to 30% (average)
PERMEABILITY:	20 md (average)
PETROLEUM BEARING UNIT No.4:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	1040.6 m (Arcturus-6)
TEST DATA FROM THE DISCOVERY WELL (Arcturus-1):	
DST 2, 472.4-515.1 m, Recovered 3 m of mud.	Black Alley Shale
DST 1, 515.1-535.8 m, Flowed gas at 101 940 m ³ /day.	Mantuan Formation
DST 4, 566.9-585.2 m, Flowed gas at 45 300 m ³ /day and recovered 31 m of mud.	Peawaddy Formation
DST 5, 585.2-646.2 m, Flowed gas at 35 400 m ³ /day and recovered 34 m of mud.	Peawaddy Formation
DST 6, 765.1-786.4 m, Flowed gas at 28 000 m ³ /day and recovered 34 m of mud.	Catherine Sandstone
DST 3, 954.0-987.6 m, Recovered 31 m of mud.	Freitag Formation
DST 7, 1036.3-1115.9 m, Recovered 192 m of mud.	Aldebaran Sandstone
DST 9, 1280.2-1301.5 m, Recovered 12 m of mud.	Aldebaran Sandstone

TEST DATA FROM THE DISCOVERY WELL (Arcturus-6) :

DST 1, 527-542 m, Mantuan Formation
Flowed gas at 52 386 m³/day.

DST 2, 544-585.5 m, Mantuan Formation
Flowed gas at 24 154 m³/day.

DST 3, 588-606 m, Mantuan Formation
Flowed gas at 19 171 m³/day.

DST 4, 608-633 m, Mantuan Formation
Flowed gas at 14 951 m³/day.

DST 5, 710-725.5 m, Catherine Sandstone
Flowed gas at a rate too small to measure
and recovered 18.3 m of rathole mud.

DST 6, 765-779.5 m, Catherine Sandstone
Flowed gas at 1246 m³/day and
recovered 18 m of rathole mud.

DST 7, 960-1007 m, Freitag Formation
No gas to surface. Recovered 0.5 litres
of mud.

DST 8, 1040-1063.5 m, Aldebaran Sandstone
Flowed gas at 170 m³/day and recovered
0.5 litres of mud.

DST 9, 1114-1149.5 m, Aldebaran Sandstone
Flowed gas at 10 704 m³/day.

DST 10, 1071-1098 m, Aldebaran Sandstone
Flowed gas at 193 m³/day and recovered
18 m of rathole mud.

DST 11, 1153-1190 m, Aldebaran Sandstone
Flowed gas at 263 m³/day.

PRODUCTION & INFRASTRUCTURE :

Discovered in 1964, gas production from Arcturus commenced in 1990. In 1992, a gas plant was built at Arcturus to provide compression for the gas produced at Arcturus, Springton, Moorooloo and Turkey Creek. A further gas compressor station was constructed at Springton and commenced operation in 1996. A 6 km pipeline loop (150 mm diameter) was also built to connect the gas compressor station at Springton with the producing wells at Arcturus.

RESERVES (30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	10	very small	10
Catherine Ss	119	very small	119
Mantuan Fm	674	286	388

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Mantuan Fm	GAS Peawaddy Fm	GAS Catherine Ss
Methane	96.40	96.20	92.50
Ethane	0.80	0.40	3.30
Propane	0.11	trace	0.77
Isobutane	0.04	trace	0.20
N-butane	0.01	-	0.20
Isopentane	0.01(C5+)	-	0.09
N-pentane	na	-	0.07
Hexanes +	na	-	0.24
N ₂ + O ₂	2.24	3.20	1.85
CO ₂	0.37	0.25	0.83
H ₂ S	-	-	-
Specific Gravity	0.573	0.572	0.608
BTU/ft ³ (gross)	1000	981	1046

STRATIGRAPHY (Arcturus-1) :

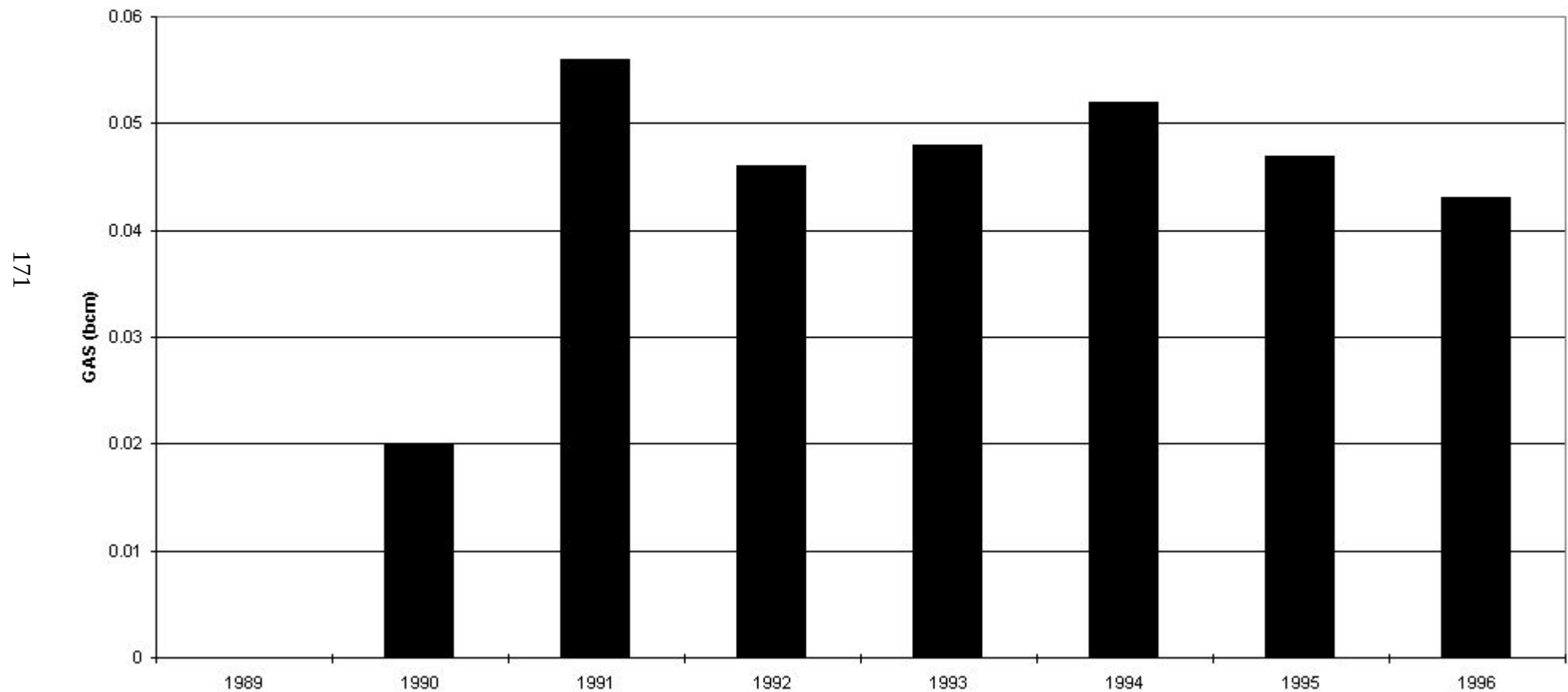
AGE	UNIT	FORMATION TOP * (mKB)
TERTIARY	Volcanics	0.00
TRIASSIC	Rewan Fm	44.2
PERMIAN	Bandanna Fm	197.2
	Black Alley Shale	378.9
	Peawaddy Fm	525.8
	Catherine Sandstone	713.8
	Ingelara Fm	827.5
	Freitag Fm	952.2
	Aldebaran Sandstone	1040.9
	Cattle Creek Fm	1494.7

* Picked by Geological Survey of Queensland

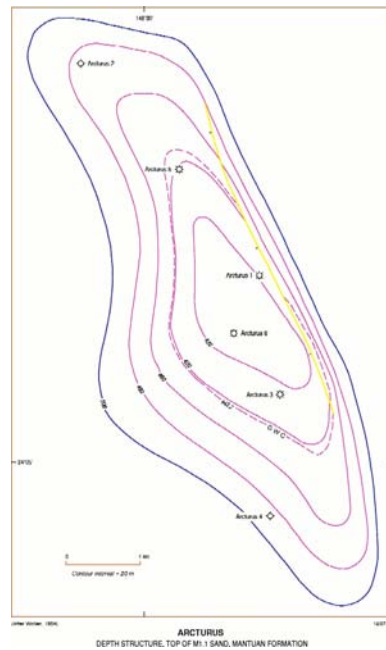
GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	TOC	VITRINITE REFLECTANCE (%)	FORMATION
Arcturus-1	236.2		0.61	Bandanna Fm
	541.0		0.53	Peawaddy Fm
	595.6	4.00	0.64	Peawaddy Fm
	1123.2		0.61	Aldebaran Ss

ARCTURUS, GAS PRODUCTION (Mantuan Formation)
Discovered 17 November 1964 Production commenced July 1990
Total Wells = 6 (3 Producers; 1 Shut In; 2 Plugged and Abandoned)



ARCTURUS MAP



AVONDALE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	43 km south-southwest of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 28
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Avondale-1
Pool(s):	Evergreen Formation.
Longitude (E):	148.660
Latitude (S):	-26.9633
Date total depth reached:	10 NOV 81
Ground level:	356.8 m
Kelly bushing:	360.8 m
Operator:	Associated Australian Resources Ltd
Total Depth:	1477 mKB
DISCOVERY WELL:	Avondale North-1
Pool(s):	Moolayember Formation (Oil).
Longitude (E):	148.6794
Latitude (S):	-26.9206
Date total depth reached:	09 OCT 82
Ground level:	320.7 m
Kelly bushing:	325.0 m
Operator:	Associated Australian Resources Ltd
Total Depth:	1464 mKB
DISCOVERY WELL:	Avondale-4
Pool(s):	Moolayember Formation (Gas).
Longitude (E):	148.6731
Latitude (S):	-26.9419
Date total depth reached:	19 NOV 82
Ground level:	351.0 m
Kelly bushing:	356.0 m
Operator:	Associated Australian Resources Ltd
Total Depth:	1470 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	7.0 km ²
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1332.0 m (Avondale-1)
PETROLEUM BEARING UNIT No.2:	Moolayember Formation
CONTENTS:	Oil and Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine

TEST DATA FROM THE DISCOVERY WELL (Avondale-1):

DST 2, 1407.0-1415.0 m, Evergreen Formation
Flowed gas at 97 700 m³/day.

DST 1, 1415.0-1423.0 m, Evergreen Formation
Flowed gas at 129 100 m³/day.

TEST DATA FROM THE DISCOVERY WELL (Avondale North-1):

DST 1, 1406.4-1413.4 m, Evergreen Formation
Flowed gas at 51 000 m³/day.

DST 2, 1427.0-1434.0 m, Moolayember Formation
Recovered 1 m of oil and 127 m of oil
and gas cut drilling mud.

TEST DATA FROM THE DISCOVERY WELL (Avondale-4):

DST 1, 1430.5-1435.5 m, Evergreen Formation
Flowed gas at 153 000 m³/day.

DST 2, 1435.5-1440.0 m, Moolayember Formation
Flowed gas at 82 100 m³/day.

PRODUCTION & INFRASTRUCTURE :

Following the start up of the SW Queensland Gas Unit in early 1997, the Avondale and Avondale North gas accumulations were taken off stream.

RESERVES (as at 30/6/96):

GAS :

Avondale :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	189	168	21
Evergreen Fm	6	6	very small

Avondale North :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	9	3	6

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	91.60
Ethane	5.00
Propane	0.04
Isobutane	0.52
N-butane	0.01
Isopentane	0.40 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	2.20
CO₂	0.18
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Avondale-1) :

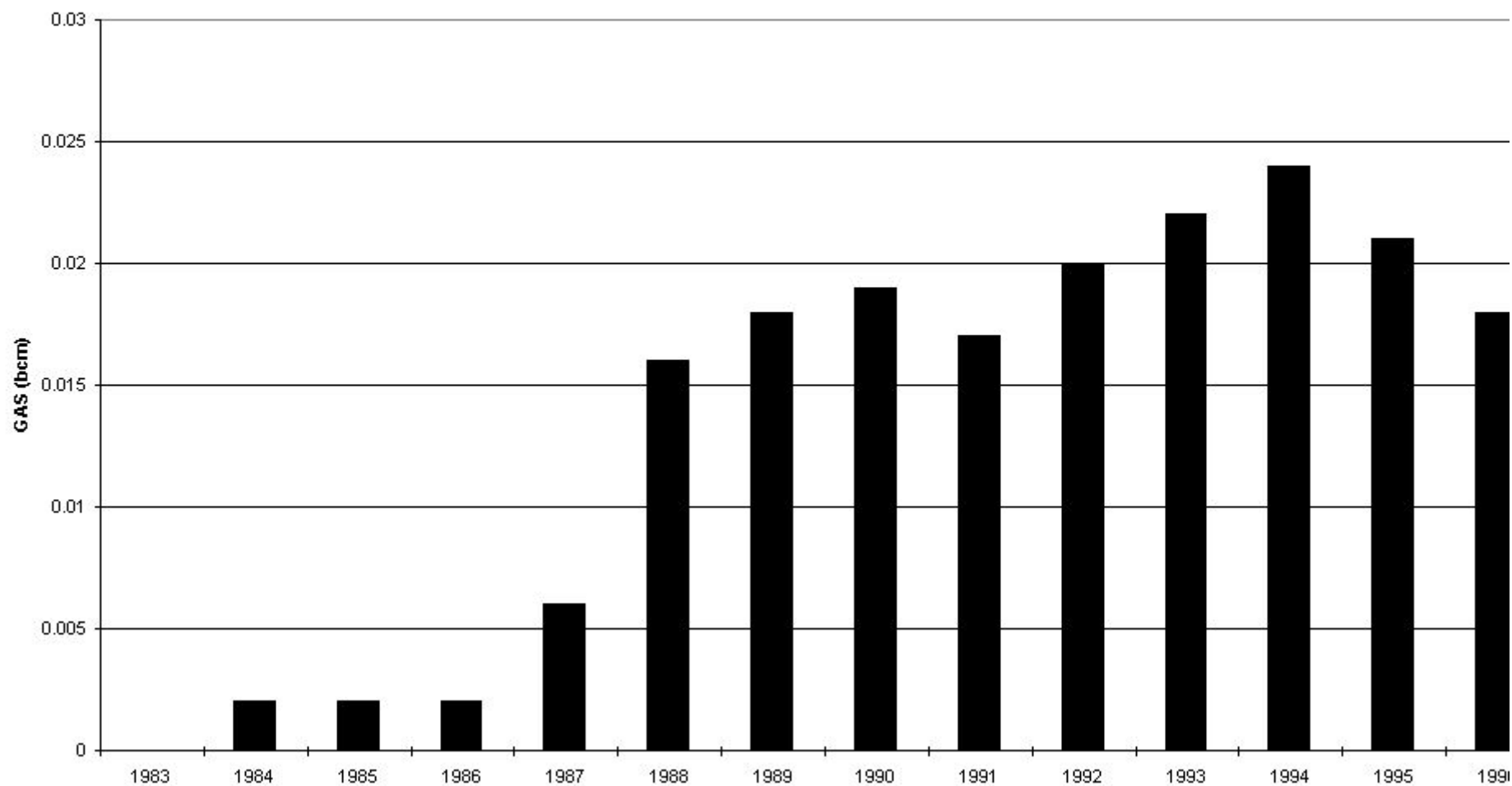
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	0.00
	Wallumbilla Fm	157.0
	Bungil Fm	335.0
	Mooga Sandstone	470.0
JURASSIC	Orallo Fm	543.0
	Gubberamunda Sandstone	727.0
	Westbourne Fm	823.0
	Springbok Sandstone	912.0
	Walloon Coal Measures	974.0
	Eurombah Fm	1131.0
	Hutton Sandstone	1166.0
	Evergreen Fm	1332.0
	Precipice Sandstone	1416.0
CARBONIFEROUS	Granite	1420.0

* Picked by Geological Survey of Queensland

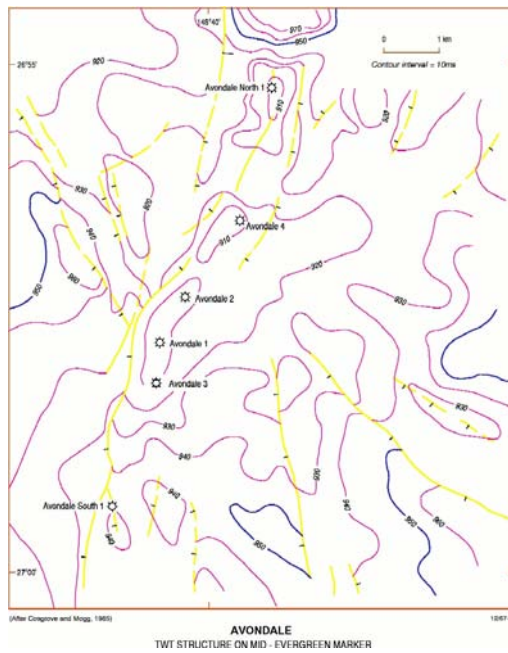
AVONDALE, GAS PRODUCTION (Evergreen Formation & Precipice Sandstone)

Discovered 10 November 1981 Production commenced January 1984

Total Wells = 4 (1 Producer; 3 Shut In)



AVONDALE MAP



BACK CREEK

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 37 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 11
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Back Creek-1
 Longitude (E): 149.1117
 Latitude (S): -26.7667
 Date total depth reached: 24 MAR 64
 Ground level: 295.4 m
 Kelly bushing: 299.3 m
 Operator: Amalgamated Petroleum NL
 Total Depth: 1615 mKB
 NUMBER OF WELLS DRILLED: 5
 STRUCTURE/TRAP: Structural/Stratigraphic trap provided by updip pinchout of the reservoir combined with structural closure away from the zero edge.
 RESERVOIR UNITS: 1
 PETROLEUM BEARING UNIT No.1: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine.
 FORMATION TOP (mKB): 1449.9 m
 TEST DATA FROM THE DISCOVERY WELL (Back Creek-1):
 DST 1, 1364.9-1371.0 m, Precipice Sandstone
 Recovered 362.7 m of slightly gas cut water.
 DST 2, 1447.8-1460.9 m, Rewan Formation
 Flowed gas at 49 500 m³/day.
 DST 3, 1460.9-1467.9 m, Rewan Formation
 Recovered 9.1 m of gas cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Rewan Fm	18	17	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Rewan Fm
Methane	69.40
Ethane	3.70
Propane	2.30
Isobutane	0.72
N-butane	0.79
Isopentane	0.72 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	13.20
CO ₂	9.20
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	908

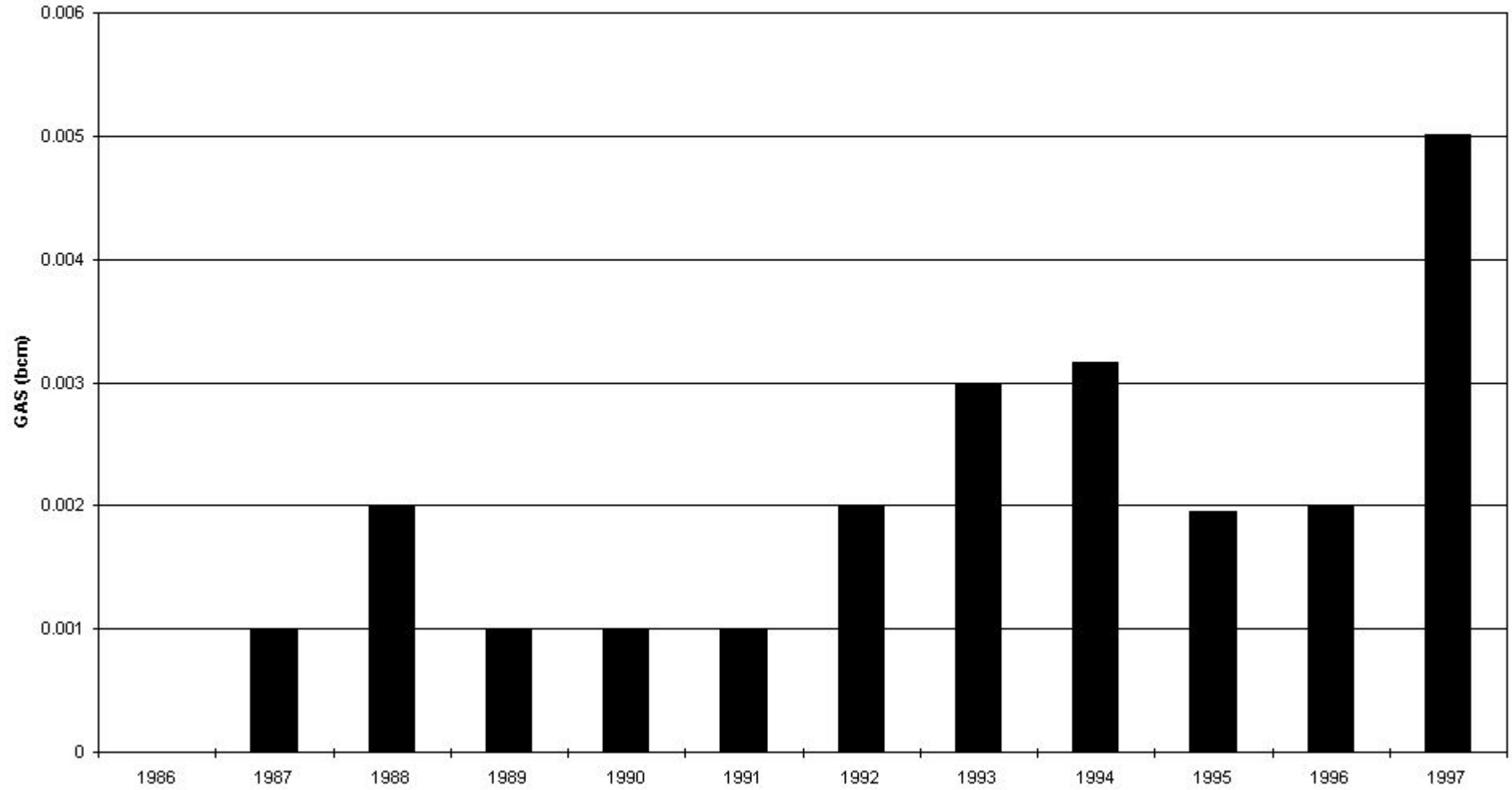
STRATIGRAPHY (Back Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	152.4
	Mooga Sandstone	258.2
JURASSIC	Orallo Fm	382.8
	Gubberamunda Sandstone	517.9
	Westbourne Fm	608.1
	Springbok Sandstone	745.9
	Walloon Coal Measures	767.8
	Eurombah Fm	1047.9
	Hutton Sandstone	1089.1
	Evergreen Fm	1250.9
	Precipice Sandstone	1360.0
TRIASSIC	Moolayember Fm	1374.0
	Snake Creek Mudstone Mbr	1432.6
	Showgrounds Sandstone	1445.7
	Rewan Fm	1449.9
PERMIAN	Blackwater Group	1526.7

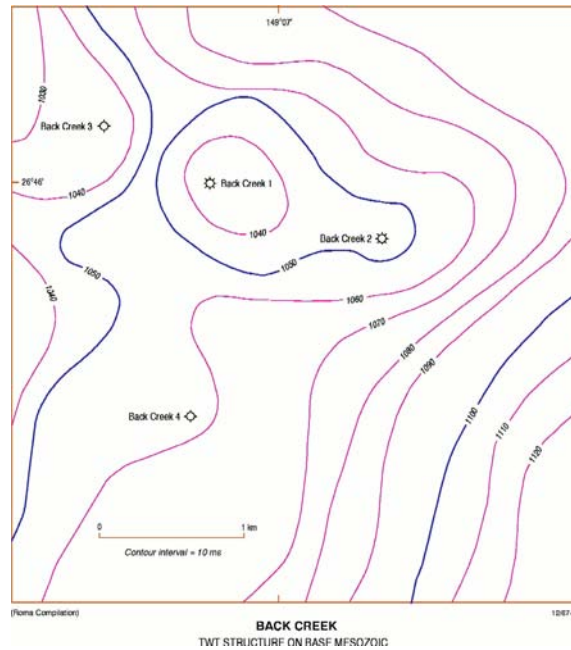
* Picked by Geological Survey of Queensland

BACK CREEK, GAS PRODUCTION (Rewan Formation)
Discovered 24 March 1964 Production commenced August 1987
Total Wells = 5 (1 Producer; 1 Shut In; 3 Plugged and Abandoned)

180



BACK CREEK MAP



BAINBILLA

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	56 km southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	375-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Bainbilla-1
Longitude (E):	149.0653
Latitude (S):	-27.0259
Date total depth reached:	27 MAY 68
Ground level:	244.8 m
Kelly bushing:	249.0 m
Operator:	Union Oil Development
Total Depth:	1954 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Back Creek Group
CONTENTS:	Gas
FORMATION:	Back Creek Group
AGE:	Permian
LITHOLOGY:	Sandstone
DEPOSITIONAL ENVIRONMENT:	Fluvio-lacustrine to shallow marine.
FORMATION TOP (mKB):	1831.9 m

TEST DATA FROM THE DISCOVERY WELL (Bainbilla-1):

DST 1, 1763.3-1777 m, Misrun.	Showgrounds Sandstone
DST 2, 1773.3-1777 m, Recovered 56.4 m of contaminated rathole mud. Tool plugged.	Showgrounds Sandstone
DST 3, 1771.8-1777 m, No recovery.	Showgrounds Sandstone
DST 4, 1862.3-1880 m, Flowed gas at 4250 m ³ /day.	Back Creek Group
DST 5, 1861.7-1866 m, Misrun.	Back Creek Group
DST 6, 1862.9-1866 m, Misrun.	Back Creek Group
DST 7, 1859.3-1871.5 m, Misrun.	Back Creek Group
DST 8, 1849.5-1954.4 m, Flowed gas at 4250 m ³ /day and recovered 152.4 m of gassy rathole mud.	Back Creek Group

STRATIGRAPHY (Bainbilla-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	146.3
	Bungil Fm	336.8
	Mooga Sandstone	479.8
JURASSIC	Orallo Fm	612.0
	Gubberamunda Sandstone	769.0
	Westbourne Fm	899.2
	Springbok Sandstone	1002.8
	Walloon Coal Measures	1072.9
	Hutton Sandstone	1329.5
	Evergreen Fm	1505.7
	Boxvale Sandstone Mbr	1553.6
	Precipice Sandstone	1620.0
TRIASSIC	Moolayember Fm	1628.2
	Snake Creek Mudstone Mbr	1749.6
	Showgrounds Sandstone	1761.7
PERMIAN	Blackwater Group	1777.6
	Back Creek Group	1831.9
CARBONIFEROUS	Volcanics	1901.3

* Picked by Geological Survey of Queensland

BARDLOMING

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	28 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Bardloming-1
Longitude (E):	149.0178
Latitude (S):	-26.7278
Date total depth reached:	05 NOV 63
Ground level:	313.3 m
Kelly bushing:	316.7 m
Operator:	Associated Australian Oilfields Ltd
Total Depth:	1432 mKB
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine.
FORMATION TOP (mKB):	1336.2 m
POROSITY:	15% (average)

TEST DATA FROM THE DISCOVERY WELL (Bardloming-1):

DST 1, 1336.6-1342.6 m,	Moolayember Formation
Flowed gas at 280 m ³ /day and recovered	
9.1 m of gas cut mud.	

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Moolayember Fm	GAS Showgrounds Ss
Methane	77.90	81.50
Ethane	7.30	6.50
Propane	4.70	3.40
Isobutane	1.86	1.08
N-butane	1.65	1.13
Isopentane	0.73	0.45
N-pentane	0.64	0.05
Hexanes +	0.73	0.74
N ₂ + O ₂	3.90	3.90
CO ₂	0.61	0.82
H ₂ S	-	-
Specific Gravity	-	-
BTU/ft ³ (gross)	-	-

STRATIGRAPHY (Bardloming-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	189.0
	Mooga Sandstone	275.5
JURASSIC	Orallo Fm	342.0
	Gubberamunda Sandstone	522.1
	Westbourne Fm	593.5
	Springbok Sandstone	724.8
	Walloon Coal Measures	759.9
	Eurombah Fm	993.7
	Hutton Sandstone	1045.5
	Evergreen Fm	1200.9
	Precipice Sandstone	1333.2
TRIASSIC	Moolayember Fm	1336.2
	Snake Creek Mudstone Mbr	1409.4
	Showgrounds Sandstone	1418.2
PERMIAN	Blackwater Group	1424.9

* Picked by Geological Survey of Queensland

BARDLOMING SOUTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	30 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Bardloming South-1
Longitude (E):	149.0386
Latitude (S):	-26.7511
Date total depth reached:	12 APR 66
Ground level:	304.8 m
Kelly bushing:	308.2 m
Operator:	CSR Ltd
Total Depth:	1441 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1423.4 m
 TEST DATA FROM THE DISCOVERY WELL (Bardloming South-1):	
DST 2, 1415.2-1431.0 m, Flowed gas at 4560 m ³ /day.	Showgrounds Sandstone
 DST 1, 1417.3-1441.7 m, Flowed gas at 6800 m ³ /day and recovered 4.6 m of gas cut mud.	 Showgrounds Sandstone

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	82.10
Ethane	5.90
Propane	3.50
Isobutane	0.97
N-butane	1.08
Isopentane	0.35
N-pentane	0.39
Hexanes +	1.30
N ₂ + O ₂	3.60
CO ₂	0.83
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Bardloming South-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	157.3
	Mooga Sandstone	275.5
JURASSIC	Orallo Fm	345.3
	Gubberamunda Sandstone	528.2
	Westbourne Fm	604.1
	Springbok Sandstone	743.1
	Walloon Coal Measures	774.5
	Eurombah Fm	1025.4
	Hutton Sandstone	1088.1
	Evergreen Fm	1220.4
	Precipice Sandstone	1338.1
TRIASSIC	Moolayember Fm	1341.4
	Snake Creek Mudstone Mbr	1412.8
	Showgrounds Sandstone	1423.4
PERMIAN	Blackwater Group	1434.4

* Picked by Geological Survey of Queensland

BEAUFORT

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	12 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 3
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Beaufort-1
Longitude (E):	148.9097
Latitude (S):	-26.5750
Date total depth reached:	02 JUL 64
Ground level:	306.9 m
Kelly bushing:	310.3 m
Operator:	Associated Australian Oilfields
Total Depth:	1169 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Structural/Stratigraphic trap formed by drape of a channel sand over a basement ridge.
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse, quartzose, garnetiferous with abundant clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1110.7 m
PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Beaufort-1):	
DST 1, 1098.8-1156.6 m, Flowed gas at 2830 m ³ /day.	Precipice Sandstone
DST 2, 1114.0-1169.2 m, Flowed gas at 25 880 m ³ /day.	Showgrounds Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	173	115	58
Showgrounds Ss	73	55	18

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss	GAS Showgrounds Ss
Methane	91.70	90.80
Ethane	4.00	4.00
Propane	0.21	1.14
Isobutane	0.40	0.24
N-butane	0.06	0.25
Isopentane	0.17	0.09
N-pentane	0.02	0.05
Hexanes +	0.35	0.42
N ₂ + O ₂	2.50	2.70
CO ₂	0.59	0.28
H ₂ S	-	-
Specific Gravity	-	-
BTU/ft ³ (gross)	-	-

STRATIGRAPHY (Beaufort-1) :

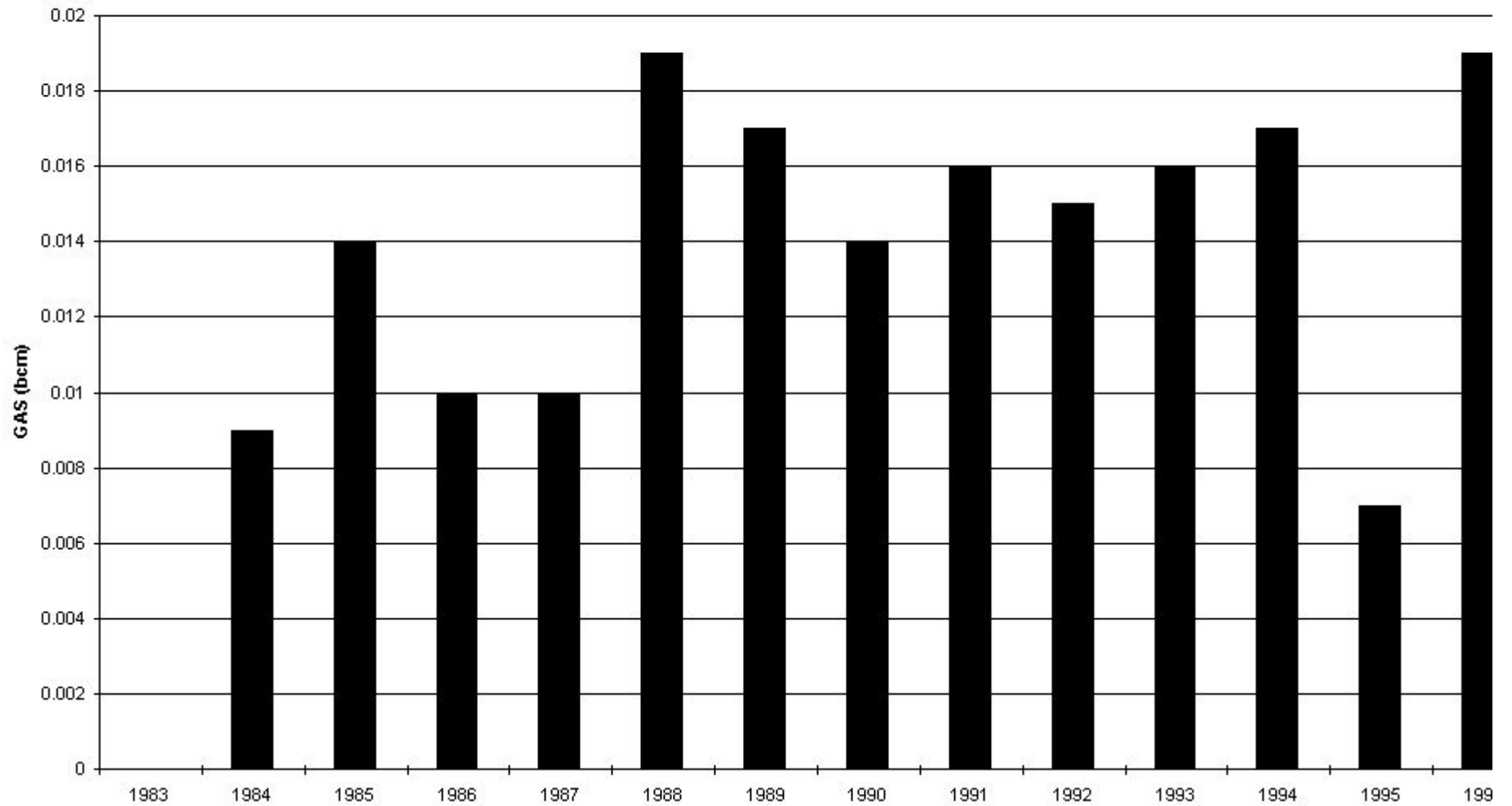
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	103.6
JURASSIC	Orallo Fm	167.6
	Gubberamunda Sandstone	327.1
	Westbourne Fm	392.9
	Springbok Sandstone	499.3
	Walloon Coal Measures	566.9
	Eurombah Fm	777.9
	Hutton Sandstone	818.7
	Evergreen Fm	978.1
	Precipice Sandstone	1110.7
TRIASSIC	Moolayember Fm	1118.0
CARBONIFEROUS	Granite	1160.7

* Picked by Geological Survey of Queensland

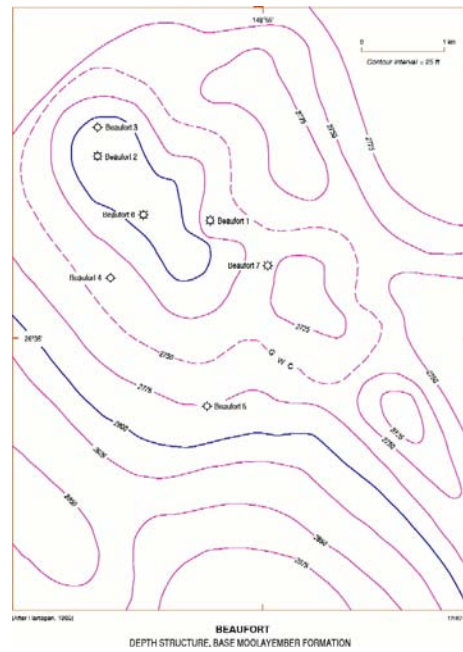
BEAUFORT, GAS PRODUCTION (Precipice Sandstone & Showgrounds Sandstone)

Discovered 2 July 1964 Production commenced July 1984

Total Wells = 7 (6 Producers; 1 Plugged and Abandoned)



BEAUFORT MAP



BEECHWOOD

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 110 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 16
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Beechwood-2
 Longitude (E): 149.2558
 Latitude (S): -27.5028
 Date total depth reached: 09 DEC 88
 Ground level: 360.8 m
 Kelly bushing: 365.2 m
 Operator: Bridge Oil Ltd
 Total Depth: 2185 mKB
 NUMBER OF WELLS DRILLED: 3
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 3.3 km² (on top Permian)
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (Beechwood-2):

DST 1, 2070.0-2081.0 m, Showgrounds Sandstone
 Flowed gas at 127 m³/day and condensate
 at 22 bbl/day.

DST 2, 2150.0-2185.0 m, Showgrounds Sandstone
 Recovered 9.0 m of mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	231	71	160

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	29	9	20

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	39	12	27

STRATIGRAPHY (Beechwood-1) :

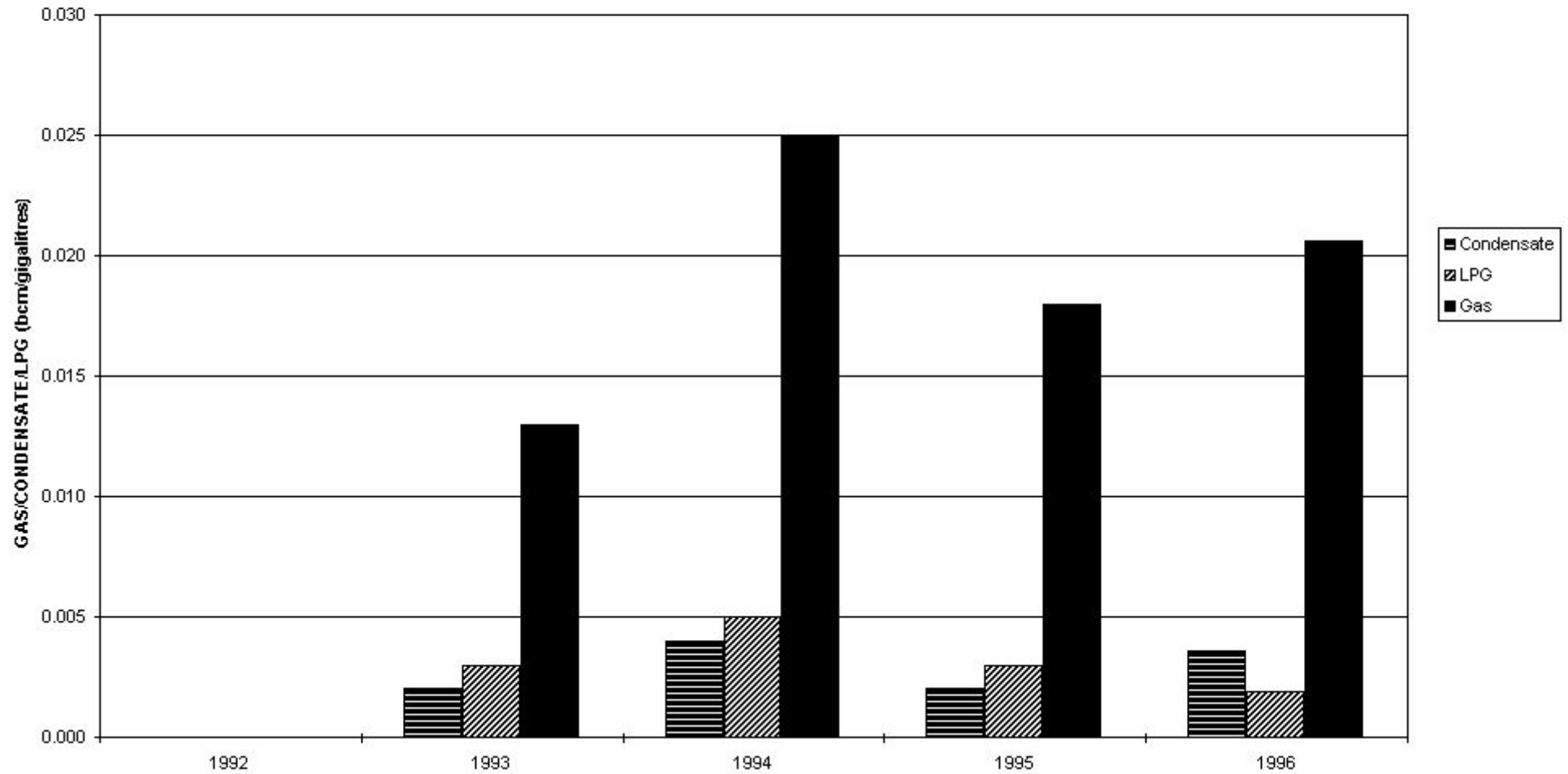
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	249.9
	Wallumbilla Fm	398.7
	Bungil Fm	613.9
	Mooga Sandstone	816.9
JURASSIC	Orallo Fm	917.5
	Gubberamunda Sandstone	1110.7
	Westbourne Fm	1270.4
	Springbok Sandstone	1362.5
	Walloon Coal Measures	1455.4
	Hutton Sandstone	1667.0
	Evergreen Fm	1824.8
	Precipice Sandstone	1916.6
TRIASSIC	Moolayember Fm	1923.9
	Snake Creek Mudstone Mbr	2083.3
	Showgrounds Sandstone	2103.7
PERMIAN	Blackwater Group	2113.8
DEVONIAN	Timbury Hills Fm	2176.3

* Picked by Geological Survey of Queensland

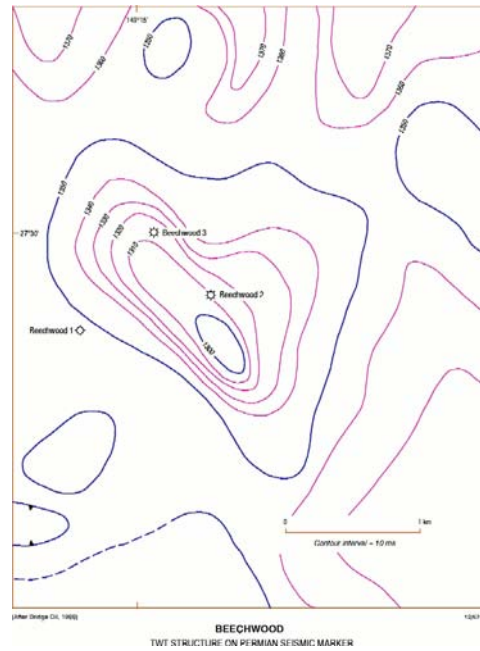
BEECHWOOD, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 9 December 1988 Production commenced 1993

Total Wells = 3 (2 Producers; 1 Plugged and Abandoned)



BEECHWOOD MAP



BELDENE

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	50 km south-southwest of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 21
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Beldene-1
Pool(s):	Evergreen Formation.
Longitude (E):	148.6658
Latitude (S):	-27.0304
Date total depth reached:	23 OCT 79
Ground level:	345.9 m
Kelly bushing:	348.9 m
Operator:	Hartogen Energy Ltd
Total Depth:	1481 mKB
DISCOVERY WELL:	Beldene-7
Pool(s):	Wandoan Sandstone Member.
Longitude (E):	148.6505
Latitude (S):	-27.0158
Date total depth reached:	04 NOV 80
Ground level:	311.0 m
Kelly bushing:	314.0 m
Operator:	Hartogen Energy Ltd
Total Depth:	1422 mKB
NUMBER OF WELLS DRILLED:	12
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Boxvale Sandstone Member
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1405.7 m (Beldene-1)
PETROLEUM BEARING UNIT No.2:	Wandoan Sandstone Member
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Beldene-1):	
DST 3, 1398.7-1414.0 m, Recovered 18.3 m of mud and 1070 m of gas cut water.	Evergreen Formation (Boxvale Ss)
DST 1, 1441.4-1451.2 m, Flowed gas at 232 200 m ³ /day.	Evergreen Formation (Boxvale Ss)
DST 2, 1450.2-1469.1 m, Recovered 107.0 m of mud.	Moolayember Formation

TEST DATA FROM THE DISCOVERY WELL (Beldene-7):

DST 1, 1392.0-1400.0 m, Evergreen Formation
Flowed gas at 178 400 m³/day.

DST 2, 1400.1-1423.0 m, Wandoan Sandstone
Flowed gas at 170 000 m³/day.

PRODUCTION & INFRASTRUCTURE :

Discovered in 1979 by Beldene-1, the Beldene gas accumulation was brought into production in 1982 with the completion of Beldene-5, 6 and 7 as gas producers. In 1993/4 Beldene-11 was brought into production and in the following year (1995), Beldene-12 was brought on stream. Gas from Beldene is transported to Brisbane via Kincora and Wallumbilla. In 1996, production from the Beldene accumulation was shut in due to high water cut.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	335	293	42
Wandoan Ss	very small	very small	very small

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	3	2	1
Wandoan Ss	very small	very small	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	9	8	1
Wandoan Ss	very small	very small	very small

STRATIGRAPHY (Beldene-1) :

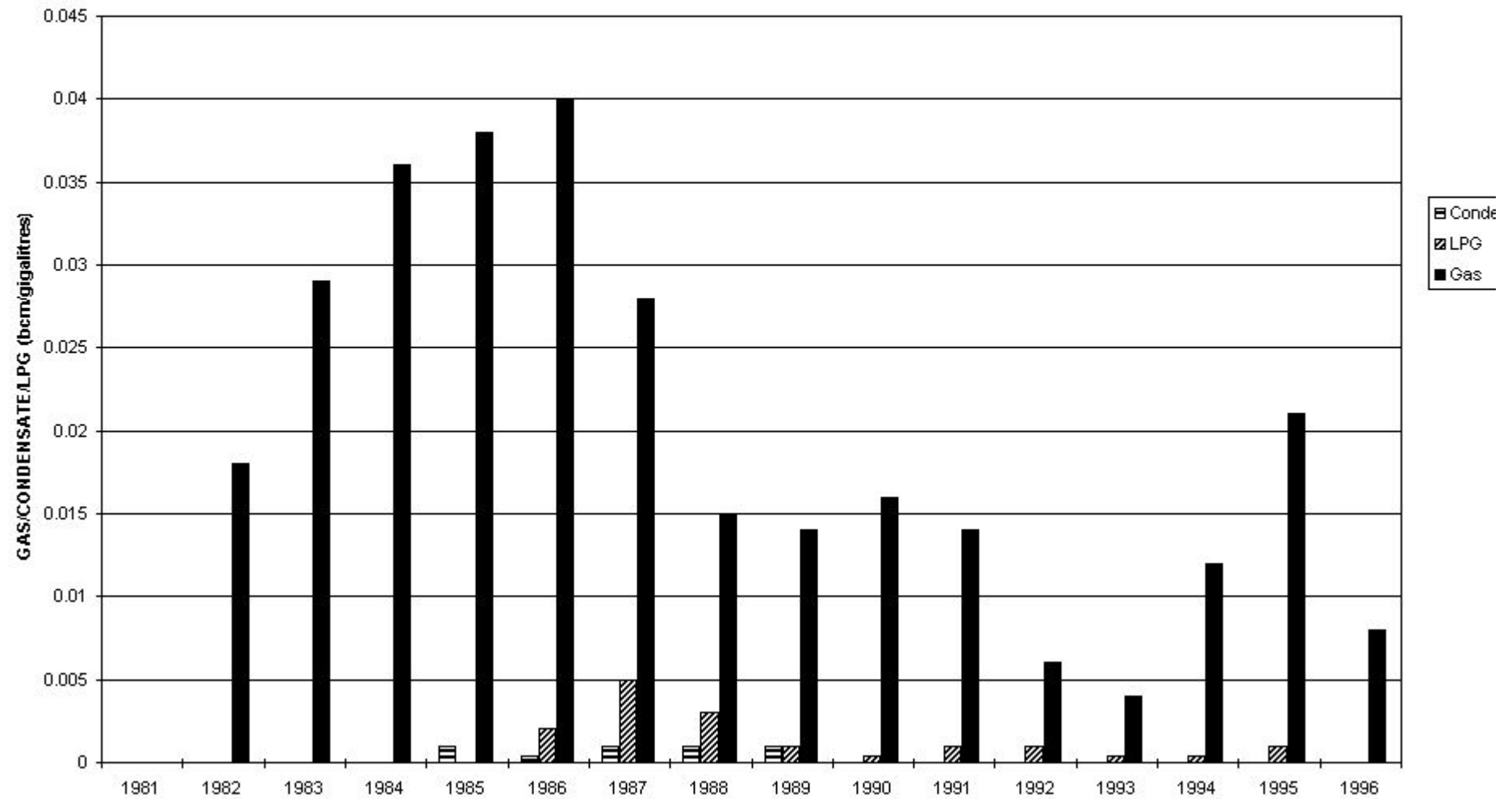
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	204.8
	Bungil Fm	368.8
	Mooga Sandstone	501.4
JURASSIC	Orallo Fm	571.5
	Gubberamunda Sandstone	773.0
	Westbourne Fm	862.6
	Springbok Sandstone	963.2
	Walloon Coal Measures	1027.2
	Hutton Sandstone	1247.2
	Evergreen Fm	1371.6
CARBONIFEROUS	Granite	1455.7

* Picked by Geological Survey of Queensland

BELDEN, GAS / CONDENSATE / LPG PRODUCTION (Basal Evergreen Formation)

Discovered 23 October 1979 Production commenced June 1982

Total Wells = 12



BELLBIRD

PRESENT OPERATOR:	Brisbane Petroleum NL
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	155 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	552-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Bellbird-1
Longitude (E):	149.4953
Latitude (S):	-27.8481
Date total depth reached:	17 FEB 84
Ground level:	230.7 m
Kelly bushing:	236.3 m
Operator:	Sydney Oil Company Pty Ltd
Total Depth:	2620 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Kianga Formation
CONTENTS:	Oil and Gas
FORMATION:	Kianga Formation
AGE:	Late Permian to Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	2360.0 m

TEST DATA FROM THE DISCOVERY WELL (Bellbird-1):

Production Test, 2415.2-2417.4 m, Flowed 32 bbl/day of oil.	Kianga Formation

DST 4, 2415.5-2420.0 m, Flowed gas at 3100 m ³ /day. Recovered 723 m of oil, 150 m of gas cut mud and 305 m of muddy water.	Kianga Formation

DST 3, 2422-2426.5 m, No gas to surface. No recovery.	Kianga Formation

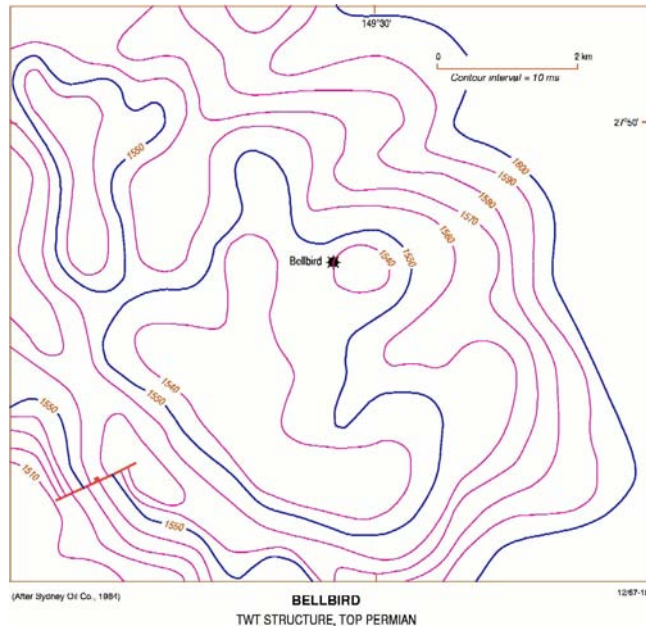
DST 5, 2588.0-2596.0 m, Recovered 220 m of muddy water.	Back Creek Group

STRATIGRAPHY (Bellbird-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	387.5
	Bungil Fm	640.0
	Mooga Sandstone	875.0
JURASSIC	Orallo Fm	1020.0
	Gubberamunda Sandstone	1152.5
	Westbourne Fm	1368.5
	Springbok Sandstone	1450.0
	Walloon Coal Measures	1542.0
	Hutton Sandstone	1738.0
	Evergreen Fm	1895.0
	Precipice Sandstone	1990.0
TRIASSIC	Moolayember Fm	2020.5
	Snake Creek Mudstone Mbr	2254.0
	Showgrounds Sandstone	2275.5
	Rewan Fm	2302.0
PERMIAN	Kianga Fm	2360.0
	Back Creek Group	2470.0
CARBONIFEROUS	Kuttung Fm	2595.0

* Picked by Geological Survey of Queensland

BELLBIRD MAP



BENDEE

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	118 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	212-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Bendee-1
Longitude (E):	148.9822
Latitude (S):	-27.6458
Date total depth reached:	02 JUL 81
Ground level:	280.0 m
Kelly bushing:	284.0 m
Operator:	Hematite Petroleum
Total Depth:	1832 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	2.0 km ² (on Showgrounds Sandstone)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1802.9 m
 TEST DATA FROM THE DISCOVERY WELL (Bendee-1):	
DST 3, 1762-1769 m, No gas to surface.	Moolayember Formation
DST 1, 1800.8-1812.6 m, Flowed 74 bbl/day of oil.	Showgrounds Sandstone
DST 2, 1802.0-1804.0 m, Recovered 22 bbl of slightly gas cut water.	Showgrounds Sandstone

STRATIGRAPHY (Bendee-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	246.9
	Wallumbilla Fm	373.4
	Bungil Fm	562.4
	Mooga Sandstone	759.6
JURASSIC	Orallo Fm	886.4
	Gubberamunda Sandstone	975.4
	Westbourne Fm	1197.3
	Springbok Sandstone	1305.2
	Walloon Coal Measures	1365.5
	Hutton Sandstone	1492.0
	Evergreen Fm	1639.5
TRIASSIC	Moolayember Fm	1731.3
	Snake Creek Mudstone Mbr	1790.7
	Showgrounds Sandstone	1802.9
CARBONIFEROUS	Granite	1805.0

* Picked by Geological Survey of Queensland

BENGALLA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	45 km east-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 8
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Bengalla-1
Longitude (E):	149.2306
Latitude (S):	-26.6847
Date total depth reached:	25 SEP 67
Ground level:	306.6 m
Kelly bushing:	311.2 m
Operator:	CSR Ltd
Total Depth:	2184 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	Back Creek Group
CONTENTS:	Gas
FORMATION:	Back Creek Group
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Marine
FORMATION TOP (mKB):	1906.5 m
 TEST DATA FROM THE DISCOVERY WELL (Bengalla-1):	
DST 1, 1990.3-2013.5 m, Flowed gas at 57 m ³ /day.	Back Creek Group
 DST 2, 2080.0-2108.9 m, Flowed gas at 1410 m ³ /day.	Back Creek Group

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Back Creek Gp
Methane	86.70
Ethane	4.40
Propane	1.58
Isobutane	0.17
N-butane	0.39
Isopentane	0.14
N-pentane	0.19
Hexanes +	1.99
N ₂ + O ₂	1.48
CO ₂	3.00
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Bengalla-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	137.2
	Mooga Sandstone	241.4
JURASSIC	Orallo Fm	326.1
	Gubberamunda Sandstone	513.9
	Westbourne Fm	580.6
	Springbok Sandstone	693.4
	Walloon Coal Measures	775.4
	Eurombah Fm	1040.9
	Hutton Sandstone	1134.2
	Evergreen Fm	1300.3
	Precipice Sandstone	1412.8
	Moolayember Fm	1424.6
TRIASSIC	Snake Creek Mudstone Mbr	1561.2
	Showgrounds Sandstone	1577.0
	Rewan Fm	1592.6
	Blackwater Group	1830.3
PERMIAN	Back Creek Group	1906.5
	Combarngo Volcanics	2162.9

* Picked by Geological Survey of Queensland

BENNETT

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Producer
LOCATION:	55 km north-northwest of Moonie.
STATE:	Queensland
PETROLEUM TITLES:	PL 17
BASIN:	Surat
SUB-BASIN:	Chinchilla-Goondiwindi Slope
DISCOVERY WELL:	Bennett-1
Pool(s):	Precipice Sandstone.
Longitude (E):	150.2159
Latitude (S):	-27.2211
Date total depth reached:	18 OCT 65
Ground level:	285.0 m
Kelly bushing:	288.6 m
Operator:	Union Oil Development Corporation
Total Depth:	1744 mKB
DISCOVERY WELL:	Bennett-4
Pool(s):	Evergreen Formation.
Longitude (E):	150.2258
Latitude (S):	-27.2156
Date total depth reached:	17 MAY 70
Ground level:	283.4 m
Kelly bushing:	288.0 m
Operator:	Union Oil Development Corporation
Total Depth:	1713 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	Structural/Stratigraphic trap within an anticlinal closure.
AREAL CLOSURE:	17 to 23 km ²
RESERVOIR UNITS:	2
DRIVE:	Water drive
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Oil
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1465.8 m
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Oil
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : light gray, medium to coarse, sublabile and clayey, with occasional carbonaceous laminations.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine.
FORMATION TOP (mKB):	1621.5 m (Bennett-1)
POROSITY:	15% (average)
PERMEABILITY:	3 to 11 md

TEST DATA FROM THE DISCOVERY WELL (Bennett-1):

DST 1, 1624.6-1632.2 m, Precipice Sandstone
Recovered 1311 m of oil.

DST 2, 1651.1-1659.0 m, Precipice Sandstone
Recovered 1575 m of formation water
and 30.5 m of muddy formation water.

TEST DATA FROM THE DISCOVERY WELL (Bennett-4):

DST 1, 1604.2-1611.8 m, Evergreen Formation
Recovered 20 bbl of oil.

DST 2, 1614.5-1620.6 m, Evergreen Formation
Recovered 990 m of 38° API oil.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE OIL PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	20	19	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Evergreen Fm
Methane	56.10
Ethane	3.50
Propane	9.10
Isobutane	7.60
N-butane	7.00
Isopentane	2.90
N-pentane	2.40
Hexanes +	2.60
N ₂ + O ₂	8.30
CO ₂	0.55
H ₂ S	-
Specific Gravity	1.079
BTU/ft ³ (gross)	1690

OIL :

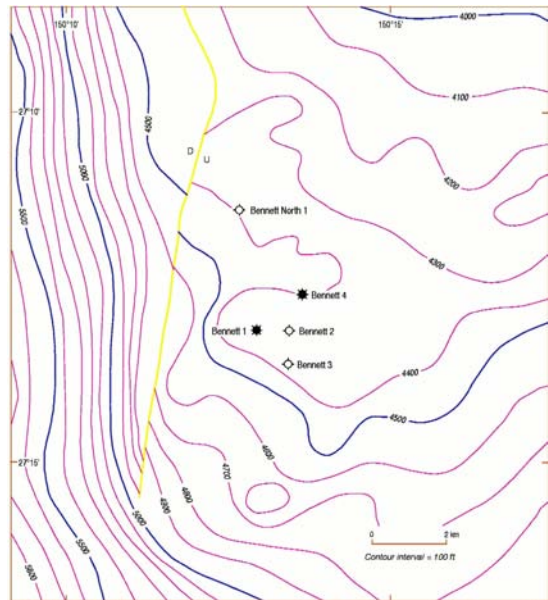
FLUID PROPERTIES	OIL Precipice Ss
API Gravity @ 60°F	41.3° to 46°
Base	-
Sulphur (% wt)(ppm)	0.01% to 0.03%
Initial GOR (ft ³ /bbl)	-
Pour Point	8.9°C to 22.8°C
Specific Gravity	0.797 to 0.819
Colour	Green-black
Viscosity (cp@100°F)	2.75
Bubble Point (psig)	-

STRATIGRAPHY (Bennett-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	142.9
	Mooga Sandstone	292.0
JURASSIC	Orallo Fm	345.6
	Gubberamunda Sandstone	562.3
	Westbourne Fm	623.3
	Walloon Coal Measures	859.5
	Hutton Sandstone	1245.1
	Evergreen Fm	1465.8
	Precipice Sandstone	1621.5
PERMIAN	Permian	1715.1

* Picked by Geological Survey of Queensland

BENNETT MAP



(After United Geophysical and Union Oil, 1967)

1247-05

BENNETT
DEPTH STRUCTURE, TOP PRECIPICE SANDSTONE

BERANGA SOUTH

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 55 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 53
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Beranga South-1
 Longitude (E): 149.0289
 Latitude (S): -27.0825
 Date total depth reached: 24 AUG 90
 Ground level: 253.3 m
 Kelly bushing: 258.8 m
 Operator: Oil Company of Australia NL
 Total depth: 1807 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Basal Permian
 CONTENTS: Gas
 FORMATION: Basal Permian
 AGE: Permian
 LITHOLOGY: Sandstone.

TEST DATA FROM THE DISCOVERY WELL (Beranga South-1):

DST 1, 1765.1-1787.0 m, Basal Permian
 Flowed gas at 86 400 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE GAS PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Permian	122	107	15

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Permian	8	6	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Permian	14	10	4

STRATIGRAPHY (Beranga South-1) :

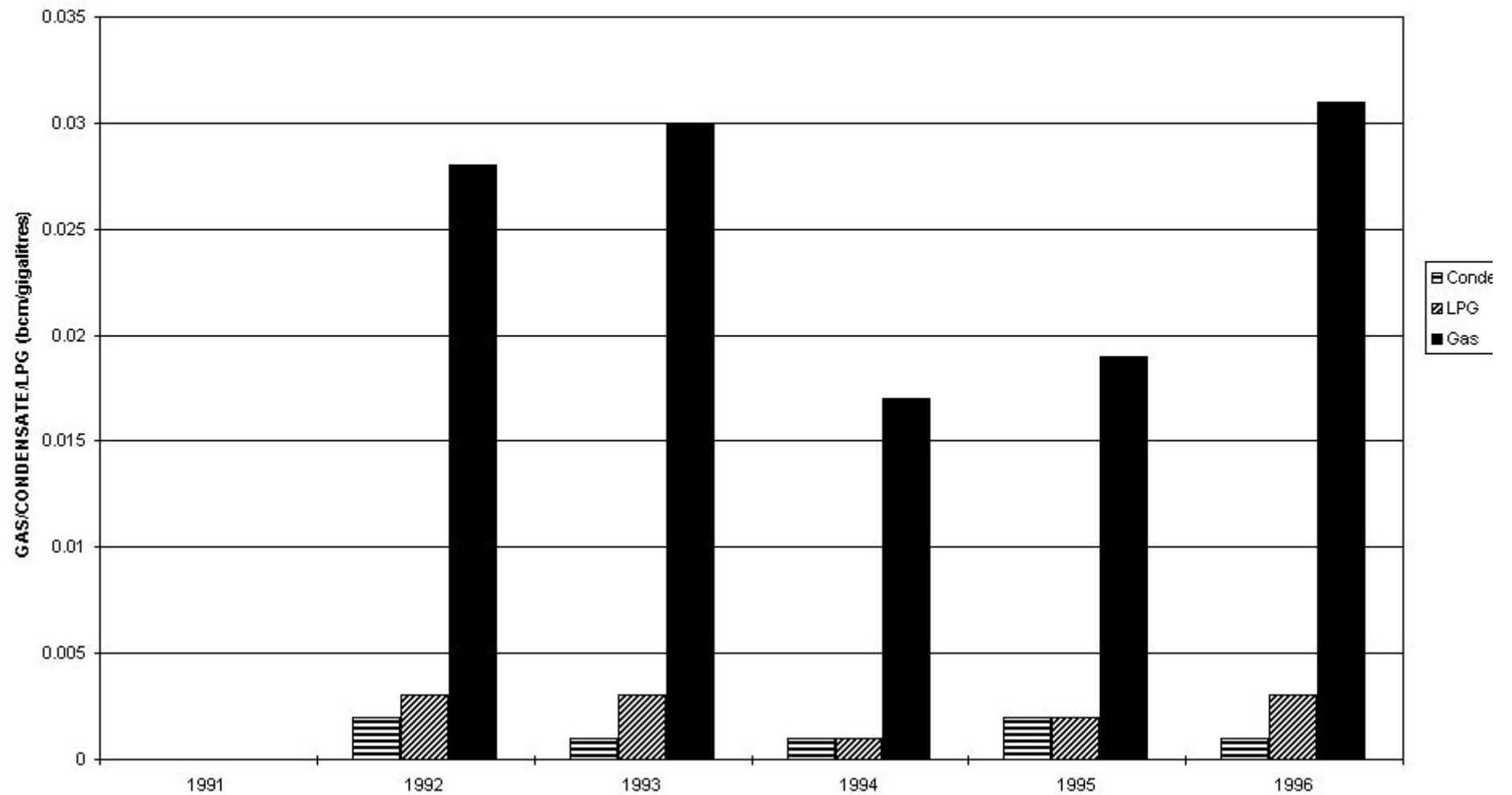
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	5.5
	Wallumbilla Formation	141.4
	Bungil Formation	328.9
	Mooga Sandstone	533.7
JURASSIC	Orallo Formation	654.6
	Gubberamunda Sandstone	781.2
	Westbourne Formation	900.8
	Adori Sandstone	1041.2
	Birkhead Formation	1084.5
	Hutton Sandstone	1296.9
	Evergreen Formation	1499.0
	Boxvale Sandstone Member	1538.0
TRIASSIC	Moolayember Formation	1603.2
	Snake Creek Mudstone Mbr	1706.0
	Showgrounds Sandstone	1717.5
PERMIAN	Blackwater Group	1723.3
	Back Creek Group	1738.6
	Basement	1778.2

* Picked Geological Survey of Queensland

BERANGA SOUTH, GAS / CONDENSATE / LPG PRODUCTION (Basal Permian)

Discovered 24 August 1990 Production commenced 1992

Total Wells = 1 (1 Producer)



BERWICK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer.
LOCATION:	70 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 70
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Berwick-1
Pool(s):	Precipice Sandstone.
Longitude (E):	148.8922
Latitude (S):	-27.2386
Date total depth reached:	11 NOV 84
Ground level:	230.4 m
Kelly bushing:	234.7 m
Operator:	Hartogen Energy Ltd
Total Depth:	1503 mKB
DISCOVERY WELL:	Berwick-2
Pool(s):	Evergreen Formation; Moolayember Formation.
Longitude (E):	148.8918
Latitude (S):	-27.2517
Date total depth reached:	15 FEB 93
Ground level:	234.0 m
Kelly bushing:	239.5 m
Operator:	Oil Company of Australia Ltd
Total Depth:	1530 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	3
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1462.4 m (Berwick-1)
PETROLEUM BEARING UNIT No.3:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine

TEST DATA FROM THE DISCOVERY WELL (Berwick-1):

DST 3, 1416.7-1429.5 m, Evergreen Formation (Boxvale Ss)
Recovered 11 m of mud.

DST 1, 1459.4-1473.4 m, Precipice Sandstone
Flowed gas at 1030 m³/day and recovered
13.7 m of gas cut mud.

DST 2, 1474.6-1502.5 m, Wandoan Sandstone
Recovered 54.9 m of gas cut mud.

TEST DATA FROM THE DISCOVERY WELL (Berwick-2):

DST 1, 1468.0-1484.0 m, Evergreen Formation
Flowed gas at 8300 m³/day.

DST 2, 1482.0-1490.0 m, Moolayember Formation
Flowed gas at 33 100 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Moolayember Fm	9	6	3

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Moolayember Fm	1	1	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Moolayember Fm	1	very small	1

STRATIGRAPHY (Berwick-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
	Blythesdale Group	359.4
JURASSIC	Injune Creek Group	891.5
	Hutton Sandstone	1216.2
	Evergreen Fm/Precipice Ss	1376.5
TRIASSIC	Wandoan Fm	1470.4
CARBONIFEROUS	Granite	1485.6

* Picked by Hartogen Energy Ltd

BLACKBUTT

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	47 km southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	336-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Blackbutt-1
Longitude (E):	149.0964
Latitude (S):	-26.9306
Date total depth reached:	17 JUL 84
Ground level:	285.0 m
Kelly bushing:	289.3 m
Operator:	Hartogen Energy Ltd
Total Depth:	1792 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1617.3 m

PETROLEUM BEARING UNIT No.2:	Timbury Hills Formation
CONTENTS:	Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Indurated sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental
FORMATION TOP (mKB):	1731.9 m

TEST DATA FROM THE DISCOVERY WELL (Blackbutt-1):

DST 1, 1614.5-1626.7 m, Flowed gas at 9060 m ³ /day.	Showgrounds Sandstone

DST 2, 1716.3-1728.5 m, Gas to surface at a rate too small to measure.	Mantuan Formation

DST 3, 1733.7-1765.7 m, Flowed gas at 135 900 m ³ /day.	Timbury Hills Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	very small	very small	very small
Timbury Hills Fm	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

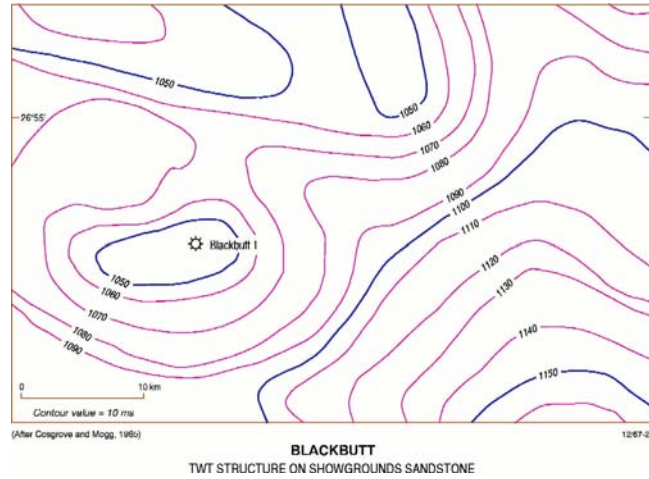
GAS PROPERTIES	GAS Showgrounds Ss	GAS Timbury Hills Fm
Methane	79.25	59.63
Ethane	6.75	4.10
Propane	3.30	1.20
Isobutane	1.05	0.23
N-butane	0.77	0.25
Isopentane	1.05 (C5+)	0.42 (C5+)
N-pentane	na	na
Hexanes +	na	na
N ₂ + O ₂	6.40	11.55
CO ₂	1.45	22.60
H ₂ S	-	-
Specific Gravity	0.710	0.868
BTU/ft ³ (gross)	1106	737

STRATIGRAPHY (Blackbutt-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
	Blythesdale Group	266.7
JURASSIC	Injune Creek Group	769.3
	Hutton Sandstone	1214.3
	Evergreen Fm/Precipice Ss	1395.7
TRIASSIC	Wandoan Fm	1499.3
	Rewan Fm	1617.3
PERMIAN	Bandanna Fm	1634.0
	Mantuan Fm	1713.0
DEVONIAN	Timbury Hills Fm	1731.9

* Picked by Hartogen Energy Ltd

BLACKBUTT MAP



BLOODWOOD

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 54 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 336-P
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Bloodwood-1
 Longitude (E): 149.1425
 Latitude (S): -26.9742
 Date total depth reached: 28 JUN 84
 Ground level: 256.9 m
 Kelly bushing: 261.2 m
 Operator: Hartogen Energy Ltd
 Total Depth: 1884 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 1677.6 m

TEST DATA FROM THE DISCOVERY WELL (Bloodwood-1):

DST 1, 1492.6-1510.3 m, Precipice Sandstone
 Recovered 18.3 m of mud.

DST 2, 1673.4-1693.8 m, Rewan Formation
 Flowed gas at 1420 m³/day.

DST 3, 1711.1-1725.5 m, Rewan Formation
 Flowed gas at 51 000 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Rewan	28	8	20

COMPOSITIONAL DATA :

GAS :

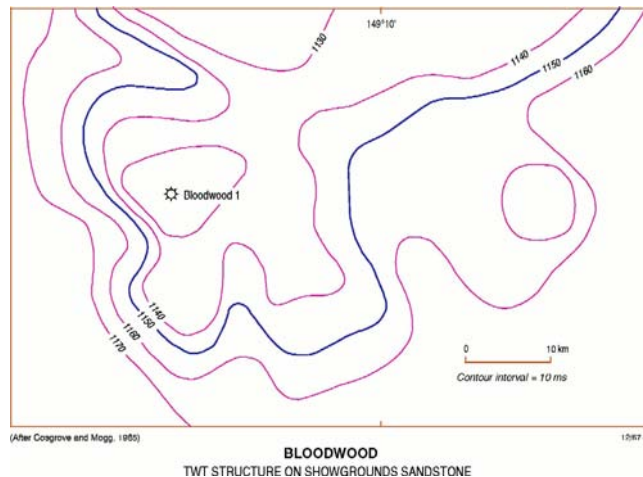
GAS PROPERTIES	GAS Rewan Fm
Methane	87.45
Ethane	5.90
Propane	2.50
Isobutane	0.58
N-butane	0.61
Isopentane	0.60 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	1.60
CO₂	0.73
H₂S	-
Specific Gravity	0.651
BTU/ft³ (gross)	1006

STRATIGRAPHY (Bloodwood-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
	Blythesdale Group	329.2
JURASSIC	Injune Creek Group	799.8
	Hutton Sandstone	1224.4
	Evergreen Fm/Precipice Ss	1438.7
TRIASSIC	Wandoan Fm	1551.7
	Rewan Fm	1677.6
PERMIAN	Bandanna Fm	1728.8
	Mantuan Fm	1819.7
DEVONIAN	Timbury Hills Fm	1864.8

* Picked by Hartogen Energy Ltd

BLOODWOOD MAP



BLYTH CREEK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	15 east-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 7
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Blyth Creek-1
Longitude (E):	148.9514
Latitude (S):	-26.6228
Date total depth reached:	12 MAR 64
Ground level:	304.5 m
Kelly bushing:	307.8 m
Operator:	Associated Australian Oilfields Ltd
Total Depth:	1219 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Structural/Stratigraphic trap formed by drape of a channel sand over a southeast plunging basement nose.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse, quartzose with a white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1141.5 m
POROSITY:	17% (average)
PERMEABILITY:	373 md (average)
TEST DATA FROM THE DISCOVERY WELL (Blyth Creek-1):	
DST 1, 1154.0-1164.3 m, Flowed gas at 237 900 m ³ /day	Precipice Sandstone
DST 3, 1164.9-1168.9 m, Flowed gas at 11 300 m ³ /day and water at 900 bbl/day.	Precipice Sandstone
DST 2, 1165.3-1218.6 m, Flowed water at 800 bbl/day.	Precipice Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	31	19	12

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	85.40
Ethane	4.90
Propane	2.50
Isobutane	0.54
N-butane	0.74
Isopentane	0.37
N-pentane	0.31
Hexanes +	1.28
N ₂ + O ₂	3.20
CO ₂	0.73
H ₂ S	-
Specific Gravity	0.687
BTU/ft ³ (gross)	1147

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Precipice Ss
API Gravity @ 60°F	49.8°
Base	-
Sulphur (% wt)(ppm)	Trace
Initial GOR (ft ³ /bbl)	-
Pour Point	< -6.7°C
Specific Gravity	0.775
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Blyth Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	36.6
	Mooga Sandstone	147.8
JURASSIC	Orallo Fm	217.9
	Gubberamunda Sandstone	361.8
	Westbourne Fm	423.7
	Walloon Coal Measures	587.7
	Eurombah Fm	849.2
	Hutton Sandstone	900.1
	Evergreen Fm	1047.9
	Precipice Sandstone	1141.5
TRIASSIC	Moolayember Fm	1173.5
	Snake Creek Mudstone Mbr	1185.7
DEVONIAN	Timbury Hills Fm	1190.2

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Blyth Creek-1) :

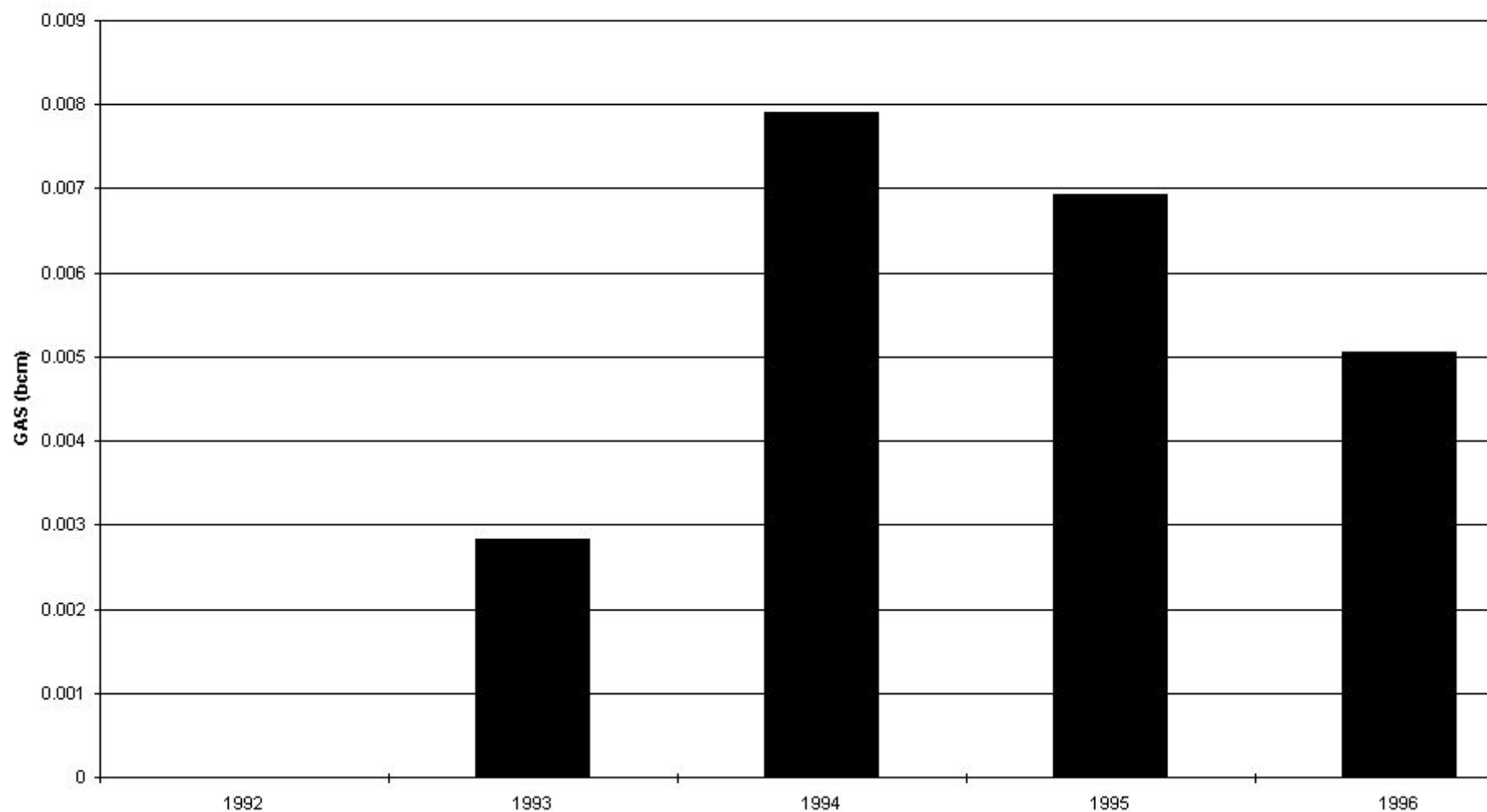
DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1159.5	21.5	234.0	68.0	Precipice Sandstone
1160.1	18.0	8.0	3.0	Precipice Sandstone
1162.5	15.0	65.0	7.0	Precipice Sandstone

GEOCHEMICAL DATA :

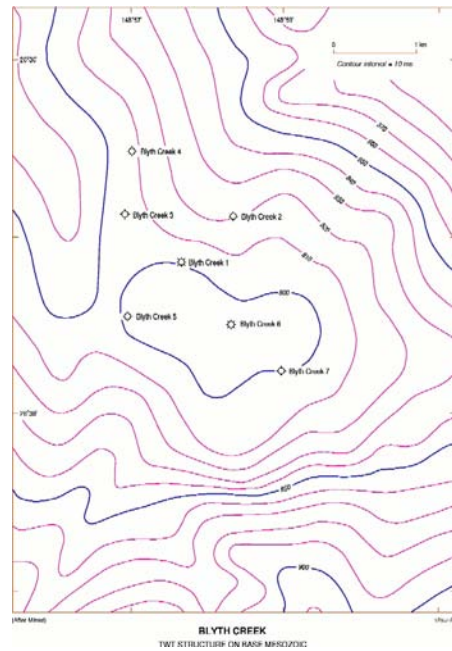
WELLNAME	SAMPLE DEPTH (mKB)	TOC	ROCK- EVAL PYROLYSIS					FORMATION
			S1	S2	S 3	HI	OI	
Blyth Creek-1	223.0	48.43	2.50	158.0	-	326	-	Orallo Fm
	601.0	39.45	2.85	205.0	-	520	-	Walloon Coal Measures
	630.0	38.93	6.19	212.0	-	545	-	Walloon Coal Measures
	723.0	40.49	9.13	233.0	-	575	-	Walloon Coal Measures
	787.0	40.63	1.90	153.0	-	377	-	Walloon Coal Measures
	939.0	10.95	0.52	35.10	-	321	-	Hutton Sandstone
	1143.0	5.26	0.50	15.70	-	298	-	Precipice Sandstone
	1195.0	1.81	0.16	1.60	-	88	-	Timbury Hills Fm

BLYTH CREEK, GAS PRODUCTION (Precipice Sandstone)

Discovered 12 March 1964 Production commenced 1993

Total Wells = 7 (2 Producers; 5 Plugged and Abandoned)

BLYTH CREEK MAP



BOBADILLA

PRESENT OPERATOR: Roma Petroleum Company Pty Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 17 km southwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 551-P
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Bobadilla-1
 Longitude (E): 148.6375
 Latitude (S): -26.6575
 Date total depth reached: 10 APR 68
 Ground level: 322.2 m
 Kelly bushing: 325.5 m
 Operator: CSR Ltd
 Total depth: 1299 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Timbury Hills Formation
 CONTENTS: Gas
 FORMATION: Timbury Hills Formation
 AGE: Devonian
 LITHOLOGY: Indurated sandstone.
 DEPOSITIONAL ENVIRONMENT: Continental
 FORMATION TOP (mKB): 1279.2 m

TEST DATA FROM THE DISCOVERY WELL (Bobadilla-1):

DST 1, 1277.1-1298.4 m, Timbury Hills Formation
 Flowed gas at 28 m³/day.

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Timbury Hills Fm
Methane	90.20
Ethane	1.38
Propane	-
Isobutane	-
N-butane	-
Isopentane	-
N-pentane	-
Hexanes +	-
N ₂ + O ₂	8.30
CO ₂	0.09
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Bobadilla-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	151.8
	Mooga Sandstone	266.7
JURASSIC	Orallo Fm	321.0
	Gubberamunda Sandstone	498.3
	Westbourne Fm	537.1
	Springbok Sandstone	699.5
	Walloon Coal Measures	713.2
	Eurombah Fm	896.4
	Hutton Sandstone	957.1
	Evergreen Fm	1108.9
TRIASSIC	Moolayember Fm	1213.1
DEVONIAN	Timbury Hills Fm	1279.2

* Picked by Geological Survey of Queensland

BOGGO CREEK

PRESENT OPERATOR: Santos Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 112 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 16
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Boggo Creek-2
 Longitude (E): 149.1317
 Latitude (S): -27.5539
 Date total depth reached: 02 SEP 78
 Ground level: 269.4 m
 Kelly bushing: 273.7 m
 Operator: Bridge Oil Ltd
 Total depth: 1929 mKB
 NUMBER OF WELLS DRILLED: 4
 STRUCTURE/TRAP: Anticline
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1893.7 m

TEST DATA FROM THE DISCOVERY WELL (Boggo Creek-2):

DST 2, 1868.1-1917.5 m, Showgrounds Sandstone
 Flowed oil at 1000 bbl/day through a
 9.5 mm choke.

DST 1, 1876.0-1913.2 m, Showgrounds Sandstone
 Recovered a small, unmeasured quantity
 of oil through a 11 mm choke.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	1	very small	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Showgrounds Ss
Methane	83.30
Ethane	4.70
Propane	1.64
Isobutane	0.59
N-butane	0.44
Isopentane	0.52 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	8.30
CO ₂	0.50
H ₂ S	-
Specific Gravity	0.658
BTU/ft ³ (gross)	-

OIL :

FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	45.8°
Base	-
Sulphur (% wt)(ppm)	0.10 ppm
Initial GOR (ft ³ /bbl)	-
Pour Point	11°C
Specific Gravity	0.798
Colour	-
Viscosity (cp@100°F)	2.41
Bubble Point (psig)	-

STRATIGRAPHY (Boggo Creek-2) :

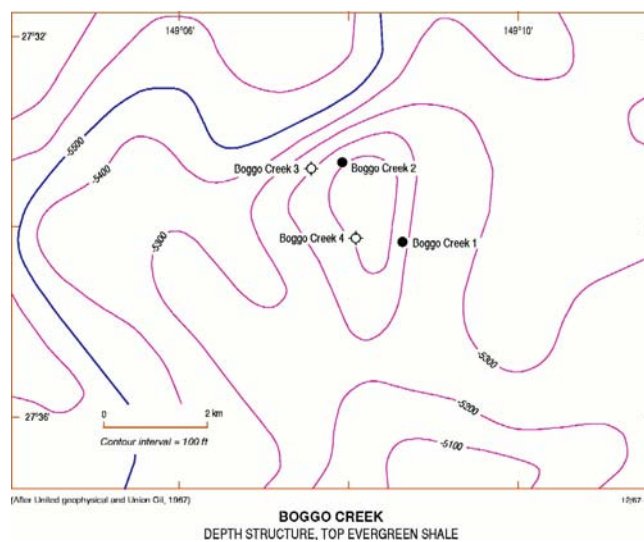
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	214.9
	Wallumbilla Fm	342.0
	Bungil Fm	545.6
	Mooga Sandstone	700.4
JURASSIC	Orallo Fm	840.3
	Gubberamunda Sandstone	979.0
	Westbourne Fm	1198.8
	Springbok Sandstone	1307.6
	Walloon Coal Measures	1346.9
	Hutton Sandstone	1549.9
	Evergreen Fm	1689.8
	Precipice Sandstone	1777.3
TRIASSIC	Moolayember Fm	1782.8
	Snake Creek Mudstone Mbr	1877.6
DEVONIAN	Timbury Hills Fm	1896.8

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Boggo Creek-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1752.9	24.0	285.0	-	Evergreen Fm
1753.2	24.0	767.0	-	Evergreen Fm
1753.8	10.5	0.0	0.0	Evergreen Fm
1754.1	16.0	0.0	0.0	Evergreen Fm
1754.4	23.5	46.0	29.0	Evergreen Fm
1754.7	22.5	40.0	27.0	Evergreen Fm

BOGGO CREEK MAP



BONY CREEK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	24 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Bony Creek-1
Longitude (E):	148.9667
Latitude (S):	-26.7500
Date total depth reached:	27 MAR 63
Ground level:	311.8 m
Kelly bushing:	314.9 m
Operator:	Associated Australian Oilfields
Total depth:	1397 mKB
NUMBER OF WELLS DRILLED:	18
STRUCTURE/TRAP:	Structural/Stratigraphic trap located on a southeast trending anticline. A permeability barrier exists on the northwest flank of the structure.
AREAL CLOSURE:	18.0 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : fine to coarse, strongly crossbedded, quartzose with thin lenses of conglomerate.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1316.7 m
POROSITY:	17.8% (average)
PERMEABILITY:	159 md (average)
TEST DATA FROM THE DISCOVERY WELL (Bony Creek-1):	
DST 1, 1306.7-1322.8 m, Flowed gas at 56 600 m ³ /day.	Precipice Sandstone
DST 2, 1348.1-1369.8 m, No gas to surface.	Moolayember Formation
DST 3, 1373.1-1392.9 m, No gas to surface.	Timbury Hills Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	921	881	40

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	84.40
Ethane	5.40
Propane	1.83
Isobutane	1.02
N-butane	0.25
Isopentane	0.64
N-pentane	0.08
Hexanes +	0.39
N ₂ + O ₂	5.00
CO ₂	1.00
H ₂ S	-
Specific Gravity	0.678
BTU/ft ³ (gross)	-

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Precipice Ss
API Gravity @ 60°F	47.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.793
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Bony Creek-1) :

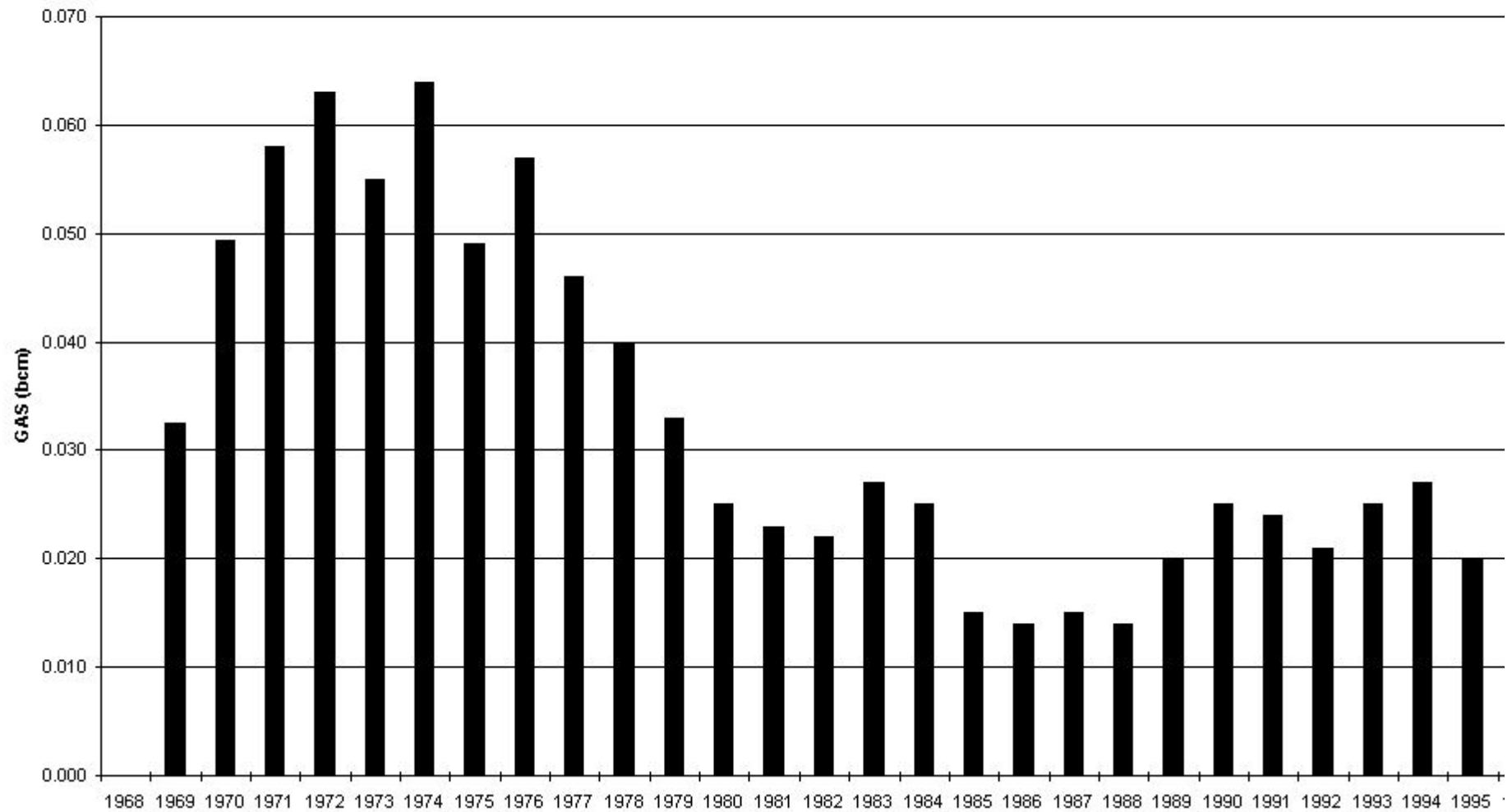
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	164.6
	Mooga Sandstone	267.6
JURASSIC	Orallo Fm	349.9
	Gubberamunda Sandstone	530.4
	Westbourne Fm	607.2
	Springbok Sandstone	724.5
	Walloon Coal Measures	752.6
	Eurombah Fm	1014.1
	Hutton Sandstone	1061.3
	Evergreen Fm	1207.3
	Precipice Sandstone	1316.7
TRIASSIC	Moolayember Fm	1325.3
	Snake Creek Mudstone Mbr	1360.3
DEVONIAN	Timbury Hills Fm	1367.9

* Picked by Geological Survey of Queensland

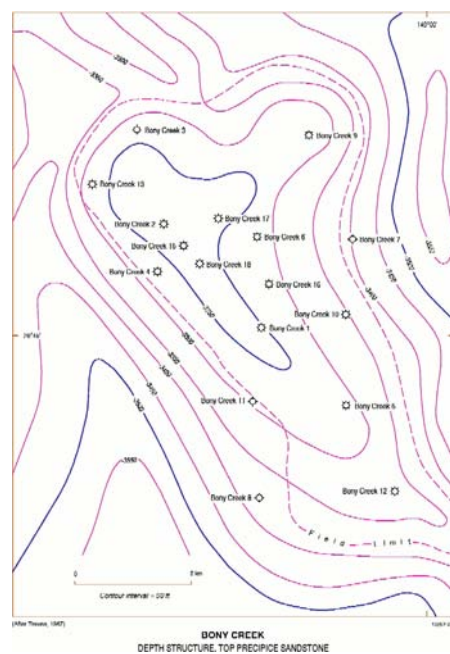
POROSITY AND PERMEABILITY DATA (Bony Creek-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1322.9	13.5	0.0	0.0	Precipice Sandstone
1323.5	19.0	88.0	-	Precipice Sandstone
1324.1	11.5	0.0	0.0	Precipice Sandstone
1324.7	17.5	10.0	0.0	Precipice Sandstone
1325.3	9.0	0.0	0.0	Moolayember Fm
1325.9	7.0	0.0	0.0	Moolayember Fm
1327.1	8.5	0.0	0.0	Moolayember Fm
1327.8	7.5	0.0	0.0	Moolayember Fm
1393.6	10.0	0.0	0.0	Timbury Hills Fm
1394.2	8.0	0.0	0.0	Timbury Hills Fm
1394.8	8.5	0.0	0.0	Timbury Hills Fm
1395.4	8.0	0.0	-	Timbury Hills Fm
1396.6	7.0	0.0	0.0	Timbury Hills Fm

BONY CREEK, GAS PRODUCTION, (Precipice Sandstone)
Discovered 27 March 1963 Production commenced March 1969
Total Wells = 18 (5 Producers; 2 Shut In; 5 Plugged and Abandoned; 6 Suspended)



BONY CREEK MAP



BORAH CREEK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	58 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Borah Creek-1
Pool(s):	Wandoan Sandstone Member (Gas).
Longitude (E):	148.8633
Latitude (S):	-27.1156
Date total depth reached:	27 APR 82
Ground level:	263.0 m
Kelly bushing:	267.3 m
Operator:	Hartogen Energy Ltd
Total depth:	1537 mKB
DISCOVERY WELL:	Borah Creek-2
Pool(s):	Wandoan Sandstone Member (Oil).
Longitude (E):	148.8589
Latitude (S):	-27.1081
Date total depth reached:	26 JUL 82
Ground level:	264.0 m
Kelly bushing:	268.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1527 mKB
DISCOVERY WELL:	Borah Creek-3
Pool(s):	Evergreen Formation.
Longitude (E):	148.8729
Latitude (S):	-27.1183
Date total depth reached:	22 SEP 82
Ground level:	265.0 m
Kelly bushing:	270.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1526 mKB
NUMBER OF WELLS DRILLED:	5
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine

PETROLEUM BEARING UNIT No.2:	Wandoan Sandstone Member
CONTENTS:	Oil and Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1455.4 m (Borah Creek-1)
TEST DATA FROM THE DISCOVERY WELL (Borah Creek-1):	
DST 1, 1350.3-1394.2 m, Recovered 732 m of gas and oil cut mud.	Hutton Ss/Evergreen Formation
DST 5, 1353.3-1371.6 m, Recovered 92 m of gas cut mud with a slight oil film.	Hutton Sandstone
DST 4, 1409.7-1421.9 m, Recovered 101 m of gas cut mud.	Evergreen Formation (Boxvale Ss)
DST 3, 1446.3-1458.5 m, Flowed gas at 1410 m ³ /day.	Moolayember Fm (Wandoan Ss Mbr)
DST 2, 1467.6-1479.8 m, Flowed gas at 66 000 m ³ /day.	Moolayember Fm (Wandoan Ss Mbr)
DST 6, 1485.6-1537.7 m, Recovered 3.1 m of mud speckled with condensate.	Moolayember Fm (Wandoan Ss Mbr)
TEST DATA FROM THE DISCOVERY WELL (Borah Creek-2):	
DST 1, 1482.0-1497.0 m, Flowed gas at 14 000 m ³ /day and oil at 750 bbl/day.	Moolayember Fm (Wandoan Ss Mbr)
TEST DATA FROM THE DISCOVERY WELL (Borah Creek-3):	
DST 4, 1218.0-1227.0 m, Recovered 600 m of gas and mud cut water.	Hutton Sandstone
DST 1, 1442.0-1451.0 m, Flowed gas at 138 000 m ³ /day.	Evergreen Formation
DST 2, 1467.0-1476.0 m, No recovery (tight formation).	Moolayember Fm (Wandoan Ss Mbr)
DST 3, 1480.0-1526.0 m, No recovery (tight formation).	Moolayember Fm (Wandoan Ss Mbr)

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Wandoan Ss	5	5	very small
Evergreen Fm	46	39	7

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Wandoan Ss	3	3	very small

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Wandoan Ss	1	very small	1
Evergreen Fm	3	1	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Wandoan Ss	2	1	1
Evergreen Fm	6	4	2

COMPOSITIONAL DATA :

OIL :

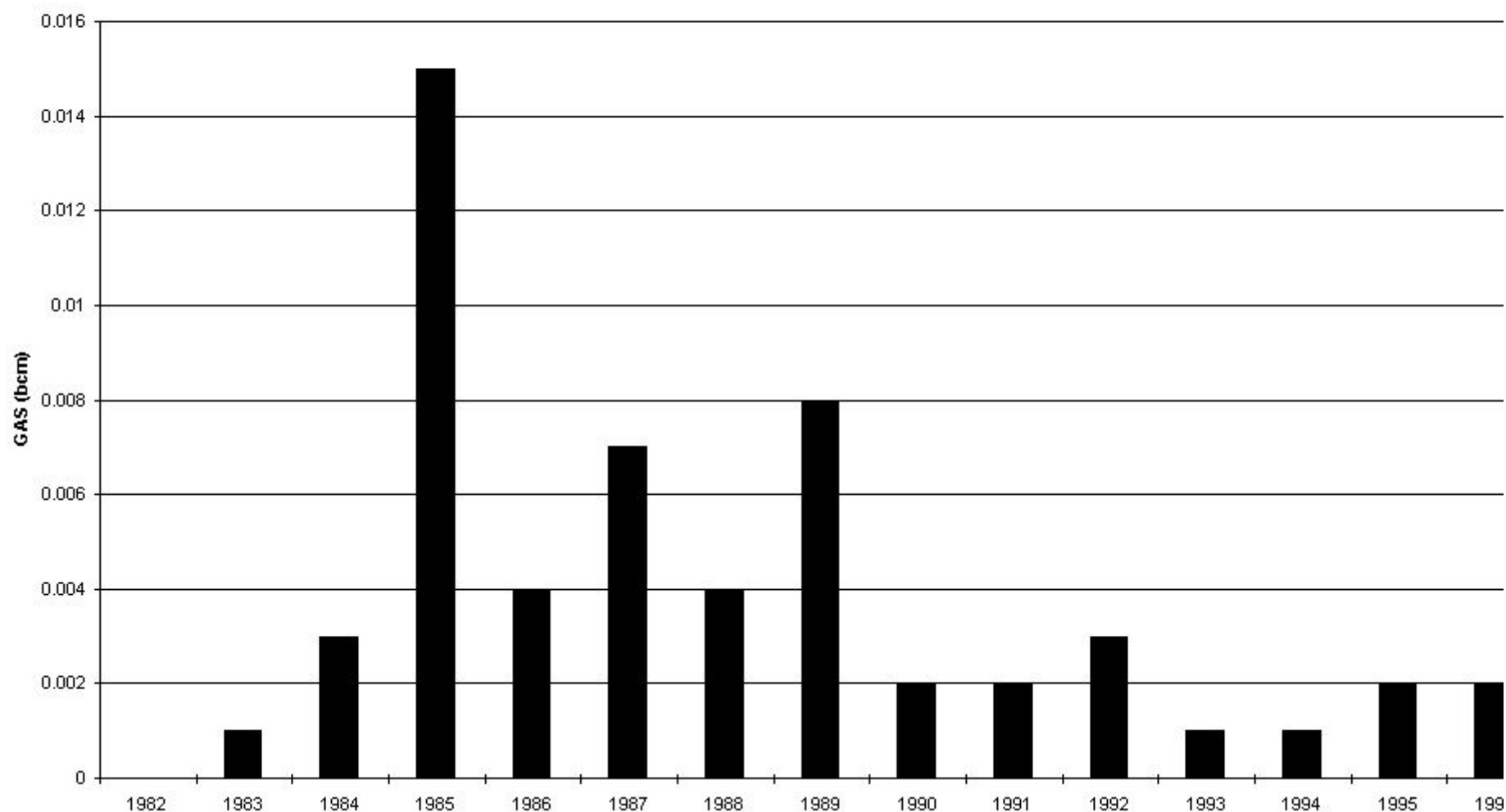
FLUID PROPERTIES	OIL Wandoan Ss
API Gravity @ 60°F	38.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	548
Pour Point	14.4°C
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	0.875
Bubble Point (psig)	1615

STRATIGRAPHY (Borah Creek-1) :

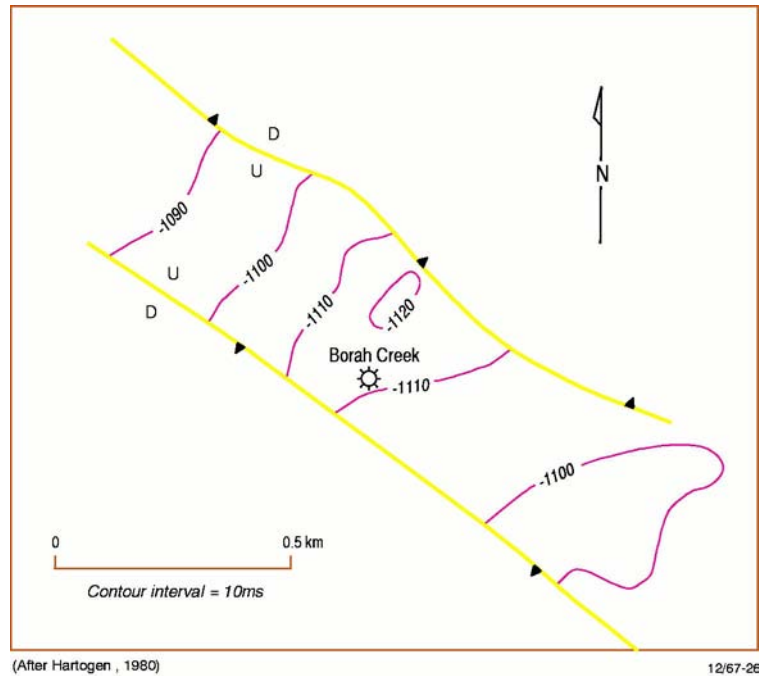
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	358.1
	Mooga Sandstone	478.5
JURASSIC	Orallo Fm	602.0
	Gubberamunda Sandstone	752.9
	Westbourne Fm	904.3
	Springbok Sandstone	1021.4
	Walloon Coal Measures	1064.4
	Eurombah Fm	1207.0
	Hutton Sandstone	1252.7
	Evergreen Fm	1382.3
	Precipice Sandstone	1448.1
TRIASSIC	Moolayember Fm	1455.4
CARBONIFEROUS	Granite	1493.5

* Picked by Geological Survey of Queensland

BORAH CREEK, GAS PRODUCTION **(Evergreen Formation & 'Wandoan' Formation)**
Discovered 28 April 1982 Production commenced August 1982
Total Wells = 5



BORAH CREEK MAP



DEPTH STRUCTURE ON BASE WANDOAN SANDSTONE MEMBER

BOTTLETREE

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 58 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 22
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Bottletree-1
 Longitude (E): 149.0196
 Latitude (S): -27.0917
 Date total depth reached: 06 JUL 90
 Ground level: 250.9 m
 Kelly bushing: 256.3 m
 Operator: Oil Company of Australia NL
 Total depth: 1835 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Basal Permian
 CONTENTS: Gas
 FORMATION: Basal Permian
 AGE: Permian
 LITHOLOGY: Sandstone
 FORMATION TOP (mKB): 1752.6 m

TEST DATA FROM THE DISCOVERY WELL (Bottletree-1):

DST 1, 1787.3-1834.6 m, Basal Permian
 Flowed gas at 85 000 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Permian	71	29	42

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Permian	4	2	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Permian	7	3	4

STRATIGRAPHY (Bottletree-1) :

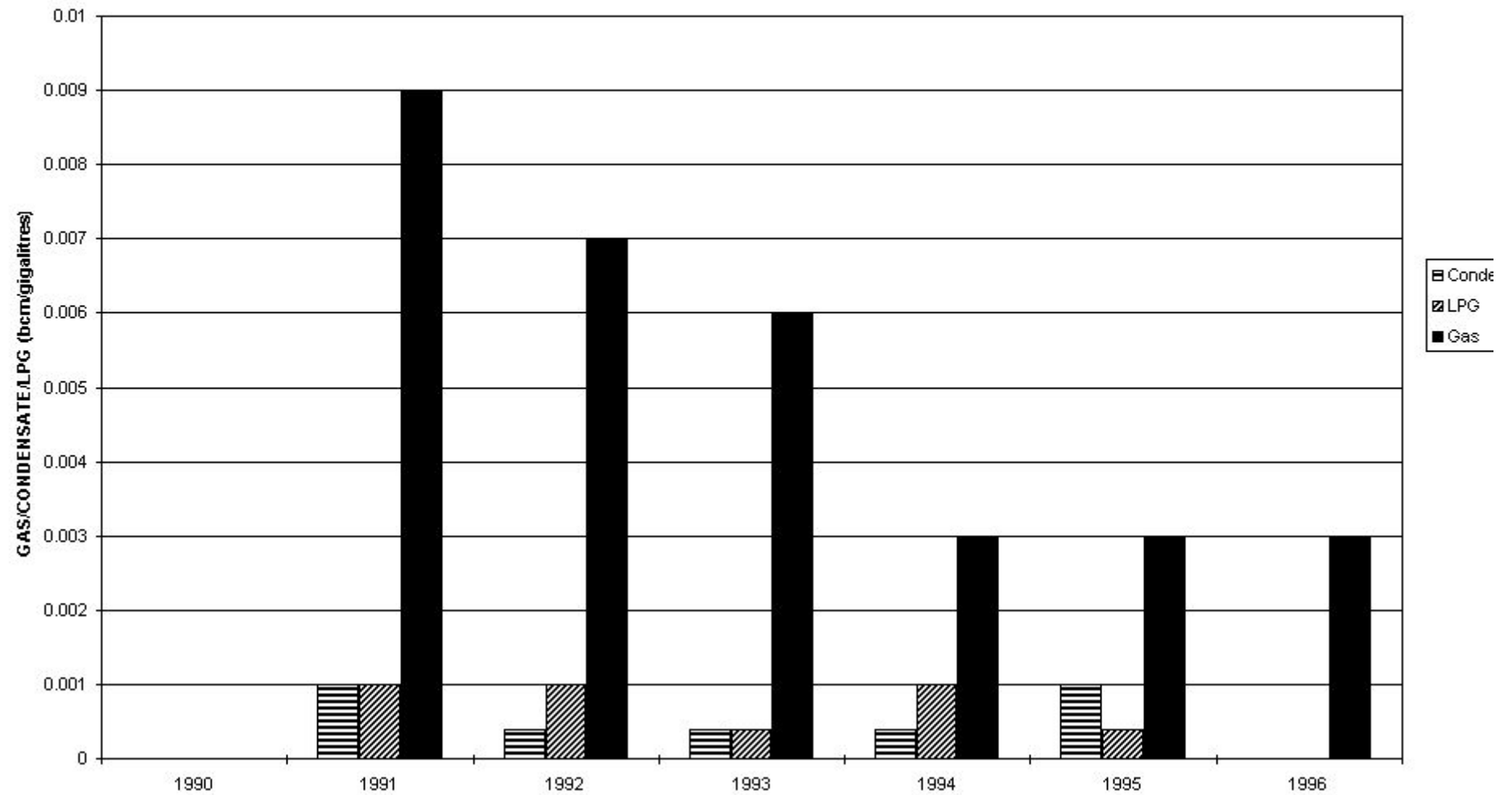
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	155.4
	Mooga Sandstone	531.6
JURASSIC	Orallo Fm	657.3
	Gubberamunda Sandstone	776.6
	Westbourne Fm	908.6
	Springbok Sandstone	1043.9
	Birkhead Formation	1094.2
	Hutton Sandstone	1306.1
	Evergreen Fm	1505.7
	Boxvale Sandstone Mbr	1545.0
TRIASSIC	Moolayember Fm	1599.3
	Snake Creek Mudstone Mbr	1724.3
	Showgrounds Sandstone	1733.4
PERMIAN	Blackwater Group	1736.3
	Back Creek Group	1752.6
	Basement	1802.3

* Picked by Geological Survey of Queensland

BOTTLETREE, GAS / CONDENSATE / LPG PRODUCTION (Basal Permian)

Discovered 6 July 1990 Production commenced 1991

Total Wells = 1 (1 Producer)



BOXLEIGH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	115 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 15
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Boxleigh-1
Longitude (E):	149.0572
Latitude (S):	-27.6275
Date total depth reached:	03 JUN 70
Ground level:	267.3 m
Kelly bushing:	274.6 m
Operator:	Union Oil Development Corporation
Total depth:	1926 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Predominantly structural (four-way dip closure) but with some stratigraphic component (poor permeability limits the distribution of gas within the reservoir).
AREAL CLOSURE:	18.1 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	MiddleTriassic
LITHOLOGY:	Sandstone : white, medium to coarse grained, friable, quartzose with minor clay matrix and interbeds of shale, siltstone and coal.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1886.7 m
POROSITY:	15 to 20% (average log porosity)
PETROLEUM BEARING UNIT No.2:	Blackwater Group
CONTENTS:	Oil
FORMATION:	Blackwater Group
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine.
FORMATION TOP (mKB):	1893.4 m

TEST DATA FROM THE DISCOVERY WELL (Boxleigh-1):

DST 2, 1883.7-1924.4 m, Showgrounds Sandstone
Flowed gas at 211 000 m³/day and recovered 46 m of condensate.

DST 4, 1885.2-1894.3 m, Showgrounds Sandstone
Flowed gas at 250 600 m³/day and recovered 56 m of condensate.

DST 5, 1891.3-1893.1 m, Showgrounds Sandstone
Flowed gas at 109 600 m³/day.

DST 6, 1894.6-1896.2 m, Rewan Formation
No recovery.

DST 3, 1900.4-1924.5 m, Rewan Formation
Recovered gas cut formation water.

DST 1, 1902.3-1906.2 m, Blackwater Group
Recovered 0.03 m of oil and 55 m of mud and gas cut water.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	395	372	23

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	78	74	4

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	84	78	6

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	75.90
Ethane	8.00
Propane	4.70
Isobutane	1.29
N-butane	1.25
Isopentane	0.47
N-pentane	0.48
Hexanes +	3.10
N₂ + O₂	4.70
CO₂	0.15
H₂S	-
Specific Gravity	0.785
BTU/ft³ (gross)	1295

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Showgrounds Ss
API Gravity @ 60°F	51.0° to 54.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft³/bbl)	-
Pour Point	-14.2°C
Specific Gravity	0.7754 to 0.7629
Colour	Yellow-brown
Viscosity (cp@100°F)	0.701 to 0.831
Bubble Point (psig)	na

STRATIGRAPHY (Boxleigh-1) :

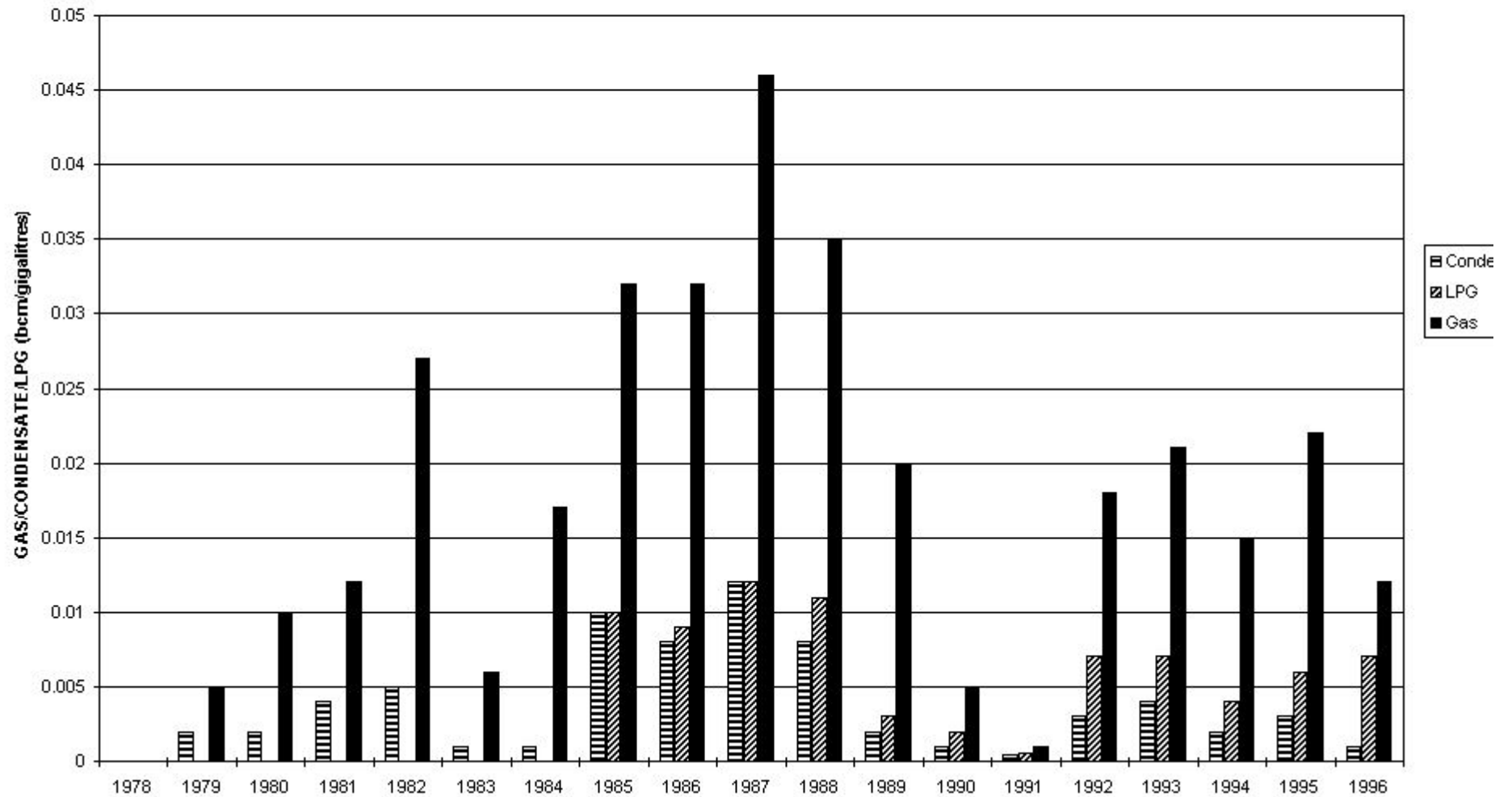
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	231.0
	Wallumbilla Fm	364.9
	Bungil Fm	577.6
	Mooga Sandstone	788.8
JURASSIC	Orallo Fm	892.2
	Gubberamunda Sandstone	1061.9
	Westbourne Fm	1229.3
	Springbok Sandstone	1318.9
	Walloon Coal Measures	1367.9
	Hutton Sandstone	1537.4
	Evergreen Fm	1709.9
	Precipice Sandstone	1773.0
TRIASSIC	Moolayember Fm	1776.7
	Snake Creek Mudstone Mbr	1872.4
	Showgrounds Sandstone	1886.7
PERMIAN	Blackwater Group	1893.4
CARBONIFEROUS	Granite	1923.3

* Picked by Geological Survey of Queensland

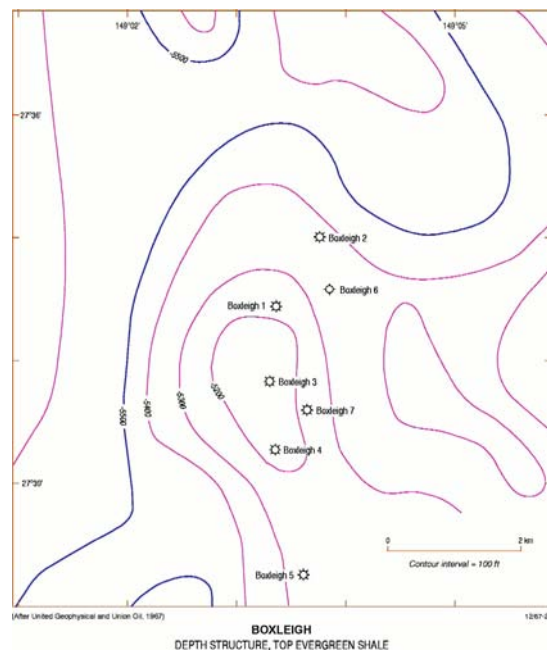
BOXLEIGH, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 3 June 1970 Production commenced January 1979

Total Wells = 7



BOXLEIGH MAP



BROADWAY

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Past Producer
 LOCATION: 75 km south of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 56
 BASIN: Surat
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Broadway-1
 Longitude (E): 148.8197
 Latitude (S): -27.2739
 Date total depth reached: 29 APR 83
 Ground level: 232.0 m
 Kelly bushing: 236.5 m
 Operator: BHP Petroleum
 Total depth: 1499 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Boxvale Sandstone Member
 CONTENTS: Gas
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine
 FORMATION TOP (mKB): 1402.4 m

TEST DATA FROM THE DISCOVERY WELL (Broadway-1):

DST (CASED HOLE), 1477.6-1481.3 m, Boxvale Sandstone Member
 Flowed gas at 149 700 m³/day and
 condensate at 45 bbl/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	64	64	very small

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	5	5	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	6	6	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	82.01
Ethane	7.36
Propane	3.33
Isobutane	3.00
N-butane	0.33
Isopentane	2.44 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	1.32
CO ₂	0.15
H ₂ S	-
Specific Gravity	0.621
BTU/ft ³ (gross)	1078

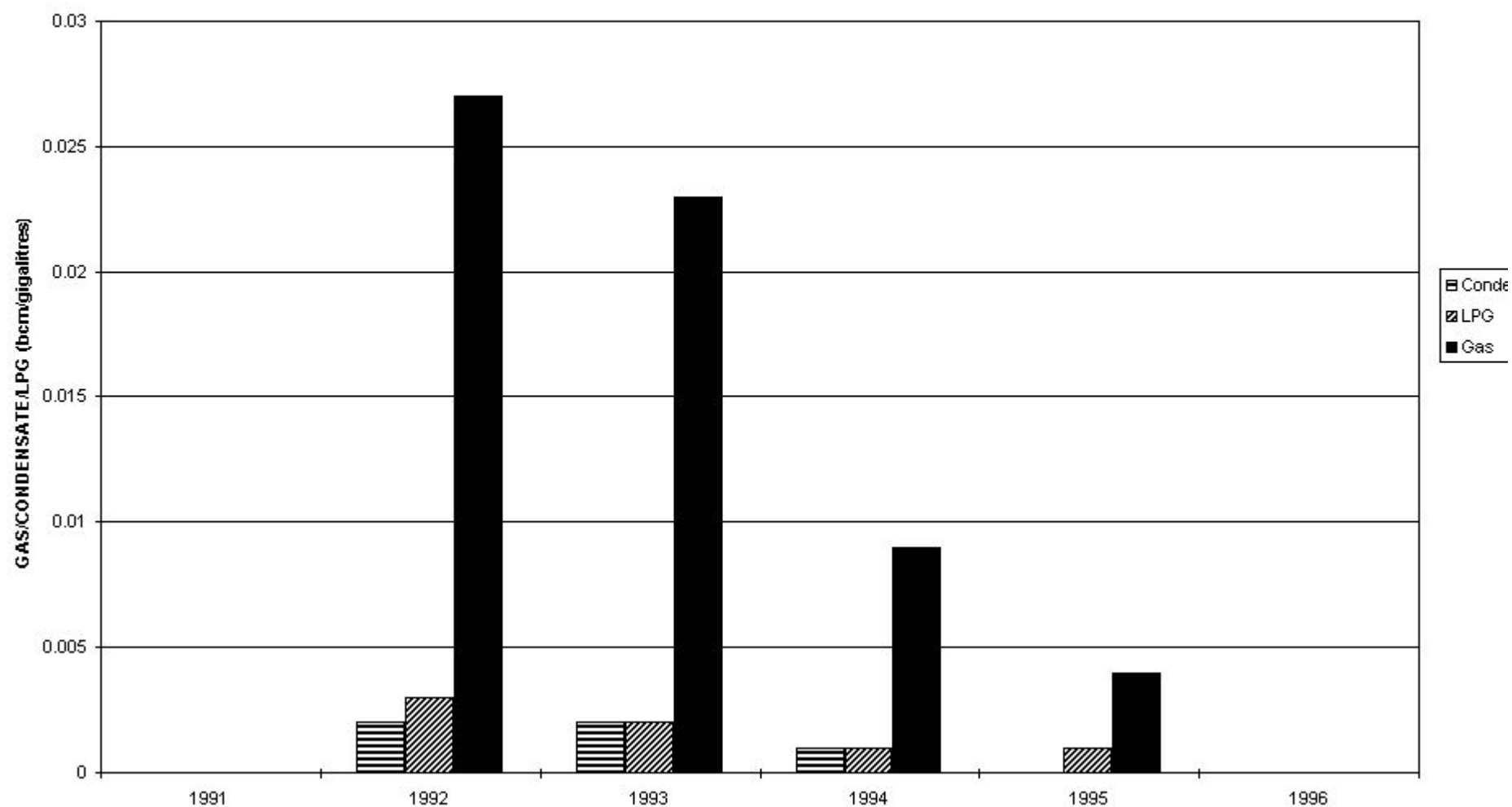
STRATIGRAPHY (Broadway-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	177.7
	Bungil Fm	374.9
	Mooga Sandstone	524.3
JURASSIC	Orallo Fm	655.9
	Gubberamunda Sandstone	783.3
	Westbourne Fm	944.3
	Springbok Sandstone	1048.8
	Walloon Coal Measures	1087.5
	Hutton Sandstone	1245.4
	Evergreen Fm	1402.4
DEVONIAN	Timbury Hills Fm	1484.7

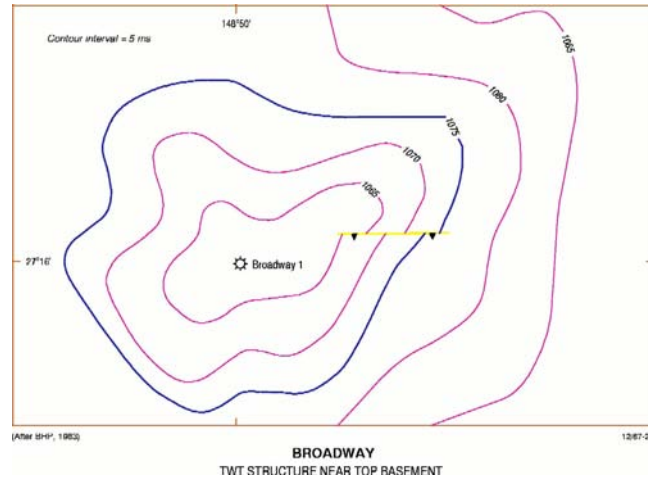
* Picked by Geological Survey of Queensland

BROADWAY, GAS / CONDENSATE / LPG PRODUCTION (Evergreen Formation)

Discovered 29 April 1983 Production commenced 1992

Total Wells = 1 (1 Producer)

BROADWAY MAP



BUNGARIE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	140 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Bungarie-1
Longitude (E):	149.4800
Latitude (S):	-27.7097
Date total depth reached:	25 JAN 82
Ground level:	282.9 m
Kelly bushing:	289.2 m
Operator:	Bridge Oil Ltd
Total depth:	2655 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2314.5 m

TEST DATA FROM THE DISCOVERY WELL (Bungarie-1):

DST 1, 2326.4-2341.0 m, Flowed gas at 227 m ³ /day and recovered 160 m of oily, gas cut mud.	Showgrounds Sandstone
 DST 3, 2511-2517 m, No recovery.	 Kianga Formation
 DST 2, 2595-2624.5 m, Gas to surface at a rate too small to measure.	 Kianga Formation

STRATIGRAPHY (Bungarie-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Unspecified	00.0
	Walloon Coal Measures	1563.0
	Hutton Sandstone	1762.0
	Evergreen Fm	1928.0
	Precipice Sandstone	2065.0
TRIASSIC	Wandoan Fm	2102.0
	Sub Unit 9 (Triassic)	2290.0
	Showgrounds Sandstone	2314.5
	Cabawin Fm	2347.0
PERMIAN	Kianga Fm	2433.0
	Back Creek Group	2632.0

* Picked by Bridge Oil Ltd

BUNGIL

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 8 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 7
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Bungil-1
 Longitude (E): 148.8306
 Latitude (S): -26.6644
 Date total depth reached: 01 MAY 64
 Ground level: 290.2 m
 Kelly bushing: 293.5 m
 Operator: Associated Australian Oilfields Ltd
 Total depth: 1251 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1187.2 m
 PERMEABILITY: 1 md (average)

 TEST DATA FROM THE DISCOVERY WELL (Bungil-1):

 DST 1, 1184.1-1250.6 m, Precipice Sandstone
 Flowed gas at 3500 m³/day.

COMPOSITIONAL DATA :

GAS :

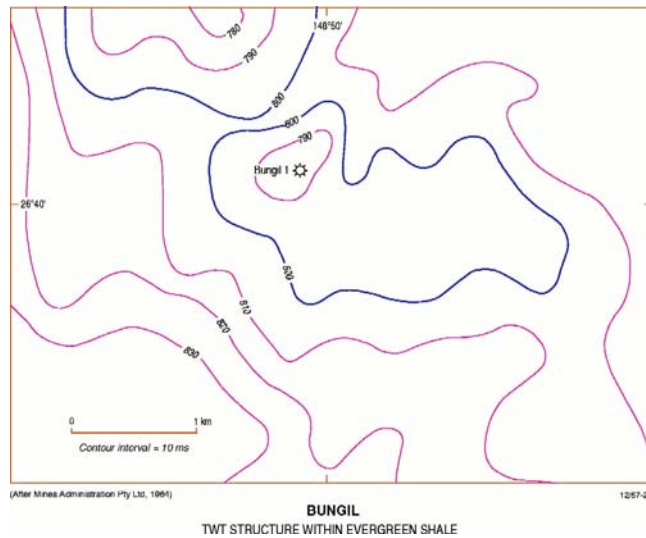
GAS PROPERTIES	GAS Precipice Ss
Methane	84.60
Ethane	5.90
Propane	3.10
Isobutane	1.08
N-butane	0.69
Isopentane	0.48
N-pentane	0.19
Hexanes +	0.70
N ₂ + O ₂	2.80
CO ₂	0.42
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Bungil-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	91.4
	Mooga Sandstone	216.4
JURASSIC	Orallo Fm	279.5
	Gubberamunda Sandstone	435.0
	Westbourne Fm	502.9
	Springbok Sandstone	608.4
	Walloon Coal Measures	656.5
	Eurombah Fm	887.6
	Hutton Sandstone	919.6
	Evergreen Fm	1083.6
	Precipice Sandstone	1187.2
TRIASSIC	Moolayember Fm	1200.9
DEVONIAN	Timbury Hills Fm	1236.9

* Picked by Geological Survey of Queensland

BUNGIL MAP



BURGOYNE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	35 km north of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 5
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Burgoyne-1
Longitude (E):	149.0552
Latitude (S):	-26.4958
Date total depth reached:	20 MAY 87
Ground level:	355.0 m
Kelly bushing:	359.0 m
Operator:	Associated Australian Resources Ltd
Total depth:	1280 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.6 km ² (near top of Boxvale seismic marker)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
 TEST DATA FROM THE DISCOVERY WELL (Burgoyne-1):	
 DST 1, 1115-1138.5 m, Flowed gas at 2270 m ³ /day.	Precipice Sandstone
 DST 2, 1203-1228.5 m, Recovered 47 m of mud.	Rewan Formation

STRATIGRAPHY (Burgoyne-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Mooga Sandstone	00.0
JURASSIC	Orallo Fm	144.0
	Gubberamunda Sandstone	289.0
	Westbourne Fm	337.0
	Hutton Sandstone	750.0
	Evergreen Fm	1004.0
	Boxvale Sandstone Mbr	1059.0
	Precipice Sandstone	1100.0
TRIASSIC	Moolayember Fm	1135.0
	Snake Creek Mudstone Mbr	1170.0
	Showgrounds Sandstone	1183.5
	Rewan Formation	1189.5
PERMIAN	Bandanna Formation	1224.0
	Black Alley Shale	1247.0
	Undifferentiated	1257.0
CARBONIFEROUS	Roma Granite	1265.0

* Picked by CSR Ltd.

BURUNGA

PRESENT OPERATOR:	Moonie Oil NL
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	145 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	378-P
BASIN:	Bowen
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Burunga-1
Longitude (E):	150.0786
Latitude (S):	-26.0000
Date total depth reached:	28 SEP 62
Ground level:	327.4 m
Kelly bushing:	332.7 m
Operator:	Australian Oil and Gas Corporation
Total depth:	3122 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Fault trap on upthrown side of fault at top Kianga Fm level with internal four-way dip closure.
AREAL CLOSURE:	148 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Kianga Formation
CONTENTS:	Gas
FORMATION:	Kianga Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	634.9 m
TEST DATA FROM THE DISCOVERY WELL (Burunga-1):	
DST 1, 535.5-546.2 m, Recovered 64 m of water.	Precipice Sandstone
DST 6, 1218.6-1240.5 m, Recovered 54.9 m of drilling mud and 54.9 m of watery drilling mud.	Gyranda Formation
DST 2, 1251.5-1284.4 m, Flowed gas at 7080 m ³ /day and recovered 122 m of gas cut water.	Kianga Formation
DST 3, 2404.6-2411.3 m, No recovery.	Back Creek Group
DST 4, 3067.8-3121.8 m, Misrun.	Camboon Andesite
DST 5, 3071.5-3121.8 m, Misrun.	Camboon Andesite

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Kianga Fm
Methane	90.60
Ethane	3.20
Propane	1.25
Isobutane	0.17
N-butane	0.31
Isopentane	0.10
N-pentane	0.08
Hexanes +	0.03
N₂ + O₂	2.40
CO₂	1.80
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Burunga-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Walloon Coal Measures	00.0
	Hutton Sandstone	89.9
	Evergreen Fm	313.9
	Precipice Sandstone	487.7
TRIASSIC	Rewan Fm	618.7
PERMIAN	Blackwater Group	637.0
	Gyranda Fm	1167.4
	Back Creek Group	2005.6
CARBONIFEROUS	Camboon Andesite	2987.0

* Picked by Geological Survey of Queensland

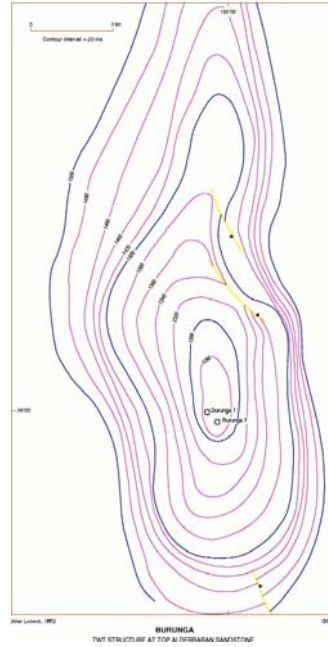
POROSITY AND PERMEABILITY DATA (Burunga-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
192.6	19.0	-	0.5	Hutton Sandstone
192.7	19.0	-	0.0	Hutton Sandstone
427.0	15.0	0.5	0.5	Evergreen Fm
427.1	15.5	0.0	0.0	Evergreen Fm
535.2	18.0	2.0	2.0	Precipice Sandstone
542.2	11.0	0.5	0.5	Precipice Sandstone
542.3	11.5	0.0	0.0	Precipice Sandstone
1120.4	13.0	0.5	0.5	Blackwater Group
1120.6	13.0	0.0	0.0	Blackwater Group
1121.7	14.0	0.1	0.1	Blackwater Group
1275.6	16.0	0.1	0.1	Kianga Fm
2409.1	18.0	0.3	0.1	Back Creek Group
2412.5	16.0	0.3	0.1	Back Creek Group

GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	VITRINITE REFLECTANCE (%)	FORMATION
Burunga-1	701.0-703.0	0.67	Blackwater Group
	865.6-868.6	0.68	Blackwater Group
	1514.8-1517.9	0.73	Gyranda Fm
	1664.2-1667.2	0.86	Gyranda Fm
	2822.4-2825.4	1.41	Back Creek Group
	2913.8-2916.9	1.50	Back Creek Group

BURUNGA MAP



CABAWIN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	30 km northwest of Moonie
STATE:	Queensland
PETROLEUM TITLES:	PL 1
BASIN:	Bowen/Surat
SUB-BASIN:	Chinchilla-Gooniwindi Slope
DISCOVERY WELL:	Cabawin-1
Longitude (E):	150.1895
Latitude (S):	-27.4961
Date total depth reached:	26 MAR 61
Ground level:	289.6 m
Kelly bushing:	295.1 m
Operator:	Union Oil Development Corporation
Total depth:	3668 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	Structural/Stratigraphic trap located on a plunging anticlinal nose.
AREAL CLOSURE:	21.0 km ²
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1659.3 m
PETROLEUM BEARING UNIT No.2:	Kianga Formation (multiple reservoirs)
CONTENTS:	Oil and Gas
FORMATION:	Kianga Formation
AGE:	Late Permian to Early Triassic
LITHOLOGY:	Sandstone : gray, poorly sorted, sublabile, subangular with abundant clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal.
FORMATION TOP (mKB):	2997.7 m
POROSITY:	14% (average log porosity))
PERMEABILITY:	<1 md (sparse core analysis)
TEST DATA FROM THE DISCOVERY WELL (Cabawin-1):	
DST 1, 2050.7-2065.3 m, Flowed gas at 15 100 m ³ /day and condensate at 63 bbl/day. Recovered 850 m of gas cut muddy water.	Precipice Sandstone
DST 2, 2251.9-2257.4 m, No gas to surface.	Bundamba Formation
Production Test, 3025.1-3100.4 m, Flowed gas at 21 200 m ³ /day and green, 51° API oil at 79 bbl/day.	Kianga Formation

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Kianga Fm	18	17	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Kianga Fm
Methane	70.30
Ethane	9.50
Propane	8.10
Isobutane	2.40
N-butane	3.00
Isopentane	0.90
N-pentane	1.00
Hexanes +	-
N ₂ + O ₂	4.50
CO ₂	0.30
H ₂ S	-
Specific Gravity	0.815
BTU/ft ³ (gross)	1334

COMPOSITIONAL DATA CONTD :

OIL :

FLUID PROPERTIES	OIL Kianga Fm
API Gravity @ 60°F	46.5°
Base	-
Sulphur (% wt)(ppm)	0.20%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Precipice Ss
API Gravity @ 60°F	50.2°
Base	Paraffin
Sulphur (% wt)(ppm)	0.034%
Initial GOR (ft ³ /bbl)	10000
Pour Point	-
Specific Gravity	0.7792
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Cabawin-1) :

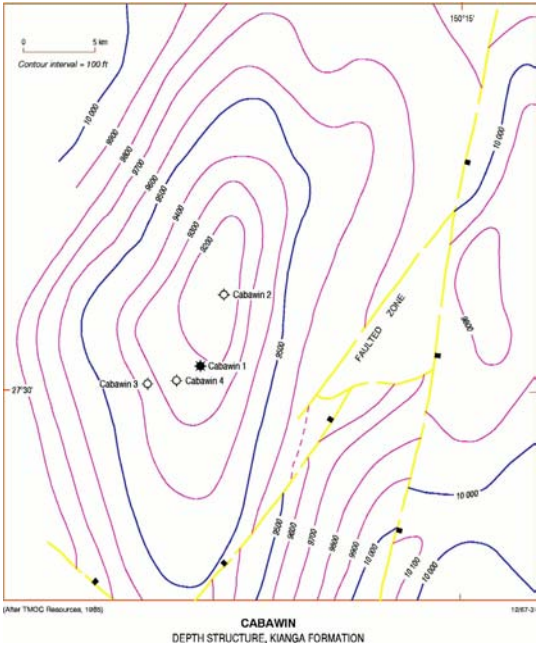
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
	Blythesdale Fm	873.3
JURASSIC	Walloon Coal Measures	1280.2
	Bundamba Fm	1659.3
TRIASSIC	Cabawin Fm	2328.7
PERMIAN	Kianga Fm	2997.7
	Back Creek Group	3156.8
CARBONIFEROUS	Cracow Fm	3554.6

* Picked by Union Oil Development Corporation

GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	TOC	VITRINITE REFLECTANCE (%)	FORMATION
Cabawin-1	337.7	0.35	0.43	Roma Fm
	556.2	-	0.44	Roma Fm
	741.3	1.10	0.35	Roma Fm
	1157.6	1.60	0.45	Blythesdale Fm
	1282.0	4.20	0.57	Walloon Coal Measures
	1315.2	-	0.47	Walloon Coal Measures
	1648.8	-	0.58	Walloon Coal Measures
	1749.5	26.60	0.60	Bundamba Fm
	1849.8	-	0.55	Bundamba Fm
	2045.6	-	0.68	Bundamba Fm
	2046.4	1.20	0.55	Bundamba Fm
	2200.4	1.10	0.56	Bundamba Fm
	2200.9	0.95	0.53	Bundamba Fm
	2257.4	0.75	0.64	Bundamba Fm
	2331.7	0.03	-	Cabawin Fm
	3029.6	-	0.72	Kianga Fm
	3033.4	-	0.80	Kianga Fm
	3034.3	47.10	0.77	Kianga Fm
	3080.0	-	0.82	Kianga Fm
	3082.4	34.30	0.78	Kianga Fm
	3082.8	-	0.80	Kianga Fm
	3087.6	-	0.97	Kianga Fm
	3088.3	0.49	0.85	Kianga Fm
	3380.5	0.70	0.67	Back Creek Group
	3381.5	0.48	1.29	Back Creek Group
	3523.4	-	0.80	Back Creek Group

CABAWIN MAP



CANEON

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Past Producer
LOCATION:	33 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 5
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Caneon-1
Longitude (E):	149.1047
Latitude (S):	-26.5417
Date total depth reached:	06 MAY 87
Ground level:	350.8 m
Kelly bushing:	354.4 m
Operator:	CSR Ltd
Total depth:	1465 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Fault dependent closure with internal four-way dip closure.
AREAL CLOSURE:	4.0 km ² (on top Permian)
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1201.0 m
TEST DATA FROM THE DISCOVERY WELL (Caneon-1):	
DST 1, 1137.9-1203.5 m, Flowed gas at 7900 m ³ /day and recovered 1 m of gas cut mud.	Precipice Sandstone
DST 2, 1198.1-1222.5 m, Flowed gas at 140 100 m ³ /day and recovered 45 m of muddy water.	Precipice Sandstone
DST 3, 1270.0-1352.0 m, Recovered 20 m of mud.	Showgrounds Sandstone

RESERVES (as at 30/6/96):

GAS :

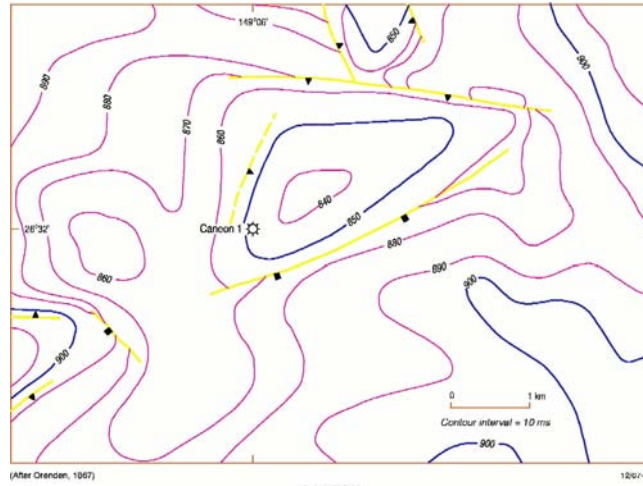
RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	4	4	very small

STRATIGRAPHY (Caneon-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Mooga Sandstone	00.0
JURASSIC	Orallo Fm	189.0
	Gubberamunda Sandstone	331.0
	Westbourne Fm	406.0
	Springbok Sandstone	496.0
	Birkhead Formation	577.0
	Eurombah Fm	831.0
	Hutton Sandstone	885.0
	Evergreen Fm	1105.6
	Boxvale Sandstone Mbr	1136.0
	Precipice Sandstone	1201.7
TRIASSIC	Moolayember Fm	1225.5
	Snake Creek Mudstone Mbr	1261.0
	Showgrounds Sandstone	1271.0
	Rewan Formation	1273.0
PERMIAN	Blackwater Group	1361.5
	Black Alley Shale	1407.0
DEVONIAN	Timbury Hills Fm	1448.0
CARBONIFEROUS	Roma Granite	1451.0

* Picked by Geological Survey of Queensland

CANEON MAP



CANEON
TWT STRUCTURE NEAR TOP PERMIAN SEISMIC MARKER

CARBEAN

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	70 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Carbean-1
Pool(s):	Evergreen Formation.
Longitude (E):	148.9061
Latitude (S):	-27.2150
Date total depth reached:	26 OCT 84
Ground level:	234.8 m
Kelly bushing:	239.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1496 mKB
DISCOVERY WELL:	Carbean-5
Pool(s):	Wandoan Sandstone Member.
Longitude (E):	148.9072
Latitude (S):	-27.2056
Date total depth reached:	13 SEP 88
Ground level:	236.5 m
Kelly bushing:	241.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1494.4 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1371.5 m (Carbean-1)
PETROLEUM BEARING UNIT No.2:	Wandoan Sandstone Mbr
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Carbean-1):	
DST 2, 1408.5-1425.9 m, Recovered 219 m of muddy water.	Evergreen Formation
DST 3, 1439.6-1448.7 m, Flowed gas at 73 600 m ³ /day.	Evergreen Formation
DST 4, 1465.2-1474.3 m, No recovery.	Moolayember Fm (Wandoan Ss Mbr)

TEST DATA FROM THE DISCOVERY WELL (Carbean-5):

DST 1, 1408.0-1424.0 m,
Flowed gas at 3020 m³/day.

Evergreen Formation

DST 2, 1445.0-1453.0 m,
Flowed gas at 106 600 m³/day.

Moolayember Fm (Wandoan Ss Mbr)

DST 3, 1454.0-1494.0 m,
Recovered 20 m of gas cut mud.

Moolayember Fm (Wandoan Ss Mbr)

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Wandoan Ss	187	179	8
Evergreen Fm	166	142	24

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Wandoan Ss	12	10	2
Evergreen Fm	11	9	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Wandoan Ss	33	31	2
Evergreen Fm	34	30	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Wandoan Ss	GAS Evergreen Fm
Methane	85.85	85.00
Ethane	7.20	7.40
Propane	2.90	3.30
Isobutane	0.47	0.54
N-butane	0.61	0.79
Isopentane	0.75 (C5+)	0.89 (C5+)
N-pentane	na	na
Hexanes +	na	na
N₂ + O₂	2.15	1.95
CO₂	0.15	0.10
H₂S	-	-
Specific Gravity	0.659	0.672
BTU/ft³ (gross)	1130	1045

STRATIGRAPHY (Carbean-1) :

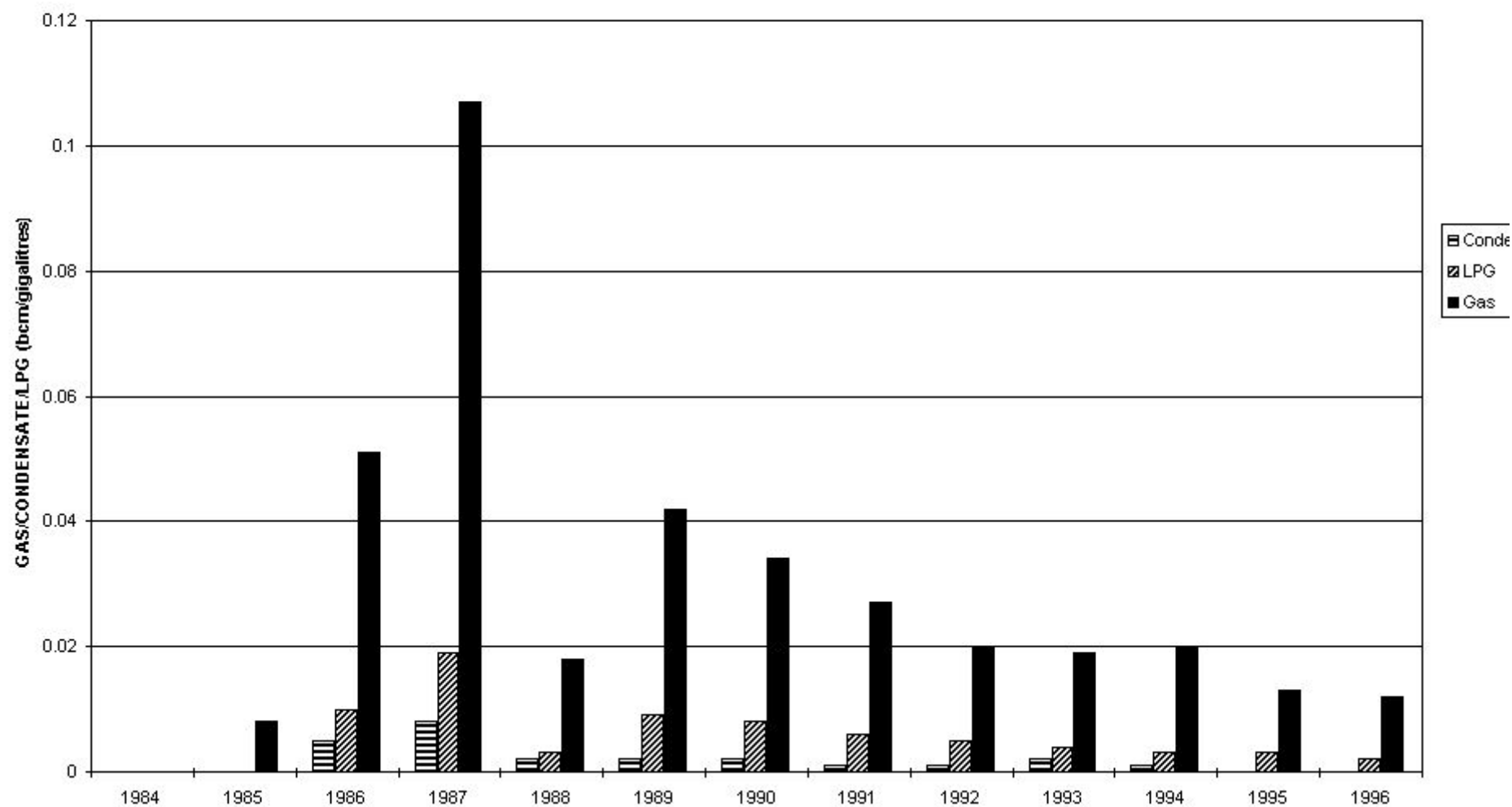
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
	Blythesdale Fm	331.6
JURASSIC	Injune Creek Fm	904.3
	Hutton Sandstone	1199.3
	Evergreen Fm	1371.5
TRIASSIC	Wandoan Fm	1448.9
CARBONIFEROUS	Basement	1473.9

* Picked by Hartogen Energy Ltd

CARBEAN, GAS / CONDENSATE / LPG PRODUCTION (Evergreen Formation & 'Wandoan' Formation)

Discovered 26 October 1984 Production commenced May 1985

Total Wells = 5



CARDIGAN

PRESENT OPERATOR: Oil Company of Australia Ltd
TYPE: Oil
COMMERCIAL STATUS: Other discovery
LOCATION: 45 km south of Roma.
STATE: Queensland
PETROLEUM TITLES: PL 22
BASIN: Surat
SUB-BASIN: Saint George-Bollon Slope
DISCOVERY WELL: Cardigan-1
 Longitude (E): 148.8507
 Latitude (S): -27.0135
 Date total depth reached: 25 SEP 93
 Ground level: 279.2 m
 Kelly bushing: 284.7 m
 Operator: Oil Company of Australia NL
 Total depth: 1504 mKB
NUMBER OF WELLS DRILLED: 1
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Evergreen Formation
CONTENTS: Oil
FORMATION: Evergreen Formation
AGE: Early Jurassic
LITHOLOGY: Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine

TEST DATA FROM THE DISCOVERY WELL (Cardigan-1):

DST 1, 1435.0-1456.0 m, Evergreen Formation
Flowed water at 9.5 bbl/day and recovered
0.5 bbl of 43° API oil.

CAXTON

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	56 km south-southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 22
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Caxton-1
Longitude (E):	148.8576
Latitude (S):	-27.0989
Date total depth reached:	25 JAN 95
Ground level:	266.0 m
Kelly bushing:	271.3 m
Operator:	Oil Company of Australia NL
Total depth:	1532 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to marginal marine

PETROLEUM BEARING UNIT No.2:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine.

TEST DATA FROM THE DISCOVERY WELL (Caxton-1):

DST 1, 1449-1465.6 m, Flowed gas at 103 100 m ³ /day through a 9.5 mm choke and recovered 0.5 barrels of gas cut mud.	Evergreen Formation

DST 2, 1492.4-1509 m, Flowed gas at 32 300 m ³ /day through a 9.5 mm choke.	Moolayember Formation

CHANTARA

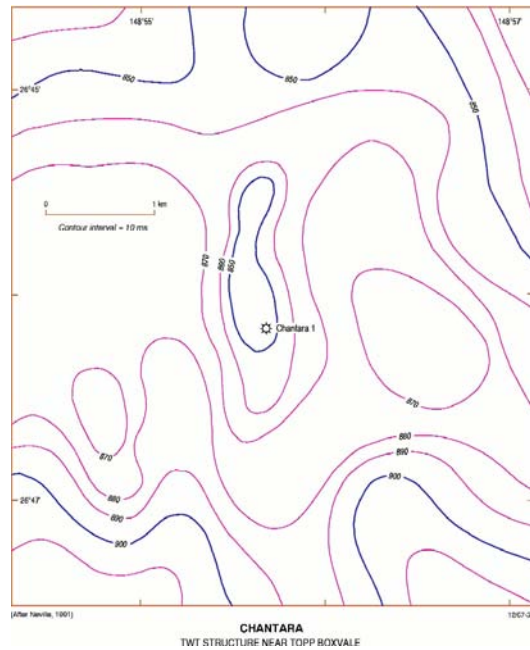
PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	22 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Chantara-1
Longitude (E):	148.9281
Latitude (S):	-26.7673
Date total depth reached:	17 MAR 91
Ground level:	300.0 m
Kelly bushing:	304.0 m
Operator:	Australian Gas Light Company
Total depth:	1427 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.4 km ² (near top of Boxvale Sandstone)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1325.0 m
 TEST DATA FROM THE DISCOVERY WELL (Chantara-1):	
DST 1, 1327.1-1341.3 m,	Precipice Sandstone
Flowed gas at 710 m ³ /day and recovered	
20 m of mud.	

STRATIGRAPHY (Chantara-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Formation	00.0
	Bungil Formation	183.8
	Mooga Sandstone	307.5
JURASSIC	Orallo Fm	428.2
	Gubberamunda Sandstone	543.8
	Westbourne Fm	638.2
	Springbok Sandstone	738.5
	Birkhead Formation	793.5
	Eurombah Fm	1034.0
	Hutton Sandstone	1078.0
	Evergreen Fm	1213.5
	Boxvale Sandstone Mbr	1266.0
	Precipice Sandstone	1325.0
TRIASSIC	Moolayember Fm	1333.0
	Snake Creek Mudstone Mbr	1383.1
	Showgrounds Sandstone	1389.0
PERMIAN	Blackwater Group	1390.0
DEVONIAN	Timbury Hills Fm	1396.2

* Picked by Geological Survey of Queensland

CHANTARA MAP



CHERWONDAH

PRESENT OPERATOR:	Stenbank Pty Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	115 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	465-P
BASIN:	Bowen
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Cherwondah-1
Longitude (E):	149.9197
Latitude (S):	-26.2647
Date total depth reached:	03 JAN 65
Ground level:	324.9 m
Kelly bushing:	328.6 m
Operator:	Union Oil Development Corporation
Total depth:	1641 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Wandoan Sandstone Member
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1194.2 m

TEST DATA FROM THE DISCOVERY WELL (Cherwondah-1):

DST 6, 1100.3-1112.5 m, No recovery.	Precipice Sandstone
DST 1, 1272.2-1276.5 m, Flowed gas at 7080 m ³ /day.	Moolayember Fm (Wandoan Ss Mbr)
DST 2, 1272.5-1280.5 m, Flowed gas at 1420 m ³ /day.	Moolayember Fm (Wandoan Ss Mbr)
DST 3, 1393.6-1401.5 m, Recovered 4.6 m of gas cut mud.	Moolayember Fm (Wandoan Ss Mbr)
DST 5, 1423.4-1438.1 m, Flowed gas at 850 m ³ /day.	Moolayember Fm (Wandoan Ss Mbr)
DST 4, 1441.1-1498.4 m, No gas to surface.	Moolayember Fm (Wandoan Ss Mbr)

STRATIGRAPHY (Cherwondah-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Walloon Coal Measures	00.0
	Hutton Sandstone	659.9
	Evergreen Fm	911.4
	Precipice Sandstone	1067.7
TRIASSIC	Wandoan Sandstone	1194.2
	Cabawin Fm	1527.4

* Picked by Union Oil Development Corporation

CHESNEY

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	92 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	337-P
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Chesney-1
Longitude (E):	148.5196
Latitude (S):	-25.8178
Date total depth reached:	10 NOV 91
Ground level:	447.5 m
Kelly bushing:	451.5 m
Operator:	Australian Gas Light Company
Total depth:	1055 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Reverse faulted anticlinal rollover.
AREAL CLOSURE:	2.4 km ² of fault dependent closure.
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	987.0 m
 TEST DATA FROM THE DISCOVERY WELL (Chesney-1):	
DST 1, 949.8-968.6 m, Misrun.	Catherine Sandstone
DST 2, 949.8-968.6 m, Recovered 9.8 m of mud.	Catherine Sandstone
DST 3, 988.0-996.0 m, Flowed gas at 6030 m ³ /day.	Aldebaran Sandstone
DST 4, 996.0-1005.0 m, Recovered 19.2 m of gas cut mud.	Aldebaran Sandstone

STRATIGRAPHY (Chesney-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Birkhead Formation	00.0
	Hutton Sandstone	75.1
	Evergreen Fm	268.3
	Boxvale Sandstone Mbr	306.3
	Precipice Sandstone	403.3
TRIASSIC	Moolayember Fm	485.7
	Snake Creek Mudstone Mbr	598.5
	Showgrounds Sandstone	608.8
	Rewan Formation	615.5
PERMIAN	Bandanna Formation	740.0
	Black Alley Shale	829.6
	Catherine Sandstone	917.2
	Aldebaran Sandstone	986.7
CARBONIFEROUS	Basement	1010.0

* Picked by Geological Survey of Queensland

COCKATOO

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	161 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 2
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Cockatoo-1
Longitude (E):	149.4105
Latitude (S):	-27.9638
Date total depth reached:	06 OCT 87
Ground level:	216.0 m
Kelly bushing:	222.6 m
Operator:	Sydney Oil Company Pty Ltd
Total depth:	2344 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Faulted anticline
AREAL CLOSURE:	6.7 km ² (near top Kianga Fm)
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial	

TEST DATA FROM THE DISCOVERY WELL (Cockatoo-1):

DST 1, 2129.0-2148.8 m,	Showgrounds Sandstone
Recovered 90 m of mud and 9 m of water.	

DST 2, 2178.0-2188.0 m,	Showgrounds Sandstone
Recovered 2.0 L of 47° API oil and 21 m of mud.	

STRATIGRAPHY (Cockatoo-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	332.8
	Wallumbilla Formation	434.2
	Bungil Formation	669.7
	Mooga Sandstone	873.5
JURASSIC	Orallo Formation	1051.3
	Gubberamunda Sandstone	1135.7
	Westbourne Formation	1368.5
	Springbok Sandstone	1417.6
	Birkhead Formation	1527.0
	Hutton Sandstone	1693.7
	Evergreen Fm	1843.6
	Boxvale Sandstone Mbr	1869.8
	Precipice Sandstone	1928.6
TRIASSIC	Moolayember Fm	1935.0
	Snake Creek Mudstone Mbr	2109.5
	Showgrounds Sandstone	2132.5
PERMIAN	Blackwater Group	2151.5
CARBONIFEROUS	Volcanics	2287.0

* Picked by Geological Survey of Queensland

COGOON RIVER

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	65 km south-southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 64
BASIN:	Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Cogoon River-2
Longitude (E):	148.6594
Latitude (S):	-27.1712
Date total depth reached:	16 AUG 82
Ground level:	260.6 m
Kelly bushing:	264.9 m
Operator:	Hartogen Energy Ltd
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Fault dependent closure
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Boxvale Sandstone Member
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1380.7 m

TEST DATA FROM THE DISCOVERY WELL (Cogoon River-2):

DST 2, 1200.9-1214.0 m, Flowed 165 bbl/day of oil cut water.	Hutton Sandstone
DST 5, 1264.0-1275.9 m, Flowed 1000 bbl/day of water.	Hutton Sandstone
DST 1, 1414.0-1422.2 m, Flowed gas at 251 200 m ³ /day and recovered 12.2 m of water.	Evergreen Formation (Boxvale Ss)
DST 6, 1419.2-1424.0 m, Recovered 268 m of muddy water.	Evergreen Formation (BoxvaleSs)
DST 4, 1439.6-1451.6 m, Flowed water at 800 barrels/day.	Evergreen/Moolayember Formation

PRODUCTION & INFRASTRUCTURE :

In early 1997, Cogoon River-2 was suspended due to high water cut.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	79	39	40

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	5	2	3

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	12	5	7

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	85.10
Ethane	6.95
Propane	1.60
Isobutane	1.90
N-butane	0.38
Isopentane	1.30 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.15
CO ₂	0.62
H ₂ S	-
Specific Gravity	0.680
BTU/ft ³ (gross)	-

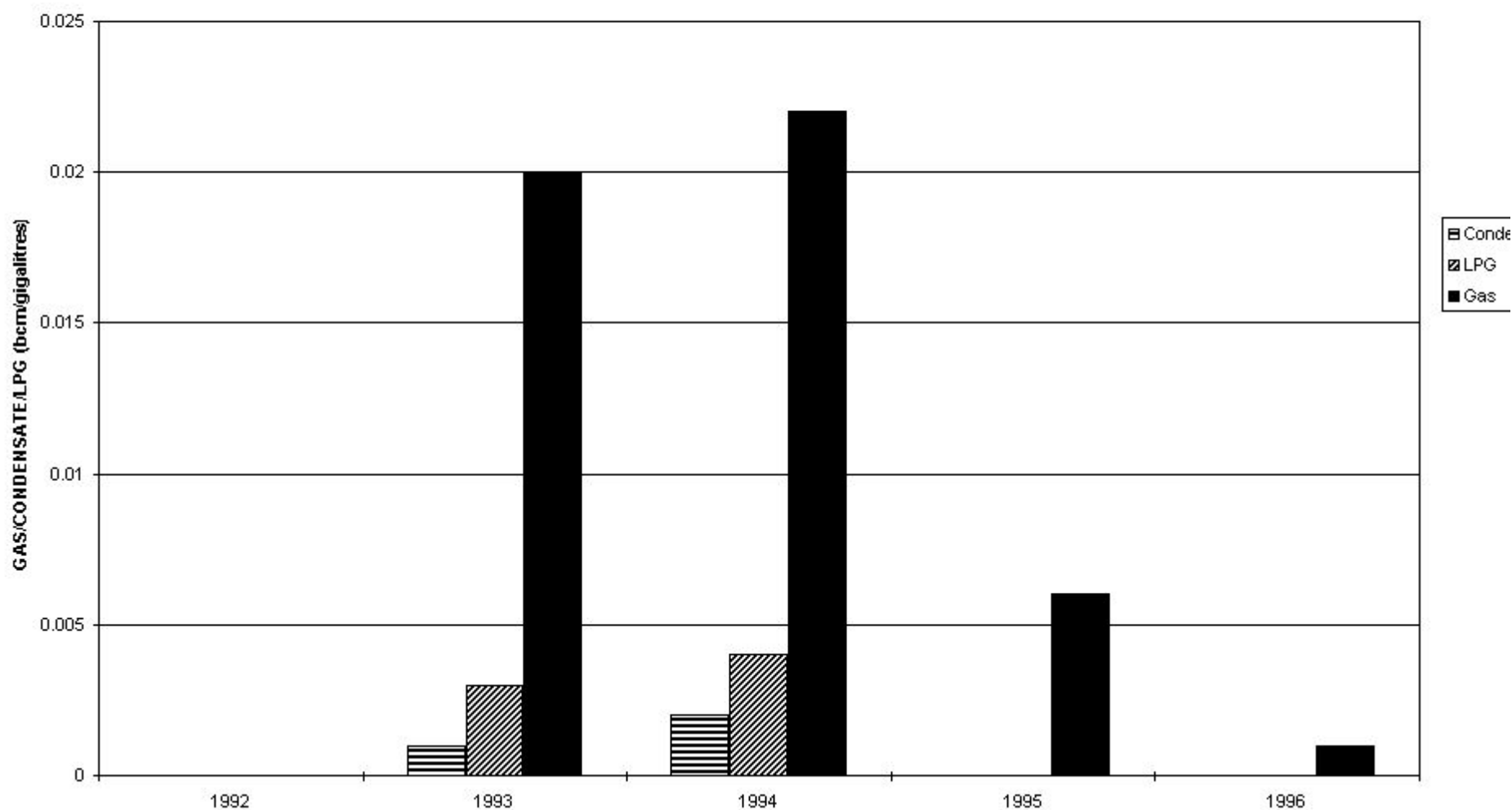
STRATIGRAPHY (Cogoon River-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Bungil Fm	355.1
	Mooga Sandstone	504.4
JURASSIC	Orallo Fm	609.0
	Gubberamunda Sandstone	757.7
	Westbourne Fm	888.5
	Springbok Sandstone	969.3
	Walloon Coal Measures	1028.7
	Hutton Sandstone	1208.8
	Evergreen Fm	1339.9
TRIASSIC	Moolayember Fm	1441.7
CARBONIFEROUS	Granite	1456.3

* Picked by Geological Survey of Queensland

COGOON RIVER, GAS / CONDENSATE / LPG PRODUCTION (Evergreen Formation)

Discovered 16 August 1982 Production commenced 1993

Total Wells = 3

COGOON RIVER WEST

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Producer
LOCATION:	66 km south-southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 64
BASIN:	Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Cogoon River West-1
Longitude (E):	148.6511
Latitude (S):	-27.1803
Date total depth reached:	10 OCT 90
Ground level:	280.4 m
Kelly bushing:	285.5 m
Operator:	Oil Company of Australia NL
Total depth:	1435 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Oil
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1337.0 m

TEST DATA FROM THE DISCOVERY WELL (Cogoon River West-1):

DST 1, 1215.5-1230.2 m, Misrun.	Walloon Coal Measures/Hutton Ss

DST 2, 1216.2-1230.2 m, Recovered 125 m of muddy water with a trace of oil.	Walloon Coal Measures/Hutton Ss

DST 3, 1415.2-1435.0 m, Recovered 335 m of oil, 49 m of oil cut mud and 494 m of water.	Evergreen Formation

DST 4, 1450.8-1468.5 m, Recovered 3 m of oil and 281 m of mud.	Evergreen Formation

DST 5, 1478.3-1487.4 m, Flowed 500 bbl/day of water.	Moolayember Formation

PRODUCTION & INFRASTRUCTURE :

Cogoon River West-1 was shut in pending plugging and abandonment in 1996.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	4	2	2

STRATIGRAPHY (Cogoon River West-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Formation	219.5
	Bungil Formation	404.8
	Mooga Sandstone	557.2
JURASSIC	Orallo Formation	664.5
	Gubberamunda Sandstone	806.4
	Westbourne Formation	946.3
	Springbok Sandstone	1030.5
	Birkhead Formation	1080.2
	Eurombah Formation	1142.4
	Hutton Sandstone	1214.6
	Evergreen Fm	1377.7
	Boxvale Sandstone Mbr	1419.1
TRIASSIC	Moolayember Fm	1454.2
CARBONIFEROUS	Basement	1496.6

* Picked by Geological Survey of Queensland

COLGOON

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	60 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Colgoon-1
Pool(s):	Precipice Sandstone
Longitude (E):	148.9219
Latitude (S):	-27.1311
Date total depth reached:	25 FEB 64
Ground level:	248.4 m
Kelly bushing:	252.7 m
Operator:	Union Oil Development Corporation
Total depth:	1484 mKB
DISCOVERY WELL:	North Colgoon-1
Pool(s):	Evergreen Formation
Longitude (E):	148.9175
Latitude (S):	-27.1161
Date total depth reached:	20 DEC 87
Ground level:	252.0 m
Kelly bushing:	256.6 m
Operator:	Hartogen Energy Ltd
Total depth:	1515 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE TRAP:	Fault dependent closure
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1357.9 m (North Colgoon-1)
POROSITY:	17% (average)
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1431.6 m (Colgoon-1)
POROSITY:	17% (average)

TEST DATA FROM THE DISCOVERY WELL (Colgoon-1):

DST 1, 1432.3-1437.7 m, Precipice Sandstone
Flowed gas at 2830 m³/day.

TEST DATA FROM THE DISCOVERY WELL (North Colgoon-1):

DST 1, 1442.9-1467.3 m, Evergreen Formation
Flowed gas at 42 760 m³/day and
recovered 9 m of condensate.

DST 2, 1445.1-1485.3 m, Moolayember Formation
Weak air blow, no gas to surface.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	35	16	19

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	3	1	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	7	3	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	84.10
Ethane	7.20
Propane	3.90
Isobutane	0.74
N-butane	1.15
Isopentane	0.30
N-pentane	0.33
Hexanes +	0.59
N ₂ + O ₂	1.52
CO ₂	0.18
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Colgoon-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	313.9
	Mooga Sandstone	430.1
JURASSIC	Orallo Fm	515.7
	Gubberamunda Sandstone	702.6
	Westbourne Fm	877.8
	Springbok Sandstone	949.5
	Walloon Coal Measures	997.3
	Eurombah Fm	1188.7
	Hutton Sandstone	1204.0
	Evergreen Fm	1347.2
	Precipice Sandstone	1431.6
TRIASSIC	Moolayember Fm	1435.9
CARBONIFEROUS	Granite	1470.4

* Picked by Geological Survey of Queensland

STRATIGRAPHY (North Colgoon-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	128.0
	Bungil Fm	309.7
	Mooga Sandstone	427.9
JURASSIC	Orallo Fm	558.7
	Gubberamunda Sandstone	704.7
	Westbourne Fm	880.9
	Springbok Sandstone	940.9
	Walloon Coal Measures	997.0
	Hutton Sandstone	1198.5
	Evergreen Fm	1357.9
TRIASSIC	Moolayember Fm	1458.2
CARBONIFEROUS	Basement	1491.7

* Picked by Geological Survey of Queensland

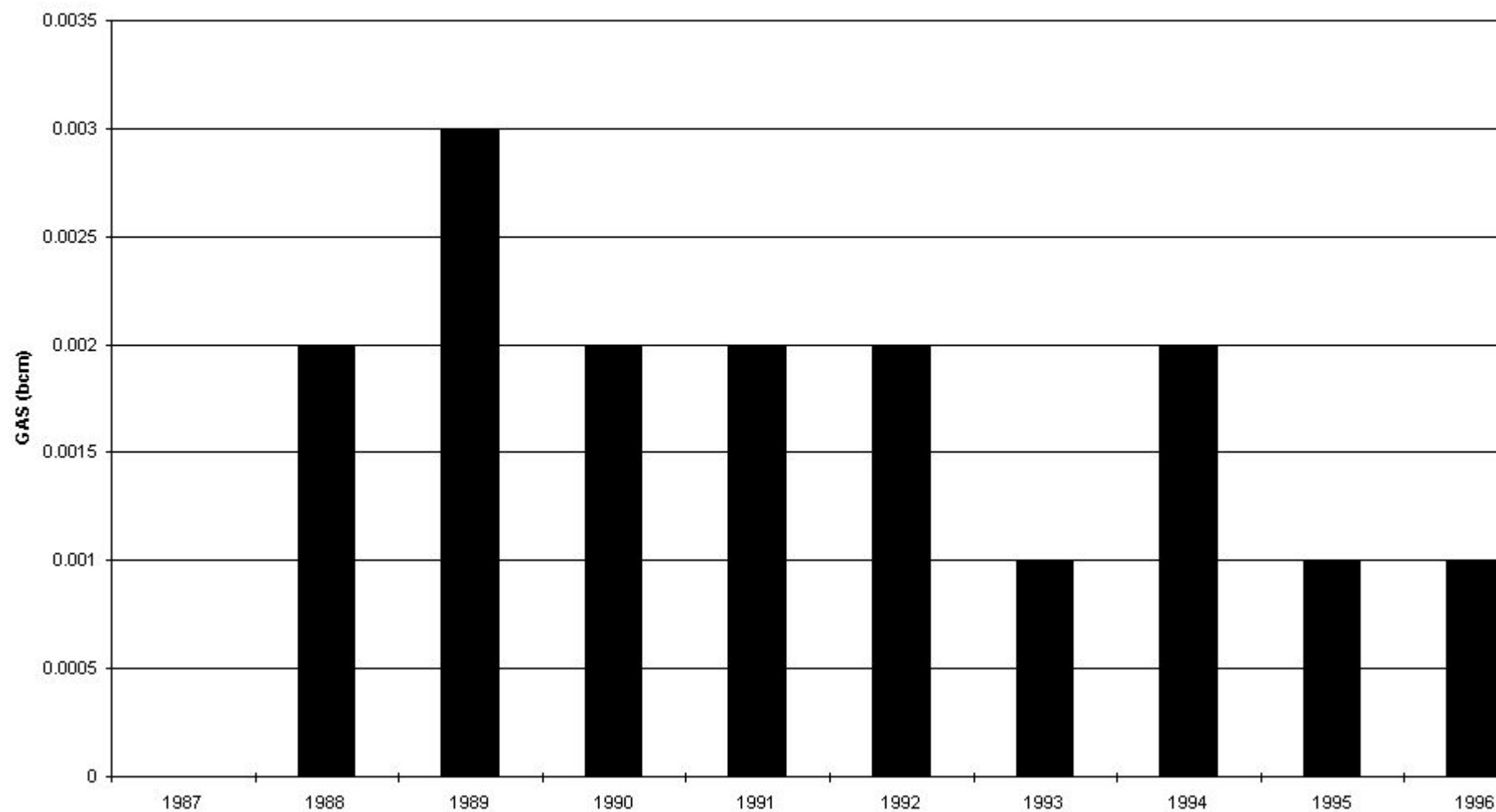
POROSITY AND PERMEABILITY DATA (Colgoon-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1227.5	20.0	12.0	4.0	Hutton Sandstone
1393.6	25.0	75.0	69.0	Evergreen Fm
1435.4	9.0	5.0	0.0	Precipice Sandstone

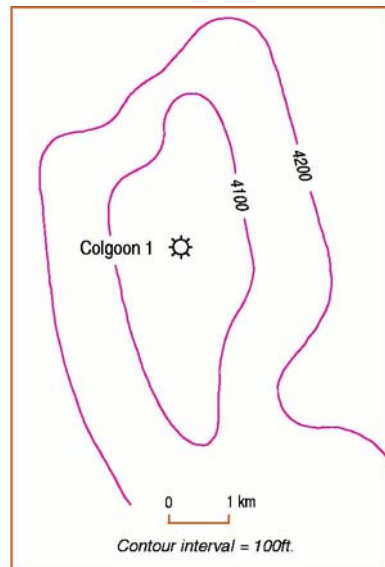
NORTH COLGOON, GAS PRODUCTION (Basal Evergreen Formation)

Discovered 20 December 1987 Production commenced September 1988

Total Wells = 1 (1 Producer)



COLGOON MAP



(After Union Oil, 1964)

12/67-34

DEPTH STRUCTURE
ON TOP EVERGREEN SHALE

COMBARNGO

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	47 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 11
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Combarngo-1
Longitude (E):	149.1500
Latitude (S):	-26.8500
Date total depth reached:	10 JUN 61
Ground level:	279.8 m
Kelly bushing:	283.5 m
Operator:	Associated Australian Oilfields
Total depth:	1824 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	13.0 km ²
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1546.9 m

PETROLEUM BEARING UNIT No.2:	Blackwater Group
CONTENTS:	Gas
FORMATION:	Blackwater Group
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine

TEST DATA FROM THE DISCOVERY WELL (Combarngo-1):

DST 1, 1546.6-1557.2 m, Flowed gas at 2260 m ³ /day and recovered 4 barrels of oil.	Showgrounds Sandstone

DST 3, 1547.2-1547.6 m, Flowed water at 23 bbl/day with a trace of oil.	Showgrounds Sandstone

DST 2, 1673.1-1720.3 m, Flowed gas at 280 m ³ /day.	Blackwater Group

STRATIGRAPHY (Combarngo-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	195.1
	Mooga Sandstone	293.2
JURASSIC	Orallo Fm	431.0
	Gubberamunda Sandstone	576.1
	Westbourne Fm	676.7
	Springbok Sandstone	768.1
	Walloon Coal Measures	844.9
	Eurombah Fm	1129.3
	Hutton Sandstone	1185.7
	Evergreen Fm	1327.4
	Precipice Sandstone	1418.8
TRIASSIC	Moolayember Fm	1441.7
	Snake Creek Mudstone Mbr	1533.1
	Showgrounds Sandstone	1546.9
	Rewan Fm	1549.9
PERMIAN	Blackwater Group	1620.0
CARBONIFEROUS	Combarngo Volcanics	1716.0

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Combarngo-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1553.6	6.5	0.0	0.0	Rewan Fm
1578.3	19.5	3.0	3.0	Rewan Fm
1719.7	9.5	0.0	0.0	Combarngo Volcanics
1797.9	1.5	0.0	0.0	Combarngo Volcanics
1812.1	2.0	0.0	0.0	Combarngo Volcanics

CONLOI

PRESENT OPERATOR:	Queensland Gas Pty Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Producer
LOCATION:	120 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	574-P
BASIN:	Surat
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Conloi-1
Longitude (E):	149.9633
Latitude (S):	-26.4283
Date total depth reached:	24 AUG 64
Ground level:	459.6 m
Kelly bushing:	463.3 m
Operator:	Union Oil Development Corporation
Total depth:	1829 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticlinal closure within a tilted fault block.
AREAL CLOSURE:	3.9 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Oil
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : light gray, medium grained, sublabile to quartzose.
DEPOSITIONAL ENVIRONMENT:	Shallow freshwater, swampy to lacustrine.
FORMATION TOP (mKB):	1194.2 m
POROSITY:	26.5% (sonic log)
TEST DATA FROM THE DISCOVERY WELL (Conloi-1):	
DST 5, 1314.0-1318.3 m, Recovered 1073 m of 29.5° API oil.	Evergreen Formation
Production Test, 1314.9-1317.0 m, Flowed oil at 170 bbl/day.	Evergreen Formation

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	4	3	1

COMPOSITIONAL DATA :

OIL :

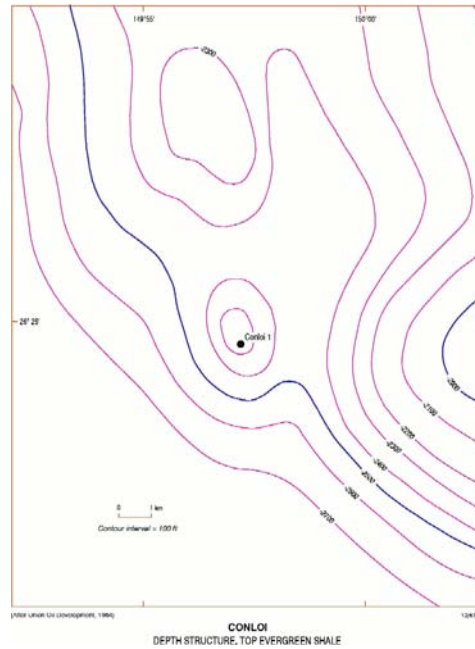
FLUID PROPERTIES	OIL Evergreen Fm
API Gravity @ 60°F	29.5°
Base	Napthenic to Aromatic
Sulphur (% wt)(ppm)	<0.10%
Initial GOR (ft ³ /bbl)	-
Pour Point	< -6°C
Specific Gravity	0.8789
Colour	Green-brown
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Conloi-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo Formation	00.0
	Gubberamunda Sandstone	217.9
	Westbourne Formation	307.8
	Springbok Sandstone	485.2
	Birkhead Formation	522.1
	Eurombah Formation	955.5
	Hutton Sandstone	1026.6
	Evergreen Fm	1193.3
	Precipice Sandstone	1368.6
TRIASSIC	Moolayember Formation	1505.4
	Snake Creek Mudstone Mbr	1576.1
	Showgrounds Sandstone	1583.1
	Rewan Formation	1771.8

* Picked by Geological Survey of Queensland

CONLOI MAP



COOLIBAH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	6 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 6
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Coolibah-1
Longitude (E):	148.7933
Latitude (S):	-26.6619
Date total depth reached:	07 AUG 64
Ground level:	321.9 m
Kelly bushing:	325.2 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1315 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.

DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1236.3 m

TEST DATA FROM THE DISCOVERY WELL (Coolibah-1):

DST 1, 1239.3-1255.2 m, Flowed gas at 4700 m ³ /day.	Precipice Sandstone
DST 2, 1274.4-1314.6 m, No gas to surface.	Moolayember Formation

COMPOSITIONAL DATA :

GAS :

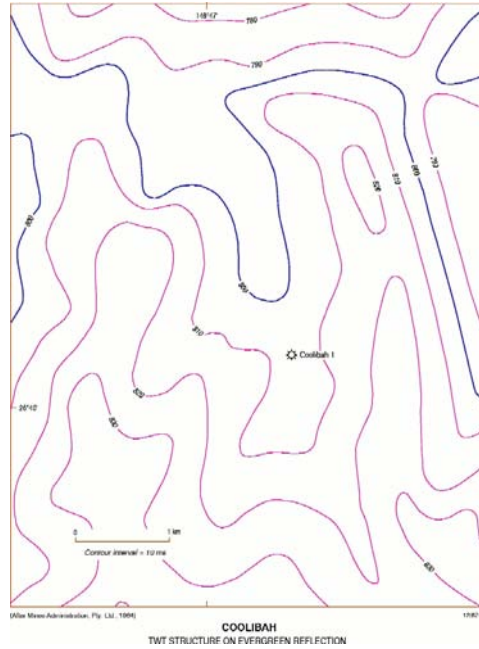
GAS PROPERTIES	GAS Precipice Ss
Methane	89.40
Ethane	5.10
Propane	1.91
Isobutane	0.59
N-butane	0.21
Isopentane	0.24
N-pentane	0.01
Hexanes +	0.29
N ₂ + O ₂	0.88
CO ₂	0.39
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Coolibah-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	144.8
	Mooga Sandstone	265.2
JURASSIC	Orallo Fm	320.0
	Gubberamunda Sandstone	467.9
	Westbourne Fm	545.6
	Springbok Sandstone	662.9
	Walloon Coal Measures	696.5
	Hutton Sandstone	923.5
	Evergreen Fm	1132.0
	Precipice Sandstone	1236.3
TRIASSIC	Moolayember Fm	1252.1
DEVONIAN	Timbury Hills Fm	1307.3

* Picked by Geological Survey of Queensland

COOLIBAH MAP



CROSSMAGLEN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	45 km east-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL11
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Crossmaglen-1
Longitude (E):	149.1283
Latitude (S):	-26.8167
Date total depth reached:	20 AUG 85
Ground level:	302.3 m
Kelly bushing:	305.7 m
Operator:	Associated Australian Resources Ltd
Total depth:	1754.5 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1537 m

TEST DATA FROM THE DISCOVERY WELL (Crossmaglen-1):

DST 1, 1530-1551 m,	Showgrounds Sandstone
Recovered 1 m of oil, 56 m of oil and gas	
cut mud and 133 m of slightly gas cut	
water. Gas to surface at a rate too small	
to measure.	

STRATIGRAPHY (Crossmaglen-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
JURASSIC	Orallo Fm	446.0
	Gubberamunda Sandstone	580.0
	Westbourne Fm	686.0
	Birkhead Fm	848.3
	Eurombah Fm	1126.5
	Hutton Sandstone	1181.8
	Evergreen Fm	1320.0
	Precipice Sandstone	1437.7
TRIASSIC	Moolayember Fm	1444.0
	Snake Creek Mudstone Mbr	1523.0
	Showgrounds Sandstone	1537.0
	Rewan Formation	1543.0
PERMIAN	Blackwater Group	1591.6
	Back Creek Group	1642.0
DEVONIAN	Timbury Hills Fm	1688.0

* Picked by Geological Survey of Queensland

DAMPER CREEK

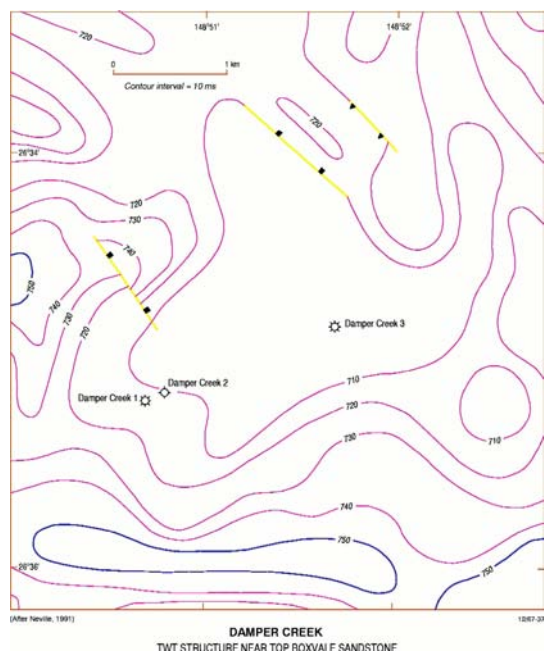
PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	5 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 3
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Damper Creek-1
Longitude (E):	148.8450
Latitude (S):	-26.5856
Date total depth reached:	08 DEC 78
Ground level:	315.8 m
Kelly bushing:	319.1 m
Operator:	Jimbilby Pty Ltd
Total depth:	1179 mKB
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	6.0 km ² (near top of Boxvale Sandstone)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1132.9 m
 TEST DATA FROM THE DISCOVERY WELL (Damper Creek-1):	
DST 1, 1127.2-1147.9 m,	Precipice Sandstone
Flowed gas at 7650 m ³ /day.	

STRATIGRAPHY (Damper Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	156.1
JURASSIC	Orallo Fm	221.0
	Gubberamunda Sandstone	365.2
	Westbourne Fm	429.2
	Springbok Sandstone	532.8
	Walloon Coal Measures	576.7
	Eurombah Fm	791.0
	Hutton Sandstone	859.5
	Evergreen Fm	1010.7
	Precipice Sandstone	1132.9
TRIASSIC	Moolayember Fm	1143.6
DEVONIAN	Timbury Hills Fm	1169.8

* Picked by Geological Survey of Queensland

DAMPER CREEK MAP



DEEPWATER

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	45 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 69
BASIN:	Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Deepwater-1
Longitude (E):	148.8083
Latitude (S):	-26.9953
Date total depth reached:	27 DEC 85
Ground level:	301.0 m
Kelly bushing:	305.0 m
Operator:	Associated Australian Resources Ltd
Total depth:	1539 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.2 km ² (on Boxvale Sandstone seismic marker).
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1453.0 m
 TEST DATA FROM THE DISCOVERY WELL (Deepwater-1):	
DST 2, 1459.4-1470.7 m, Flowed gas at 291 700 m ³ /day and recovered 92 m of gas cut water.	Precipice Sandstone
 DST 1, 1504.8-1538.9 m, Recovered 280 m of gas cut mud and 1259 m of gas cut water.	 Precipice Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	11	9	2

COMPOSITIONAL DATA :

GAS :

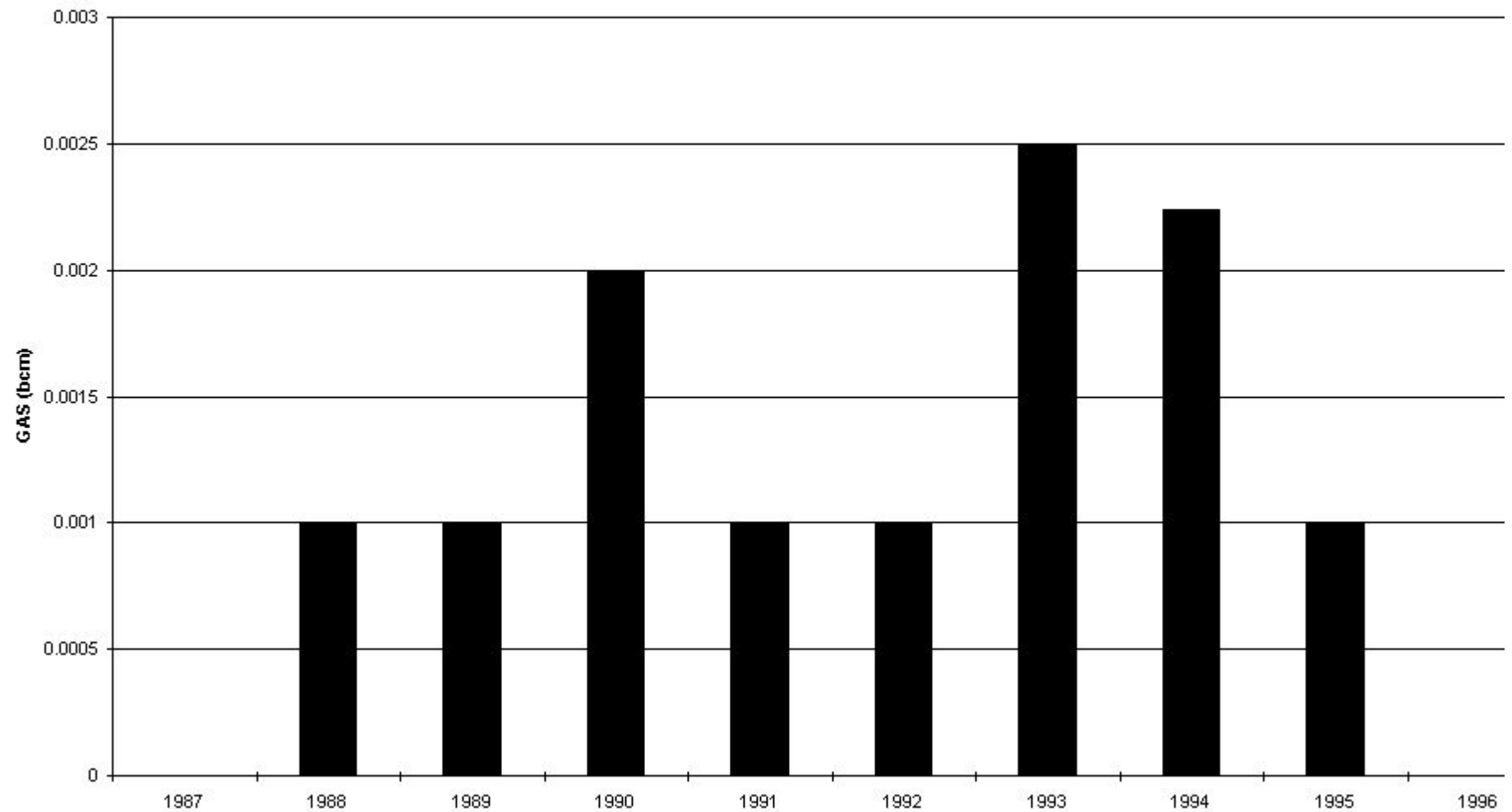
GAS PROPERTIES	GAS Precipice Ss
Methane	88.97
Ethane	5.56
Propane	2.01
Isobutane	0.44
N-butane	0.37
Isopentane	0.76 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	1.73
CO ₂	0.13
H ₂ S	-
Specific Gravity	0.640
BTU/ft ³ (gross)	1113

STRATIGRAPHY (Deepwater-1) :

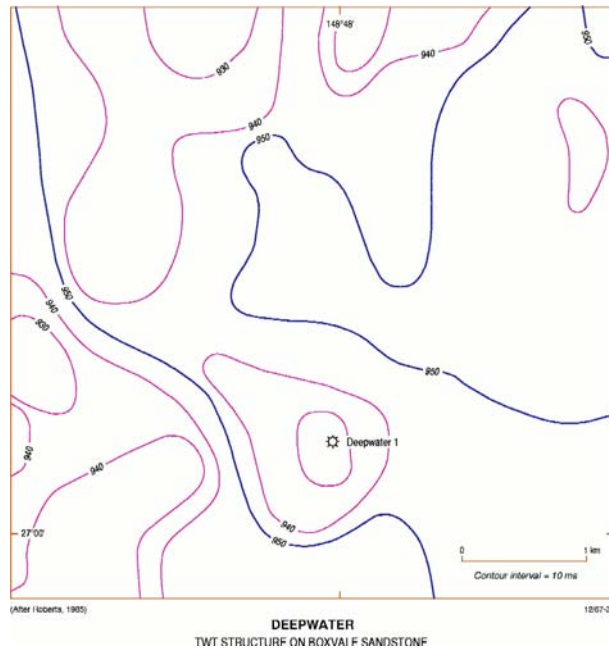
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	325.0
	Mooga Sandstone	456.0
JURASSIC	Orallo Fm	553.0
	Gubberamunda Sandstone	726.5
	Injune Creek Group	837.0
	Hutton Sandstone	1151.0
	Evergreen Fm	1353.0
	Precipice Sandstone	1453.0
TRIASSIC	Moolayember Fm	1469.0
	Granite wash	1524.0
CARBONIFEROUS	Granite	1534.0

* Picked by Associated Australian Resources Ltd

DEEPWATER, GAS PRODUCTION (Precipice Sandstone)
Discovered 27 December 1985 Production commenced 1 November 1988
Total Wells = 1 (1 Producer)



DEEPWATER MAP



DIDGERIDOO

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	60 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Didgeridoo-2
Longitude (E):	148.8872
Latitude (S):	-27.1249
Date total depth reached:	13 JUL 82
Ground level:	257.9 m
Kelly bushing:	262.1 m
Operator:	Hartogen Energy Ltd
Total depth:	1575 mKB
NUMBER OF WELLS DRILLED:	3
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Boxvale Sandstone Member
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1405.4 m
TEST DATA FROM THE DISCOVERY WELL (Didgeridoo-2):	
DST 1, 1405.1-1413.4 m, Flowed gas at 12 750 m ³ /day.	Evergreen Formation (Boxvale Ss)
DST 2, 1446.6-1454.8 m, Flowed gas at 2800 m ³ /day.	Evergreen Formation (Boxvale Ss)

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	very small	very small	very small

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	very small	very small	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	85.70
Ethane	7.95
Propane	0.41
Isobutane	1.85
N-butane	0.01
Isopentane	0.95 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	3.00
CO ₂	0.13
H ₂ S	-
Specific Gravity	0.660
BTU/ft ³ (gross)	-

STRATIGRAPHY (Didgeridoo-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	108.2
	Mooga Sandstone	434.3
JURASSIC	Orallo Fm	548.6
	Gubberamunda Sandstone	717.8
	Westbourne Fm	883.9
	Springbok Sandstone	947.9
	Walloon Coal Measures	1018.0
	Hutton Sandstone	1197.9
	Evergreen Fm	1361.8
TRIASSIC	Moolayember Fm	1446.3
CARBONIFEROUS	Granite	1486.8

* Picked by Geological Survey of Queensland

DIRINDA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	14 km southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 6
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Dirinda-1
Longitude (E):	148.6756
Latitude (S):	-26.6797
Date total depth reached:	28 NOV 64
Ground level:	313.0 m
Kelly bushing:	316.4 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1309 mKB
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Timbury Hills Formation
CONTENTS:	Oil and Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Indurated sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental
FORMATION TOP (mKB):	1208.2 m

TEST DATA FROM THE DISCOVERY WELL (Dirinda-1):

DST 1, 1158.5-1174.4 m, No gas to surface.	Evergreen Formation
DST 2, 1208.5-1219.2 m, Flowed gas at 1850 m ³ /day and recovered 180 m of 53° API oil.	Timbury Hills Formation
DST 3, 1219.2-1230.5 m, Flowed gas at 200 m ³ /day and recovered a quantity of oily gas cut mud.	Timbury Hills Formation
DST 4, 1230.2-1245.4 m, No gas to surface.	Timbury Hills Formation

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Timbury Hills Fm
Methane	28.90
Ethane	15.10
Propane	25.10
Isobutane	9.40
N-butane	10.70
Isopentane	3.00
N-pentane	3.10
Hexanes +	3.20
N ₂ + O ₂	1.19
CO ₂	0.35
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

OIL :

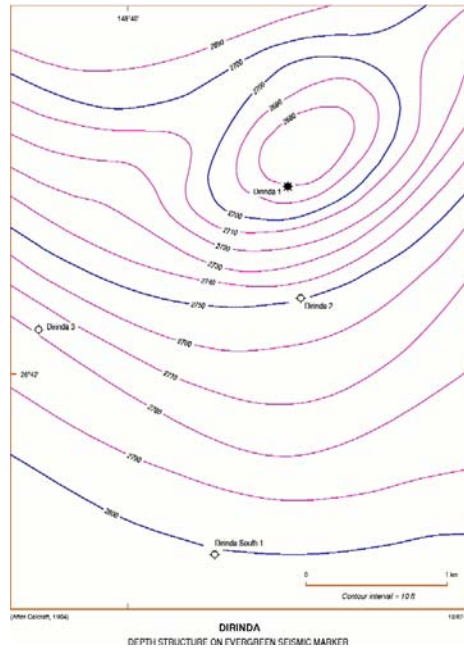
FLUID PROPERTIES	OIL Timbury Hills Fm
API Gravity @ 60°F	47.3°
Base	-
Sulphur (% wt)(ppm)	0.20%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Dirinda-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	161.5
	Mooga Sandstone	276.8
JURASSIC	Orallo Fm	326.1
	Gubberamunda Sandstone	501.7
	Westbourne Fm	558.7
	Springbok Sandstone	676.7
	Walloon Coal Measures	709.3
	Eurombah Fm	895.5
	Hutton Sandstone	942.4
	Evergreen Fm	1105.2
DEVONIAN	Timbury Hills Fm	1207.6

* Picked by Geological Survey of Queensland

DIRINDA MAP



DONGA

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	104 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	212-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Donga-1
Longitude (E):	148.8264
Latitude (S):	-27.5253
Date total depth reached:	23 MAY 91
Ground level:	227.7 m
Kelly bushing:	231.3 m
Operator:	Union Oil Development Corporation
Total depth:	1596 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.2 km ² (near top Evergreen Formation)
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Moolayember Formation
CONTENTS:	Oil
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1554.5 m

TEST DATA FROM THE DISCOVERY WELL (Donga-1):

DST 1, 1576.4-1595.9 m,	Moolayember Formation
Recovered 32 m of oil and 670 m of water.	

DST 2, 1576.4-1585.7 m,	Moolayember Formation
Recovered 487 m of water and a quantity of oil and gas cut mud.	

STRATIGRAPHY (Donga-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	137.2
	Wallumbilla Fm	272.2
	Bungil Fm	438.9
	Mooga Sandstone	634.0
JURASSIC	Orallo Fm	759.0
	Gubberamunda Sandstone	880.9
	Westbourne Fm	1021.7
	Springbok Sandstone	1097.3
	Walloon Coal Measures	1179.6
	Hutton Sandstone	1328.9
	Evergreen Fm	1478.3
TRIASSIC	Moolayember Fm	1554.5
CARBONIFEROUS	Basement	1582.5

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Donga-2) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1562.8	15.5	0.9	0.6	Moolayember Fm
1564.0	16.1	1.4	0.8	Moolayember Fm
1565.3	14.5	0.4	0.2	Moolayember Fm
1566.3	14.8	0.4	0.3	Moolayember Fm
1567.2	12.1	0.0	0.3	Moolayember Fm
1567.9	16.1	74.1	52.1	Moolayember Fm
1568.3	5.1	0.2	0.1	Moolayember Fm

DUARRAN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Past Producer
LOCATION:	11 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 6
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Duarran-1
Longitude (E):	148.8092
Latitude (S):	-26.6986
Date total depth reached:	02 JUL 64
Ground level:	284.7 m
Kelly bushing:	288.0 m
Operator:	Associated Australian Oilfields
Total depth:	1316 mKB
NUMBER OF WELLS DRILLED:	6
STRUCTURE/TRAP:	Structural/Stratigraphic trap formed by drape of a channel sand over an anticlinal nose.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : medium to coarse grained, quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1226.8 m
POROSITY:	17% (average)
TEST DATA FROM THE DISCOVERY WELL (Duarran-1):	
DST 1, 1225.3-1241.1 m,	Precipice Sandstone
Flowed gas at 13 400 m ³ /day and recovered 64 m of oil.	

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	15	15	very small

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	2	2	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Precipice Ss (Duarran-2)	ASSOCIATED GAS Precipice Ss (Duarran-1)
Methane	73.00	66.50
Ethane	11.20	11.00
Propane	6.10	8.90
Isobutane	2.80	4.50
N-butane	1.00	2.40
Isopentane	3.14 (C5+)	3.36 (C5+)
N-pentane	na	na
Hexanes +	na	na
N ₂ + O ₂	1.72	3.10
CO ₂	1.04	0.25
H ₂ S	-	-
Specific Gravity	-	-
BTU/ft ³ (gross)	1356	1472

COMPOSITIONAL DATA CONTD :

OIL :

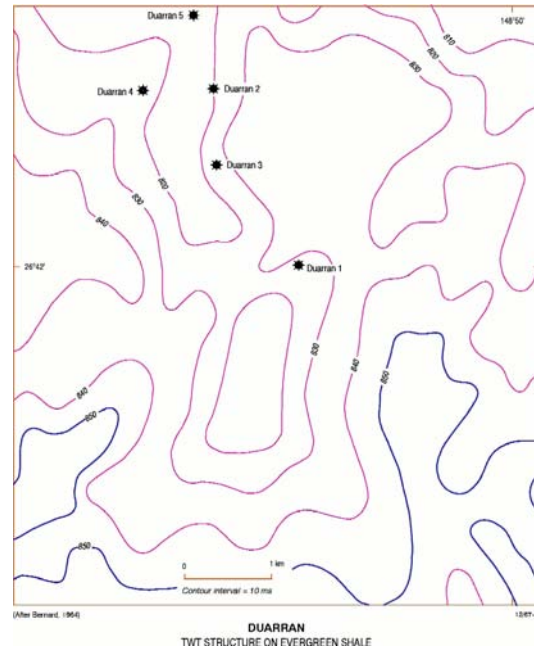
FLUID PROPERTIES	OIL Precipice Ss (Duarran-2)	OIL Precipice Ss (Duarran-1)
API Gravity @ 60°F	40.6°	37.1°
Base	-	-
Sulphur (% wt)(ppm)	-	< 0.10 ppm
Initial GOR (ft ³ /bbl)	-	-
Pour Point	5.6°C	14°C
Specific Gravity	0.8220	0.8390
Colour	-	-
Viscosity (cp@100°F)	-	5.80 (100°C)
Bubble Point (psig)	-	-

STRATIGRAPHY (Duarran-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	131.1
	Mooga Sandstone	249.3
JURASSIC	Orallo Fm	310.3
	Gubberamunda Sandstone	487.7
	Westbourne Fm	547.1
	Springbok Sandstone	662.3
	Walloon Coal Measures	698.3
	Eurombah Fm	899.8
	Hutton Sandstone	944.9
	Evergreen Fm	1128.4
	Precipice Sandstone	1226.8
TRIASSIC	Moolayember Fm	1239.9
DEVONIAN	Timbury Hills Fm	1306.7

* Picked by Geological Survey of Queensland

DUARRAN MAP



DULACCA

PRESENT OPERATOR: Vacant
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 108 km east of Roma.
 STATE: Queensland
 PETROLEUM TITLES: Vacant
 BASIN: Surat
 SUB-BASIN: Taroom Trough
 DISCOVERY WELL: Dulacca-1
 Longitude (E): 149.8750
 Latitude (S): -26.5849
 Date total depth reached: 11 DEC 64
 Ground level: 360.6 m
 Kelly bushing: 364.2 m
 Operator: Union Oil Development Corporation
 Total depth: 1972 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1548.7 m

 TEST DATA FROM THE DISCOVERY WELL (Dulacca-1):

 DST 1, 1584.0-1588.9 m, Precipice Sandstone
 Flowed gas at 140 m³/day.

STRATIGRAPHY (Dulacca-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	198.7
JURASSIC	Orallo Fm	233.5
	Gubberamunda Sandstone	444.1
	Westbourne Fm	457.2
	Springbok Sandstone	648.6
	Walloon Coal Measures	679.1
	Eurombah Fm	1085.1
	Hutton Sandstone	1142.4
	Evergreen Fm	1398.4
	Precipice Sandstone	1548.7
	Moolayember Fm	1630.4
TRIASSIC	Snake Creek Mudstone Mbr	1874.5
	Clematis Sandstone	1905.9

* Picked by Geological Survey of Queensland

EAST GLEN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	108 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 16
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	East Glen-1
Longitude (E):	149.2784
Latitude (S):	-27.4737
Date total depth reached:	23 MAY 91
Ground level:	361.8 m
Kelly bushing:	366.4 m
Operator:	Bridge Oil Ltd
Total depth:	2259 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE TRAP:	Anticline
AREAL CLOSURE:	0.8 km ² (at Rewan Fm level)
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2112.1 m

PETROLEUM BEARING UNIT No.2:	Timbury Hills Formation
CONTENTS:	Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Indurated sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental

TEST DATA FROM THE DISCOVERY WELL (East Glen-1):

DST 1, 2110.8-2133.8 m, Flowed gas at 136 500 m ³ /day and condensate at 102 bbl/day. Recovered 27 m of mud.	Showgrounds Sandstone

DST 2, 2134.6-2147.8 m, Flowed gas at 155 750 m ³ /day and condensate at 103 bbl/day. Recovered a quantity of gas cut mud.	Showgrounds Sandstone

DST 3, 2212.0-2258.8 m, Flowed gas at 8500 m ³ /day and recovered 70 m of water.	Timbury Hills Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	77	10	67

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	12	1	11

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	14	1	13

STRATIGRAPHY (East Glen-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Formation	378.2
	Bungil Fm	596.0
	Mooga Sandstone	784.0
JURASSIC	Orallo Fm	906.1
	Gubberamunda Sandstone	1110.0
	Westbourne Fm	1270.4
	Springbok Sandstone	1365.8
	Walloon Coal Measures	1447.7
	Hutton Sandstone	1666.5
	Evergreen Fm	1817.9
	Precipice Sandstone	1862.6
TRIASSIC	Moolayember Fm	1878.7
	Snake Creek Mudstone Mbr	2091.5
	Showgrounds Sandstone	2112.1
PERMIAN	Blackwater Group	2146.9
DEVONIAN	Timbury Hills Formation	2210.5

* Picked by Geological Survey of Queensland

ELUANBROOK

PRESENT OPERATOR: Santos Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Other Discovery
 LOCATION: 150 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 2
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Eluanbrook-1
 Longitude (E): 149.3303
 Latitude (S): -27.8772
 Date total depth reached: 14 JUN 85
 Ground level: 221.1 m
 Kelly bushing: 226.4 m
 Operator: Pancontinental Petroleum
 Total depth: 2138 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Fault dependent closure
 AREAL CLOSURE: 1.8 km² (near top Evergreen Formation)
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 2030.0 m

TEST DATA FROM THE DISCOVERY WELL (Eluanbrook-1):

DST 1, 2031.2-2037.6 m, Showgrounds Sandstone
 Flowed oil at 19 bbl/day and recovered
 39 m of gas cut mud.

RESERVES (as at 30/6/96):

OIL :

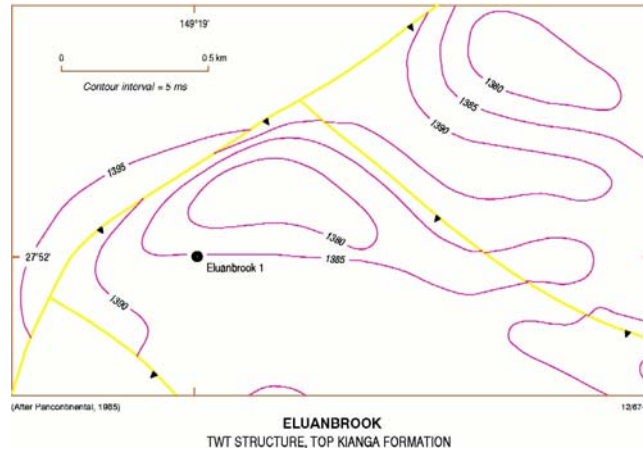
RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	very small	very small	very small

STRATIGRAPHY (Eluanbrook-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	590.0
	Mooga Sandstone	815.4
JURASSIC	Orallo Fm	963.4
	Gubberamunda Sandstone	1055.0
	Westbourne Fm	1292.0
	Springbok Sandstone	1371.2
	Walloon Coal Measures	1456.6
	Hutton Sandstone	1616.0
	Evergreen Fm	1774.6
	Precipice Sandstone	1856.8
TRIASSIC	Moolayember Fm	1869.0
	Snake Creek Mudstone Mbr	2000.0
	Showgrounds Sandstone	2030.0
PERMIAN	Kianga Fm	2039.4
	Back Creek Group	2068.0
CARBONIFEROUS	Kuttung Fm	2118.0

* Picked by Pancontinental Petroleum Ltd

ELUANBROOK MAP



EUTHULLA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Past Producer
LOCATION:	10 km north-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 3
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Euthulla-1
Longitude (E):	148.7944
Latitude (S):	-26.4728
Date total depth reached:	10 AUG 70
Ground level:	322.8 m
Kelly bushing:	326.1 m
Operator:	CSR Ltd
Total depth:	1113 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	The discovery well lies within structural closure but the trapping mechanism is thought to be entirely stratigraphic.
AREAL CLOSURE:	2.0 km ²
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : fine, quartzose with abundant clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1046.6 m
PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : white, very fine to fine, well sorted, quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Euthulla-1):	
DST 2, 1043.9-1063.8 m, Flowed gas at 31 700 m ³ /day.	Precipice Sandstone
DST 1, 1075.9-1083.9 m, Flowed gas at 134 500 m ³ /day.	Showgrounds Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	8	8	very small
Showgrounds Ss	40	40	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss	GAS Precipice Ss
Methane	93.50	91.40
Ethane	0.42	2.80
Propane	0.30	0.20
Isobutane	0.34	0.79
N-butane	0.01	0.02
Isopentane	0.50 (C5+)	0.67 (C5+)
N-pentane	na	na
Hexanes +	na	na
N ₂ + O ₂	4.60	4.00
CO ₂	0.30	0.15
H ₂ S	-	-
Specific Gravity	-	-
BTU/ft ³ (gross)	996	1037

STRATIGRAPHY (Euthulla-1) :

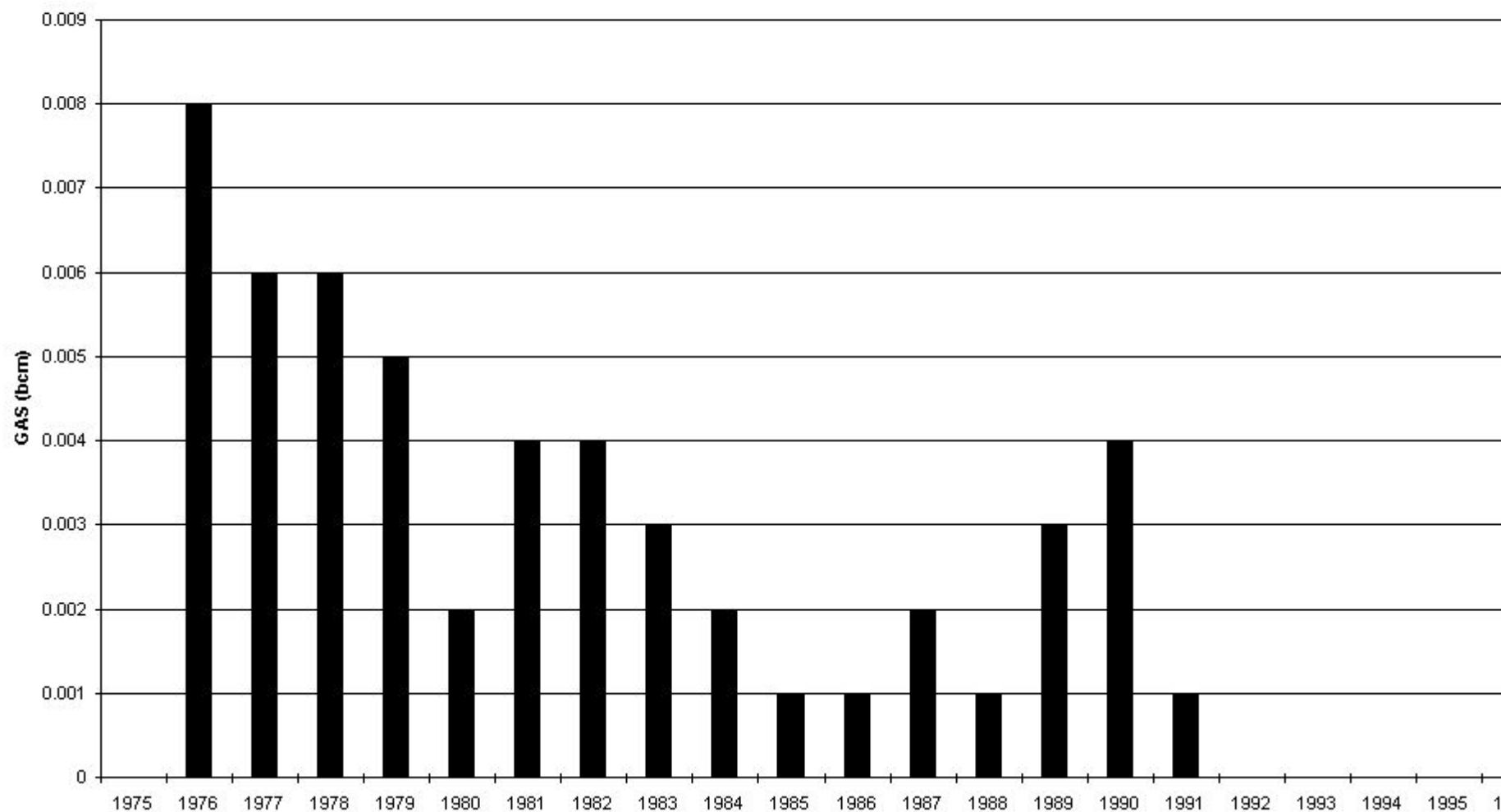
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	70.0
JURASSIC	Orallo Fm	130.0
	Gubberamunda Sandstone	275.8
	Westbourne Fm	347.2
	Springbok Sandstone	446.2
	Walloon Coal Measures	506.6
	Eurombah Fm	703.8
	Hutton Sandstone	742.2
	Evergreen Fm	936.4
	Precipice Sandstone	1040.6
TRIASSIC	Moolayember Fm	1063.1
CARBONIFEROUS	Granite	1085.7

* Picked by Geological Survey of Queensland

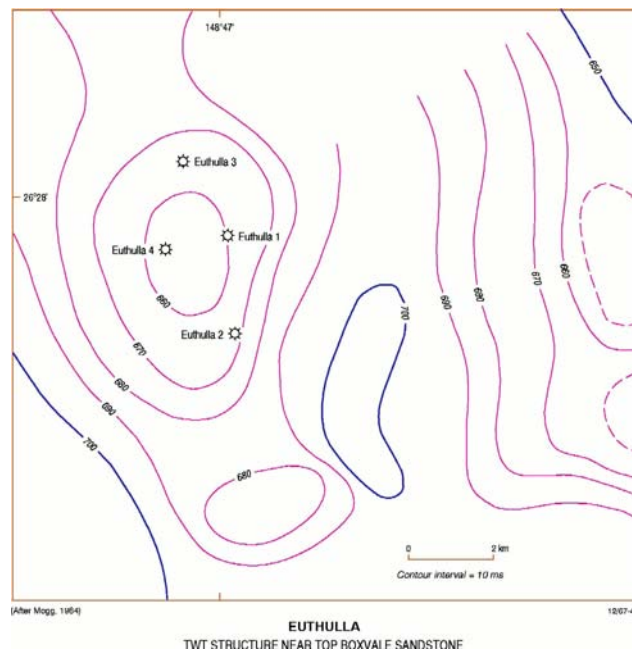
EUTHULLA, GAS PRODUCTION (Precipice Sandstone & Showgrounds Sandstone)

Discovered 10 August 1970 Production commenced 1 January 1976

Total Wells = 4 (2 Shut In; 2 Plugged and Abandoned)



EUTHULLA MAP



EUTHULLA SOUTH

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 8 km north-northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 3
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Euthulla South-1
 Longitude (E): 148.8080
 Latitude (S): -26.4975
 Date total depth reached: 05 MAR 84
 Ground level: 307.4 m
 Kelly bushing: 311.6 m
 Operator: CSR Ltd
 Total depth: 1135 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1058.0 m

 TEST DATA FROM THE DISCOVERY WELL (Euthulla South-1):

 DST 1, 1069.0-1086.5 m, Precipice Sandstone
 Flowed gas at 570 m³/day.

STRATIGRAPHY (Euthulla South-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Blythesdale Group	00.0
JURASSIC	Injune Creek Group	343.0
	Hutton Sandstone	732.5
	Evergreen Fm	956.0
	Precipice Sandstone	1058.0
TRIASSIC	Moolayember Fm	1084.0
PERMIAN	Bandanna Fm	1096.5
DEVONIAN	Timbury Hills Fm	1100.0

* Picked by CSR Ltd

FAIRMOUNT

PRESENT OPERATOR:	Mosaic Oil NL
TYPE:	Oil
COMMERCIAL STATUS:	Producer
LOCATION:	165 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	Pl 46
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Fairymount-1
Longitude (E):	149.3136
Latitude (S):	-28.0406
Date total depth reached:	04 OCT 85
Ground level:	248.9 m
Kelly bushing:	254.2 m
Operator:	Sydney Oil Company Pty Ltd
Total depth:	2116 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Fault trap
AREAL CLOSURE:	1.6 km ² (on top Showgrounds Sandstone depth map)
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2047.7 m
POROSITY:	14.7% (average)
PERMEABILITY:	2600 md (average)

TEST DATA FROM THE DISCOVERY WELL (Fairymount-1):

DST 1, 1968.4-1979.7 m,	Moolayember Formation
Recovered 5.5 bbl of slightly gas cut muddy water.	

DST 2, 2049.2-2057.4 m,	Showgrounds Sandstone
Flowed 52° API oil at 4500 bbl/day.	

PRODUCTION & INFRASTRUCTURE :

The Fairymount oil accumulation was discovered in 1985 and brought into production in the same year. Oil is taken by flowlines to a central facility where water and minor solution gas are removed. The oil is then trucked to Moonie and transported by pipeline to the BP refinery in Brisbane.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	164	150	14

COMPOSITIONAL DATA :

OIL :

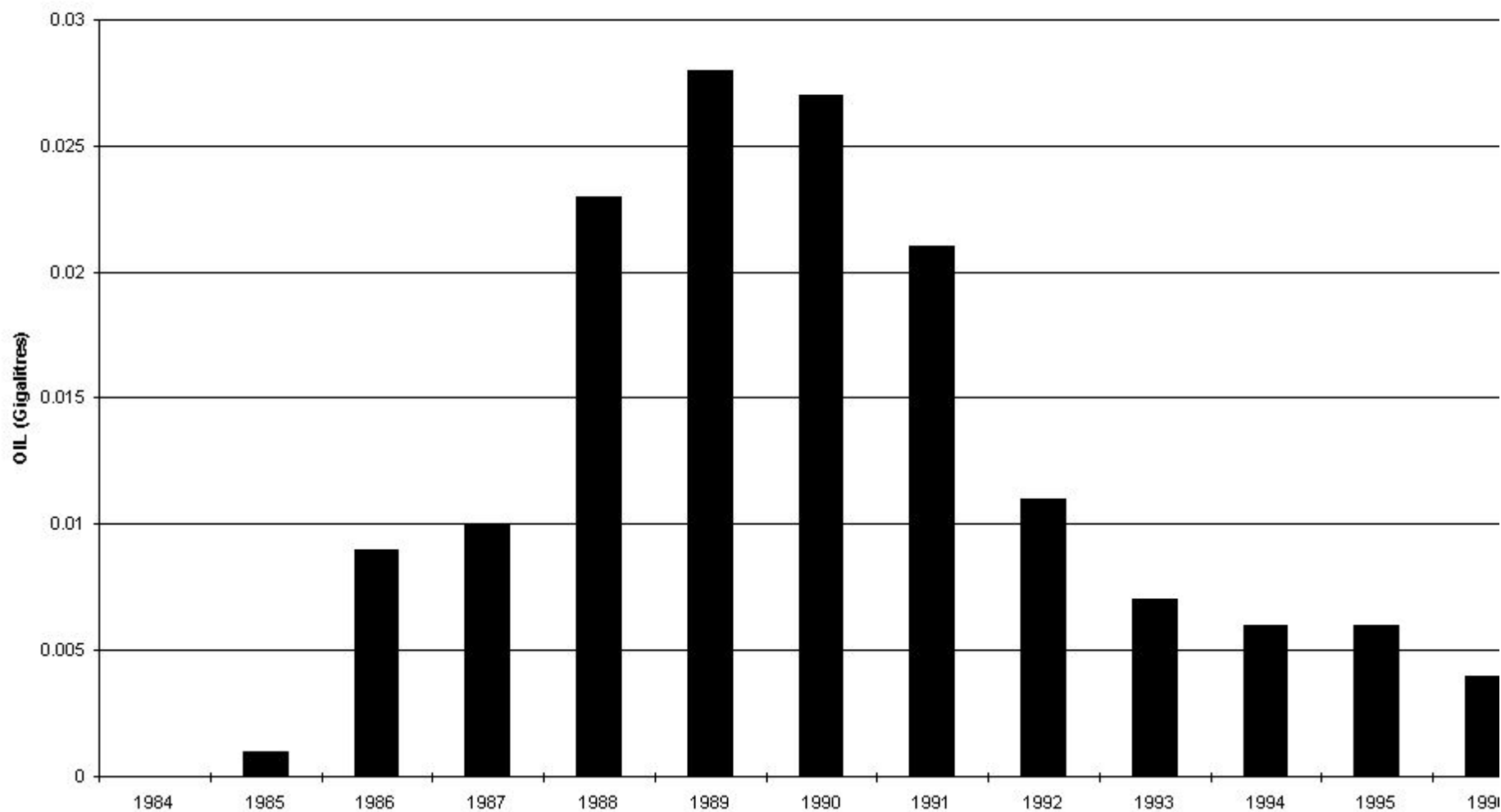
FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	47.9°
Base	-
Sulphur (% wt)(ppm)	0.03 ppm
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.780
Colour	-
Viscosity (cp@100°F)	0.375
Bubble Point (psig)	-

STRATIGRAPHY (Fairymount-1) :

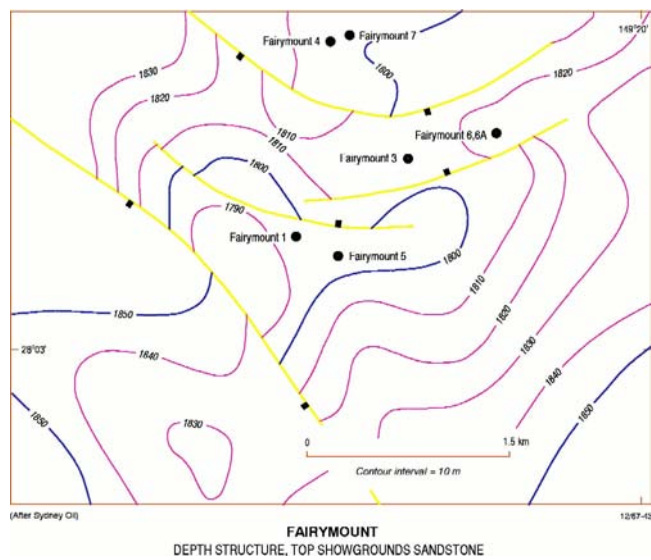
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	380.0
	Bungil Fm	704.7
	Mooga Sandstone	925.5
JURASSIC	Gubberamunda Sandstone	1181.0
	Westbourne Fm	1393.0
	Springbok Sandstone	1467.5
	Walloon Coal Measures	1542.0
	Hutton Sandstone	1701.5
	Evergreen Fm	1826.5
	Precipice Sandstone	1899.0
TRIASSIC	Moolayember Fm	1908.3
	Snake Creek Mudstone Mbr	2032.4
	Showgrounds Sandstone	2047.7
PERMIAN	Kianga Fm	2065.7

* Picked by Sydney Oil Company Pty Ltd

FAIRMOUNT, OIL PRODUCTION (Showgrounds Sandstone)
Discovered 4 October 1985 Production commenced November 1985
Total Wells = 7



FAIRMOUNT MAP



GLEN FOSSLYN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	109 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 16
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Glen Fosslyn-1
Longitude (E):	149.2820
Latitude (S):	-27.4936
Date total depth reached:	09 JUL 80
Ground level:	320.0 m
Kelly bushing:	324.3 m
Operator:	Bridge Oil Ltd
Total depth:	2188 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2078.7 m

PETROLEUM BEARING UNIT No.2:	Rewan Formation
CONTENTS:	Oil
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	2087.9 m

TEST DATA FROM THE DISCOVERY WELL (Glen Fosslyn-1):

DST 1, 2072.6-2088.8 m, Flowed gas at 181 200 m ³ /day.	Showgrounds Sandstone

DST 2, 2087.9-2089.1 m, Recovered 18 m of waxy oil.	Rewan Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	77	10	67

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	3	1	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	3	1	2

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	81.40
Ethane	7.00
Propane	3.10
Isobutane	0.75
N-butane	0.95
Isopentane	3.14 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	3.30
CO ₂	0.36
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	1231

COMPOSITIONAL DATA CONTD :

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Showgrounds Ss
API Gravity @ 60°F	43.5°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.808
Colour	-
Viscosity (cp@100°F)	2.27
Bubble Point (psig)	na

STRATIGRAPHY (Glen Fosslyn-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	375.2
	Bungil Fm	571.2
	Mooga Sandstone	791.3
JURASSIC	Gubberamunda Sandstone	1070.5
	Westbourne Fm	1239.0
	Springbok Sandstone	1352.4
	Walloon Coal Measures	1403.9
	Hutton Sandstone	1619.4
	Evergreen Fm	1792.5
	Precipice Sandstone	1868.4
TRIASSIC	Moolayember Fm	1891.3
	Snake Creek Mudstone Mbr	2056.5
	Showgrounds Sandstone	2078.7
	Rewan Fm	2087.9
PERMIAN	Blackwater Group	2107.1
DEVONIAN	Timbury Hills Fm	2172.6

* Picked by Geological Survey of Queensland

GLENLOTH

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 58 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 22
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Glenloth-1
 Longitude (E): 149.0280
 Latitude (S): -27.0915
 Date total depth reached: 16 JAN 93
 Ground level: 250.3 m
 Kelly bushing: 255.8 m
 Operator: Oil Company of Australia Ltd
 Total depth: 1831.5 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Tinowon Formation
 CONTENTS: Gas
 FORMATION: Tinowon Formation
 AGE: Late Permian
 LITHOLOGY: Sandstone
 DEPOSITIONAL ENVIRONMENT: Paralic

TEST DATA FROM THE DISCOVERY WELL (Glenloth-1):

DST 1, 1768.0-1786.0 m, Tinowon Formation
 Flowed gas at 21 000 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Tinowon	11	1	10

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Tinowon	1	very small	1

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Tinowon	1	very small	1

GLENTULLOCH

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	100 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 45
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Glentulloch-1
Longitude (E):	148.3797
Latitude (S):	-25.7880
Date total depth reached:	24 DEC 61
Ground level:	459.3 m
Kelly bushing:	462.1 m
Operator:	Associated Australian Oilfields
Total depth:	1246 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	26.0 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Aldebaran Sandstone (multiple reservoirs)
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone : coarse grained, conglomeratic.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
POROSITY:	<15% (average)

TEST DATA FROM THE DISCOVERY WELL (Glentulloch-1):

DST 1, 752.9-771.1 m, Flowed gas at 49 500 m ³ /day and recovered 110 m of gas cut mud.	Aldebaran Sandstone
DST 8, 760.8-771.1 m, Flowed gas at 21 800 m ³ /day and water at 206 bbl/day.	Aldebaran Sandstone
DST 2, 772.7-777.2 m, Recovered 31 m of mud.	Aldebaran Sandstone
DST 3, 772.7-787.9 m, Flowed gas at 6200 m ³ /day and recovered 46 m of gas cut mud.	Aldebaran Sandstone
DST 4, 786.1-829.1 m, Flowed gas at 70 200 m ³ /day and recovered 27 m of gas cut mud.	Aldebaran Sandstone
DST 9, 787.9-811.4 m, Flowed gas at 44 400 m ³ /day and water at 110 bbl/day.	Aldebaran Sandstone

DST 10, 829.7-838.2 m, Flowed gas at 36 000 m ³ /day.	Aldebaran Sandstone
DST 5, 831.2-856.2 m, Flowed gas at 83 000 m ³ /day.	Aldebaran Sandstone
DST 13, 839.7-851.6 m, Recovered 37 m of gas cut mud.	Aldebaran Sandstone
DST 14, 839.7-851.6 m, Recovered 85 m of gas cut mud.	Aldebaran Sandstone
DST 6, 854.7-876.3 m, Recovered formation water.	Aldebaran Sandstone
DST 7, 851.6-851.9 m, Recovered 27 m of water.	Aldebaran Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	337	very small	337

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss
Methane	84.50
Ethane	1.80
Propane	0.13
Isobutane	0.07
N-butane	0.01
Isopentane	0.05 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.70
CO ₂	10.75
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Glentulloch-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Injune Creek Beds	00.0
	Hutton Sandstone	12.2
	Evergreen Fm	296.6
	Precipice Sandstone	410.9
TRIASSIC	Moolayember Fm	479.2
PERMIAN	Bandanna Fm	513.0
	Mantuan Fm	637.6
	Dry Creek Shale	676.7
	Early Storms Sandstone	760.8
	Staircase Sandstone	810.2
	Conglomerate	888.2
DEVONIAN	Timbury Hills Fm	1221.3

* Picked by Associated Australian Oilfields Ltd

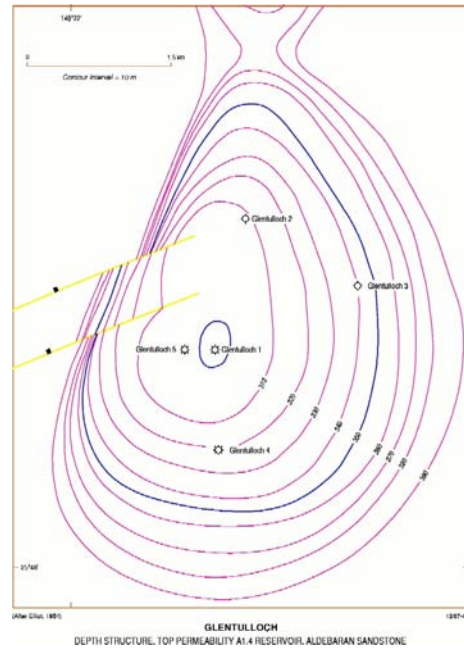
POROSITY AND PERMEABILITY DATA (Glentulloch-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
156.1	26.5	0.0	0.0	Hutton Sandstone
401.8	11.5	0.0	0.0	Evergreen Fm
458.5	30.0	-	1493.0	Precipice Sandstone
566.7	16.0	0.0	0.0	Bandanna Fm
723.0	12.0	-	8.0	Dry Creek Shale
773.0	7.0	0.0	0.0	Early Storms Sandstone
778.5	13.5	0.0	0.0	Early Storms Sandstone
782.5	11.0	0.0	0.0	Early Storms Sandstone
962.0	2.0	0.0	-	Conglomerate
1033.0	11.5	0.0	-	Conglomerate
1165.9	4.5	0.0	0.0	Conglomerate
1234.2	3.0	0.0	0.0	Timbury Hills Fm

GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	TOC	VITRINITE REFLECTANCE (%)	FORMATION
Glentulloch-1	260.6	-	0.39	Hutton Sandstone
	519.7	-	0.61	Bandanna Fm
	566.0	1.30	0.53	Bandanna Fm
	815.3	-	0.51	Staircase Sandstone
	853.4	3.05	0.61	Staircase Sandstone

GLENTULLOCH MAP



GRAFTON RANGE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	28 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 4
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Grafton Range-2
Longitude (E):	148.9292
Latitude (S):	-26.3972
Date total depth reached:	22 MAR 69
Ground level:	473.4 m
Kelly bushing:	476.7 m
Operator:	CSR Ltd
Total depth:	1102 mKB
NUMBER OF WELLS DRILLED:	23
STRUCTURE/TRAP:	Predominantly stratigraphic.
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Fm (multiple reservoirs)
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, fine to coarse grained, subrounded to subangular, well sorted, quartzose with a white kaolinitic matrix.
DEPOSITIONAL ENVIRONMENT:	Shoreline sand deposited around the flanks of a topographic high.
FORMATION TOP (mKB):	949.5 m
POROSITY:	17 to 20%
PERMEABILITY:	>100 md
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, coarse grained, angular to subangular, poorly sorted, quartzose with a white, kaolinitic matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Grafton Range-2):	
DST 1, 1060.7-1066.8 m, Flowed gas at 138 750 m ³ /day.	Evergreen Formation
DST 2, 1078.1-1090.3 m, Flowed gas at 42 500 m ³ /day.	Precipice Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	151	136	15
Evergreen Fm	671	605	66

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	88.20
Ethane	3.40
Propane	0.71
Isobutane	0.29
N-butane	0.13
Isopentane	0.13
N-pentane	0.02
Hexanes +	0.62
N ₂ + O ₂	4.20
CO ₂	2.30
H ₂ S	-
Specific Gravity	0.641
BTU/ft ³ (gross)	1021

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Evergreen Fm
API Gravity @ 60°F	60.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.738
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Grafton Range-1) :

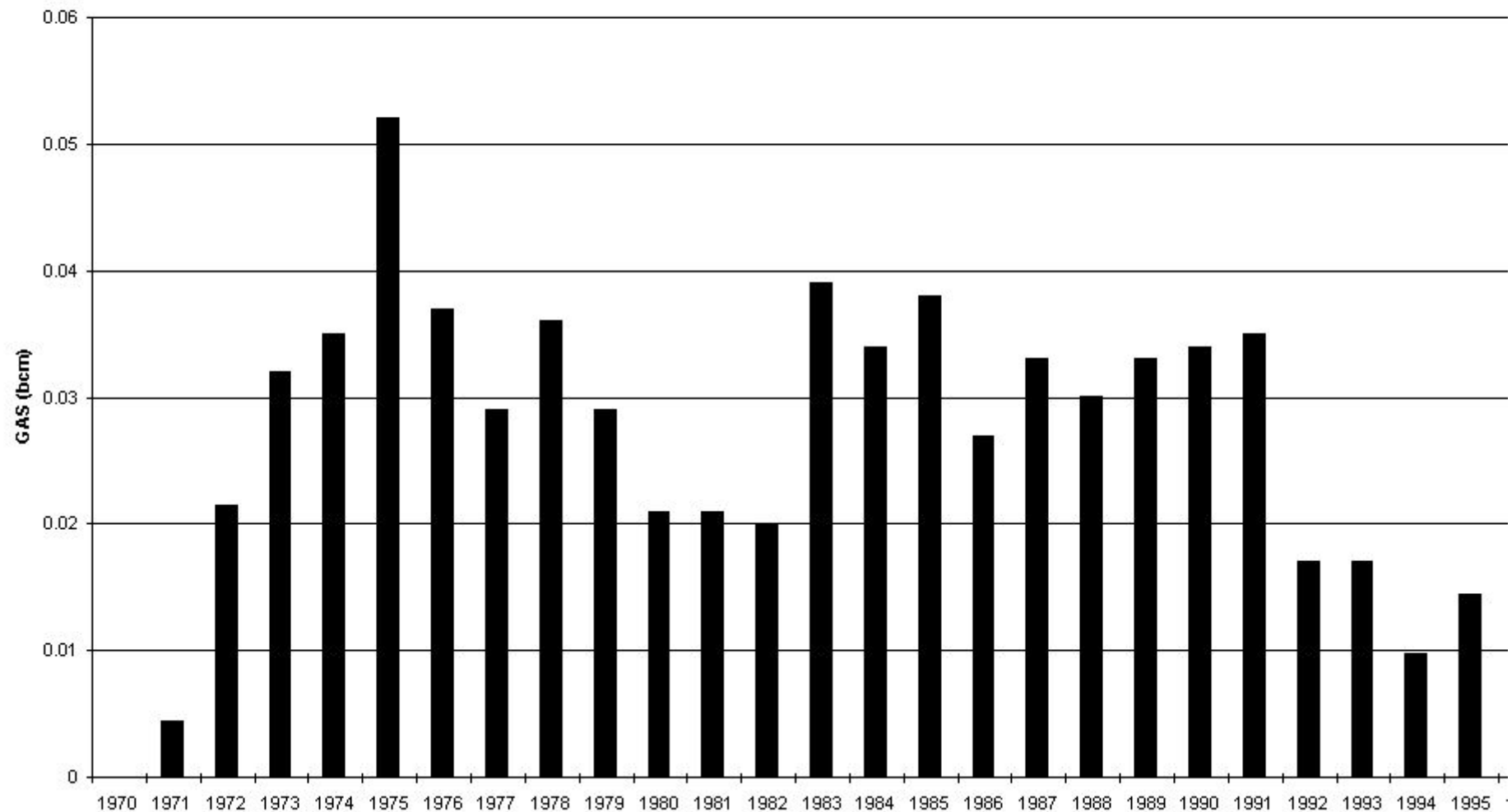
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	40.0
JURASSIC	Orallo Fm	100.0
	Gubberamunda Sandstone	229.2
	Westbourne Fm	295.7
	Springbok Sandstone	396.2
	Walloon Coal Measures	438.6
	Eurombah Fm	698.3
	Hutton Sandstone	748.0
	Evergreen Fm	961.0
	Precipice Sandstone	1095.5
TRIASSIC	Moolayember Fm	1111.0
	Rewan Fm	1138.4
PERMIAN	Blackwater Group	1189.3
CARBONIFEROUS	Basement	1268.6

* Picked by Geological Survey of Queensland

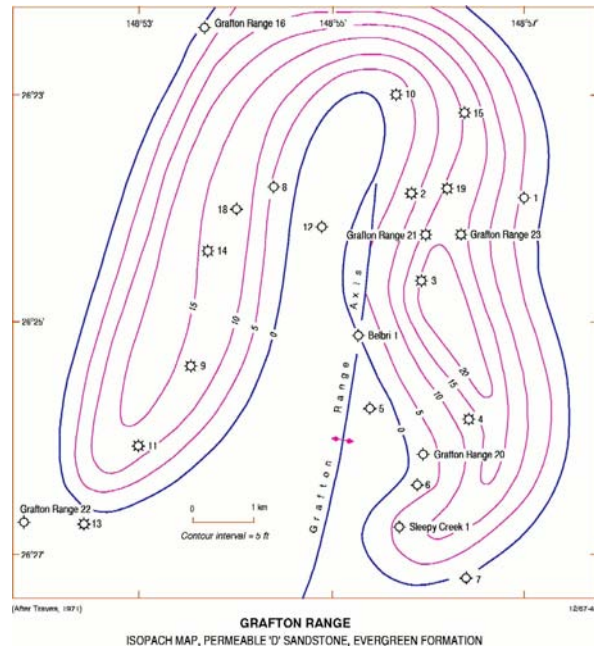
GRAFTON RANGE, GAS PRODUCTION (Evergreen Formation & Precipice Sandstone)

Discovered 22 March 1969 Production commenced 1 November 1971

Total Wells = 22(excluding Belbri) (5 Producers; 6 Shut In; 11 Plugged and Abandoned)



GRAFTON RANGE MAP



GRIMAN CREEK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	74 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Griman Creek-1
Longitude (E):	149.2092
Latitude (S):	-27.1617
Date total depth reached:	15 OCT 81
Ground level:	251.9 m
Kelly bushing:	258.4 m
Operator:	Bridge Oil Ltd
Total depth:	2222 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1940.0 m
 TEST DATA FROM THE DISCOVERY WELL (Griman Creek-1):	
DST 1, 1938.8-1952.5 m, Recovered 46 m of oil.	Showgrounds Sandstone
 DST 3, 2022.0-2050.0 m, Recovered gas cut mud.	 Blackwater Group
 DST 5, 2149.7-2222.0 m, Recovered slightly gas cut mud.	 Back Creek Group

STRATIGRAPHY (Griman Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	425.0
	Mooga Sandstone	558.0
JURASSIC	Orallo Fm	734.0
	Gubberamunda Sandstone	882.5
	Westbourne Fm	1011.0
	Springbok Sandstone	1109.0
	Walloon Coal Measures	1190.5
	Eurombah Fm	1417.5
	Hutton Sandstone	1460.0
	Evergreen Fm	1627.5
TRIASSIC	Moolayember Fm	1759.0
	Snake Creek Mudstone Mbr	1922.0
	Showgrounds Sandstone	1940.0
	Rewan Fm	1950.0
PERMIAN	Blackwater Group	2030.0
	Back Creek Group	2111.0
DEVONIAN	Timbury Hills Fm	2201.5

* Picked by Geological Survey of Queensland

HARBOUR

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	144 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 40
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Harbour-1
Longitude (E):	149.2567
Latitude (S):	-27.8103
Date total depth reached:	29 JUL 87
Ground level:	232.0 m
Kelly bushing:	238.0 m
Operator:	Sydney Oil Company Pty Ltd
Total depth:	2065 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1980.5 m

TEST DATA FROM THE DISCOVERY WELL (Harbour-1):

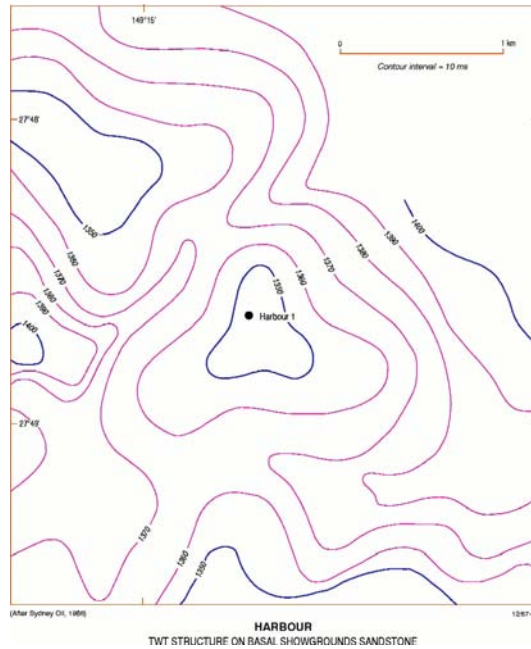
DST 3, 1974.4-1986.0 m, Recovered a small quantity of mud.	Showgrounds Sandstone
DST 2, 1975.3-1987.8 m, Flowed oil at 6 bbl/day and water at 42 bbl/day.	Showgrounds Sandstone
DST 1, 1978.0-1989.4 m, Flowed oil at 5 bbl/day and water at 80 bbl/day.	Showgrounds Sandstone

STRATIGRAPHY (Harbour-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	290.0
	Wallumbilla Formation	366.8
	Bungil Fm	598.3
	Mooga Sandstone	813.5
	Orallo Fm	963.0
	Gubberamunda Sandstone	1086.8
	Westbourne Fm	1281.5
	Springbok Sandstone	1393.8
	Birkhead Formation	1447.2
	Hutton Sandstone	1604.3
	Evergreen Fm	1736.2
	Boxvale Sandstone Mbr	1800.0
	Precipice Sandstone	1827.5
TRIASSIC	Moolayember Fm	1839.0
	Snake Creek Mudstone Mbr	1962.5
	Showgrounds Sandstone	1980.5
PERMIAN	Blackwater Group	1991.7
CARBONIFEROUS	Basement	2040.0

* Picked by Geological Survey of Queensland

HARBOUR MAP



HOLLYROOD

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 22 km south-southwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 9
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Hollyrood-1
 Longitude (E): 148.7392
 Latitude (S): -26.7819
 Date total depth reached: 08 APR 65
 Ground level: 329.8 m
 Kelly bushing: 333.1 m
 Operator: CSR Ltd
 Total depth: 1316 mKB
 NUMBER OF WELLS DRILLED: 4
 STRUCTURE/TRAP: Fault trap with independent four-way dip closure.
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1281.7 m

TEST DATA FROM THE DISCOVERY WELL (Hollyrood-1):

DST 1, 1275.3-1298.8 m, Precipice Sandstone
 Flowed gas at 171 000 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	93	69	24

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	91.90
Ethane	3.10
Propane	0.46
Isobutane	1.70
N-butane	0.05
Isopentane	0.23
N-pentane	0.01
Hexanes +	0.51
N ₂ + O ₂	1.73
CO ₂	0.35
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

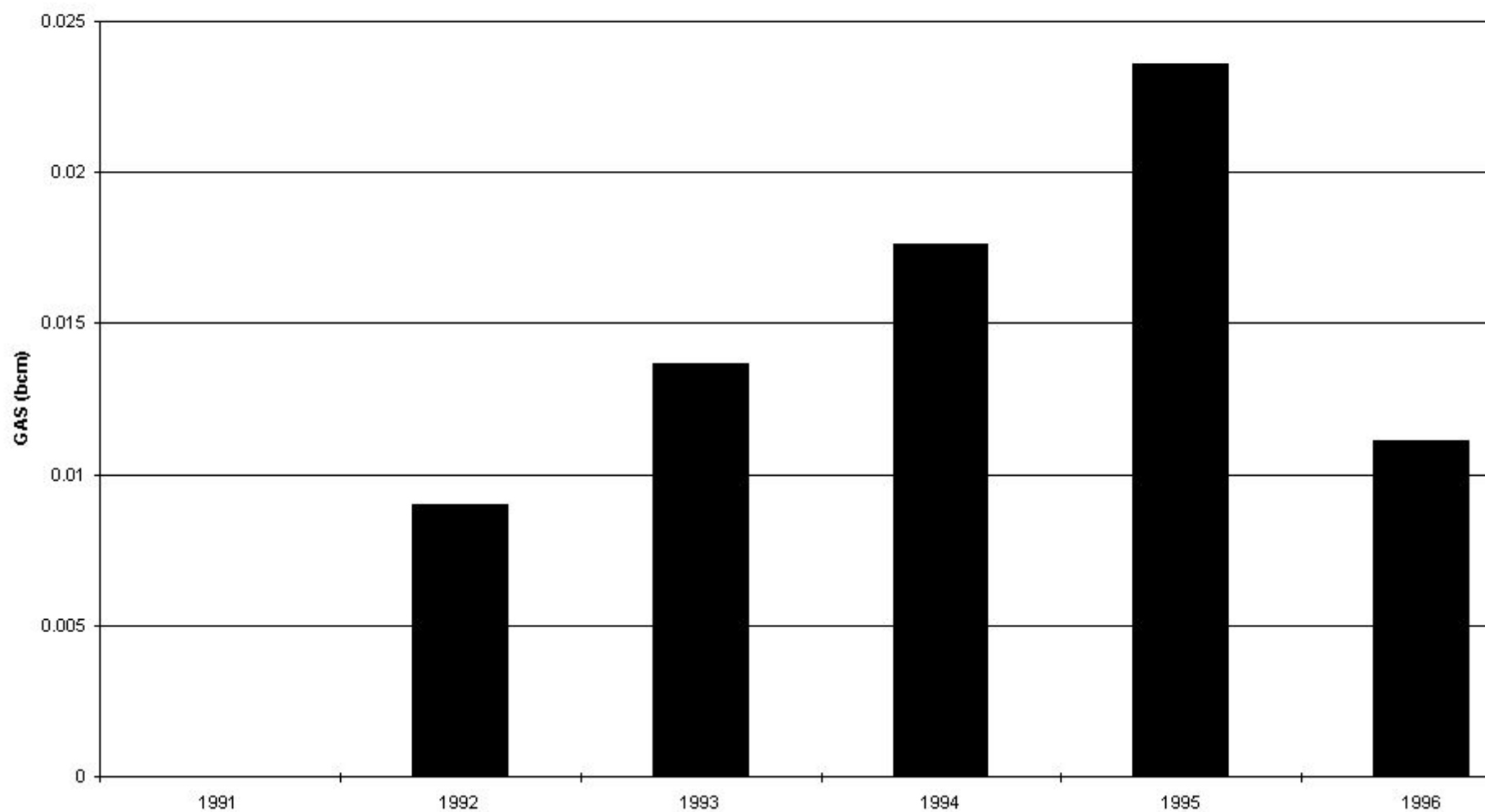
STRATIGRAPHY (Hollyrood-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	238.7
	Mooga Sandstone	363.3
JURASSIC	Orallo Fm	428.2
	Gubberamunda Sandstone	579.1
	Westbourne Fm	673.0
	Springbok Sandstone	759.0
	Walloon Coal Measures	819.3
	Eurombah Fm	1001.9
	Hutton Sandstone	1046.1
	Evergreen Fm	1191.8
	Precipice Sandstone	1281.7
TRIASSIC	Moolayember Fm	1288.7
DEVONIAN	Timbury Hills Fm	1294.5

* Picked by Geological Survey of Queensland

HOLLYROOD, GAS PRODUCTION (Precipice Sandstone)

Discovered 8 April 1965 Production commenced 1992

Total Wells = 4 (2 Producers; 2 Plugged and Abandoned)

HOPE CREEK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	11 km south-southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 6
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Hope Creek-1
Longitude (E):	148.7583
Latitude (S):	-26.6964
Date total depth reached:	07 OCT 67
Ground level:	285.3 m
Kelly bushing:	288.6 m
Operator:	CSR Ltd
Total depth:	1311 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Predominantly stratigraphic even though the well lies within structural closure.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : fine to medium grained, partly silty and quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1225.3 m
TEST DATA FROM THE DISCOVERY WELL (Hope Creek-1):	
DST 4, 1220.7-1233.8 m, Flowed gas at 21 200 m ³ /day.	Precipice Sandstone
DST 1, 1224.4-1231.7 m, Flowed gas at 45 300 m ³ /day.	Precipice Sandstone
DST 2, 1237.5-1310.6 m, Recovered 64 m of slightly gas cut mud.	Moolayember/Timbury Hills Formations

RESERVES (as at 30/6/94):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

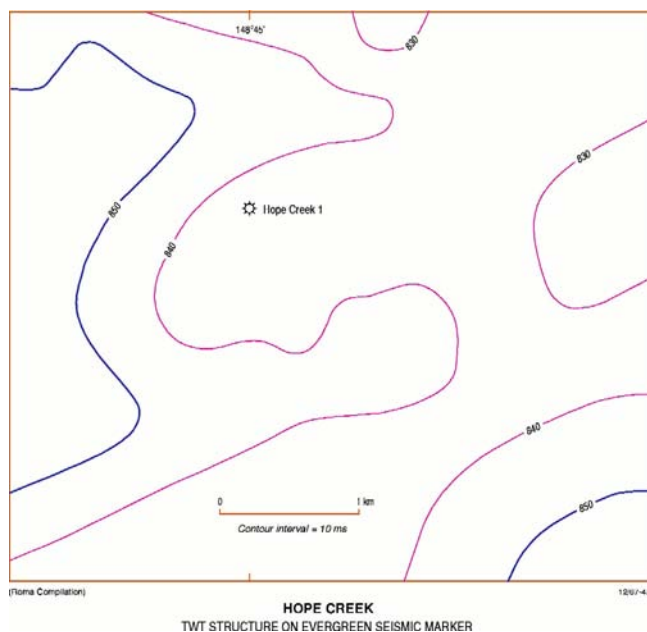
GAS PROPERTIES	GAS Precipice Ss
Methane	66.90
Ethane	8.30
Propane	6.20
Isobutane	3.10
N-butane	2.40
Isopentane	10.11 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	3.00
CO ₂	0.23
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Hope Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	135.3
	Mooga Sandstone	252.1
JURASSIC	Orallo Fm	304.8
	Gubberamunda Sandstone	502.9
	Westbourne Fm	568.1
	Springbok Sandstone	673.6
	Walloon Coal Measures	730.3
	Eurombah Fm	912.0
	Hutton Sandstone	980.8
	Evergreen Fm	1118.9
	Precipice Sandstone	1225.3
TRIASSIC	Moolayember Fm	1231.4
DEVONIAN	Timbury Hills Fm	1287.8

* Picked by Geological Survey of Queensland

HOPE CREEK MAP



HOSPITAL HILL

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 4 km northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 3
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Hospital Hill-2(Queensland Government)
 Longitude (E): 148.7791
 Latitude (S): -26.5750
 Date total depth reached: 30 OCT 11
 Operator: Queensland Government
 NUMBER OF WELLS DRILLED: 10
 STRUCTURE: Structural/Stratigraphic. Located on the crest of a minor anticline, limited by poor permeability on the flanks.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone : medium to coarse grained, garnetiferous, quartzose.
 DEPOSITIONAL ENVIRONMENT: Fluvial channel sand.

 TEST DATA FROM THE DISCOVERY WELL (Hospital Hill-2 (QG-2)):

 Production Test, 1127.8-1132.6 m, Precipice Sandstone
 Flowed gas. Flow rates not available.

STRATIGRAPHY (Hospital Hill-2(QG-2)) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Formation	00.0
	Blythesdale Group	91.4
JURASSIC	Walloon Coal Measures	198.1
	Bundamba Group	813.8
TRIASSIC	Moolayember Shale	990.3

* Picked by Queensland Government

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	84.60
Ethane	4.90
Propane	2.00
Isobutane	0.63
N-butane	0.21
Isopentane	0.31
N-pentane	0.03
Hexanes +	0.26
N₂ + O₂	6.60
CO₂	0.48
H₂S	-
Specific Gravity	0.656
BTU/ft³ (gross)	1045

HUMBUG CREEK

PRESENT OPERATOR: Anulka NL
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 64 km north-northwest of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 244-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Goondiwindi Slope
 DISCOVERY WELL: Humbug Creek-2
 Longitude (E): 150.1933
 Latitude (S): -27.1597
 Date total depth reached: 07 SEP 65
 Ground level: 280.4 m
 Kelly bushing: 284.1 m
 Operator: Union Oil Development Corporation
 Total depth: 1761 mKB
 NUMBER OF WELLS DRILLED: 2
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Oil
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1601.4 m

TEST DATA FROM THE DISCOVERY WELL (Humbug Creek-2):

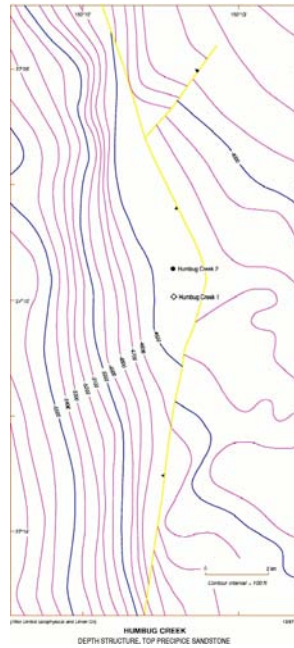
DST 1, 1615.4-1618.5 m, Precipice Sandstone
 Recovered 3 m of light green oil and
 23 m of fresh water.

STRATIGRAPHY (Humbug Creek-2) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	0.00
	Bungil Fm	137.2
	Mooga Sandstone	296.9
JURASSIC	Orallo Fm	350.5
	Gubberamunda Sandstone	573.0
	Westbourne Fm	638.9
	Springbok Sandstone	835.1
	Walloon Coal Measures	875.1
	Eurombah Fm	1189.3
	Hutton Sandstone	1245.1
	Evergreen Fm	1479.5
	Precipice Sandstone	1601.4
PERMIAN	Back Creek Group	1706.9

* Picked by Geological Survey of Queensland

HUMBUG CREEK MAP



HUTTON CREEK

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 103 km north-northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 337-P
 BASIN: Bowen
 SUB-BASIN: Comet Platform
 DISCOVERY WELL: Hutton Creek (OSL 2)
 Longitude (E): 148.7000
 Latitude (S): -25.7000
 Date total depth reached: 29 JUN 38
 Ground level: 460.2 m
 Operator: Oil Search Ltd
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Aldebaran Sandstone
 CONTENTS: Gas
 FORMATION: Aldebaran Sandstone
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvio-deltaic

TEST DATA FROM THE DISCOVERY WELL (Hutton Creek (OSL 2)):

DST 1, 708.7 m, Aldebaran Sandstone
 Flowed gas at 368 m³/day.

STRATIGRAPHY (Hutton Creek (OSL-2)) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Bundamba Group	00.0
TRIASSIC	Bowen Group (Middle Unit)	198.1
	Undifferentiated	271.9

* Picked by Oil Search Ltd.

INDERI

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	260 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	337-P
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Inderi-1
Longitude (E):	148.4833
Latitude (S):	-24.2833
Date total depth reached:	11 AUG 63
Ground level:	216.4 m
Kelly bushing:	219.5 m
Operator:	Associated Freney Oil Company
Total depth:	1655 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Faulted anticline
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	569.7 m

TEST DATA FROM THE DISCOVERY WELL (Inderi-1):

DST 4, 554.1-579.4 m, Flowed gas at 22 600 m ³ /day.	Aldebaran Sandstone

DST 1, 556.3-574.5 m, Recovered an unmeasured quantity of gas cut mud.	Aldebaran Sandstone

DST 3, 557.5-586.7 m, Recovered 161 m of water.	Aldebaran Sandstone

DST 5, 710.8-751.6 m, No gas to surface.	Aldebaran Sandstone

DST 7, 1162.5-1202.1 m, Gas to surface at a rate too small to measure.	Cattle Creek Formation

DST 8, 1328.3-1343.3 m, Steady air blow. No gas to surface.	Cattle Creek Formation

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss
Methane	91.90
Ethane	0.03
Propane	-
Isobutane	-
N-butane	-
Isopentane	-
N-pentane	-
Hexanes +	-
N₂ + O₂	7.20
CO₂	0.90
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Inderi-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Alluvium	00.0
TERTIARY	Volcanics	18.3
PERMIAN	Bandanna Fm	28.0
	Mantuan Fm	356.6
	Dry Creek Shale	381.0
	Early Storms Sandstone	508.7
	Ingelara Shale	513.9
	Aldebaran Sandstone	569.7
	Cattle Creek Shale	1164.6
	Stanleigh Fm	1636.2

* Picked by Associated Freney Oil Company

KANALOO

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	70 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 27
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Kanaloo-1
Longitude (E):	148.8908
Latitude (S):	-27.2244
Date total depth reached:	19 JUL 87
Ground level:	233.5 m
Kelly bushing:	236.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1510 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1388.7 m

PETROLEUM BEARING UNIT No.2:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1462.4 m

TEST DATA FROM THE DISCOVERY WELL (Kanaloo-1):

DST 3, 1460.0-1476.8 m, Flowed gas at 70 000 m ³ /day.	Evergreen Formation

DST 2, 1460.0-1510.3 m, Misrun.	Evergreen Formation

DST 1, 1461.5-1467.6 m, Flowed gas at 7360 m ³ /day and recovered 9.1 m of gas cut mud.	Evergreen Formation

DST 4, 1488.3-1492.9 m, (Cased Hole) Flowed gas at 760 m ³ /day.	Moolayember Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	33	26	7

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	2	2	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	5	4	1

STRATIGRAPHY (Kanaloo-1) :

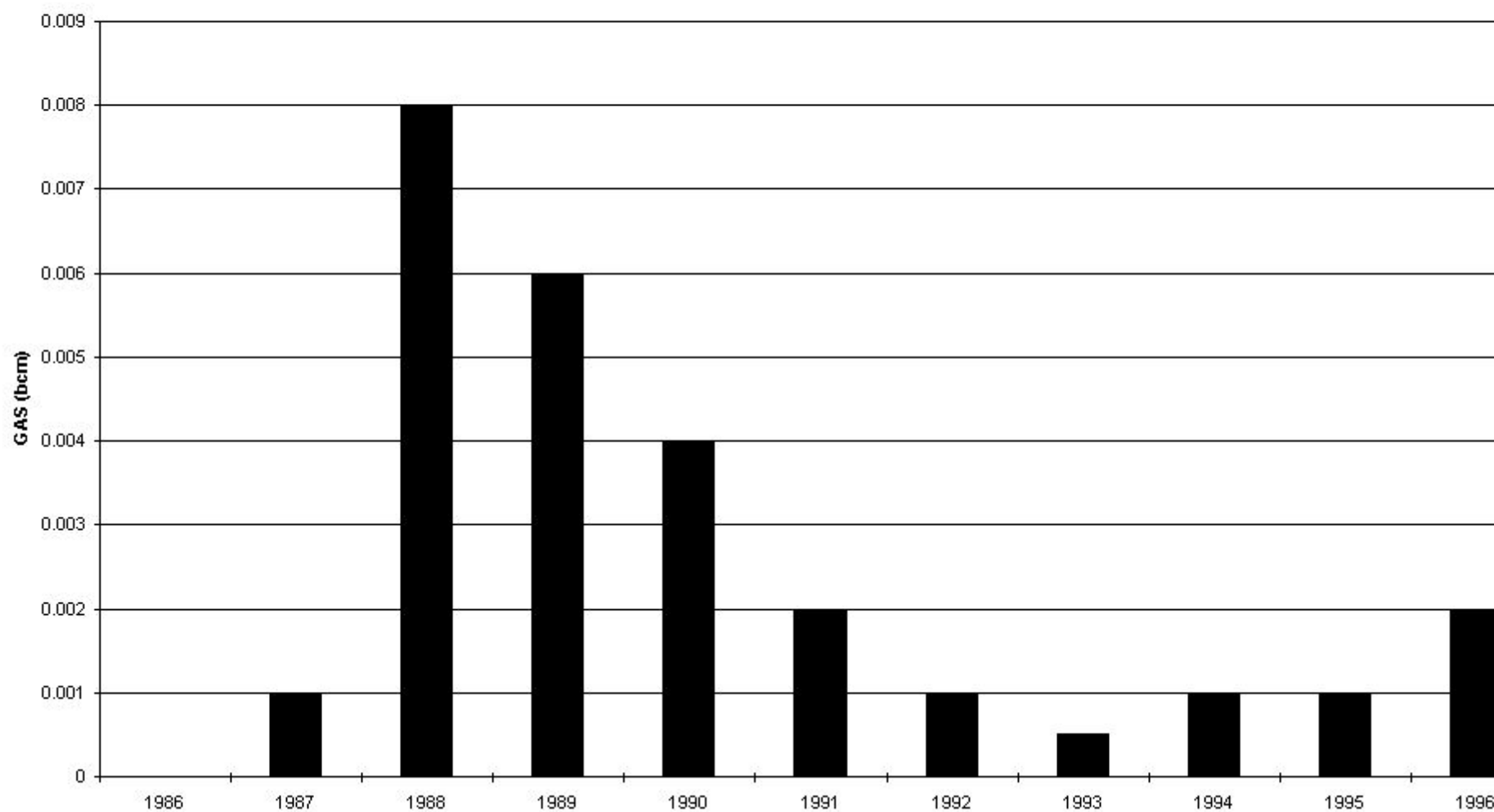
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	54.9
	Wallumbilla Fm	166.4
	Bungil Fm	354.8
	Mooga Sandstone	468.8
JURASSIC	Orallo Fm	545.0
	Gubberamunda Sandstone	746.8
	Westbourne Fm	927.2
	Springbok Sandstone	1002.2
	Birkhead Formation	1060.4
	Hutton Sandstone	1190.2
	Evergreen Fm	1388.7
	Boxvale Sandstone Mbr	1428.9
TRIASSIC	Moolayember Formation	1462.4
CARBONIFEROUS	Basement	1489.9

* Picked by Geological Survey of Queensland

KANALOO, GAS PRODUCTION (Basal Evergreen Formation)

Discovered 19 July 1987 Production commenced November 1987

Total Wells = 1 (1 Producer)



KINCORA

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	50 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Kincora-2
Pool(s):	Wandoan Sandstone Member (Oil).
Longitude (E):	148.7933
Latitude (S):	-27.0694
Date total depth reached:	12 DEC 69
Ground level:	326.1 m
Kelly bushing:	330.1 m
Operator:	Union Oil Development Corporation
Total depth:	1614 mKB
DISCOVERY WELL:	Kincora-3
Pool(s):	Evergreen Formation.
Longitude (E):	148.8100
Latitude (S):	-27.0481
Date total depth reached:	17 FEB 70
Ground level:	327.1 m
Kelly bushing:	331.0 m
Operator:	Union Oil Development Corporation
Total depth:	1572 mKB
DISCOVERY WELL:	Kincora-5
Pool(s):	Wandoan Sandstone Member (Gas).
Longitude (E):	148.0824
Latitude (S):	-27.0797
Date total depth reached:	09 DEC 70
Ground level:	287.1 m
Kelly bushing:	291.4 m
Operator:	Union Oil Development Corporation
Total depth:	1489 mKB
NUMBER OF WELLS DRILLED:	39
STRUCTURE/TRAP:	Structural/stratigraphic. Four-way dip and fault dependent closure on Evergreen reservoirs. Primarily stratigraphic trapping in the Wandoan Sandstone.
AREAL CLOSURE:	4.7 km ² on base of the Wandoan Ss
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Fm (multiple reservoirs)
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : light gray, coarse, quartzose to sublabile, poorly sorted, subangular with a trace of clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
POROSITY:	11 to 28%
PERMEABILITY:	0 to 214 md

PETROLEUM BEARING UNIT No.2:	Wandoan Sandstone Member
CONTENTS:	Oil and Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : light gray, poorly sorted, sublabile, angular with a trace of clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
POROSITY:	13 to 20%
PERMEABILITY:	<20 md
TEST DATA FROM THE DISCOVERY WELL (Kincora-2):	
DST 2, 1535.6-1552.4 m, Recovered 55 m of mud.	Wandoan Sandstone
DST 1, 1536.2-1551.4 m, Recovered 0.6 m of oil and 42 m of mud.	Wandoan Sandstone
TEST DATA FROM THE DISCOVERY WELL (Kincora-3):	
DST 7, 1438.0-1572.8 m, Recovered mud.	Evergreen/Moolayember Formation
DST 9, 1443.2-1450.9 m, Recovered 62 m of muddy water.	Evergreen Formation
DST 8, 1446.0-1447.8 m, Misrun.	Evergreen Formation
DST 1, 1467.6-1475.2 m, Recovered 4.6 m of mud.	Evergreen Formation
DST 6, 1483.8-1569.7 m, Flowed gas cut water.	Evergreen/Moolayember Formation
DST 2, 1488.3-1493.5 m, No recovery.	Evergreen Formation
DST 4, 1488.6-1498.4 m, Flowed gas at 101 900 m ³ /day.	Evergreen Formation
DST 3, 1532.5-1542.3 m, Recovered formation water.	Moolayember Formation
DST 5, 1535.6-1536.8 m, Flowed gas cut water.	Moolayember Formation
TEST DATA FROM THE DISCOVERY WELL (Kincora-5):	
DST 1, 1400.6-1416.1 m, Flowed gas at 53 800 m ³ /day.	Evergreen Formation
DST 2, 1437.1-1488.7 m, No recovery	Wandoan Sandstone
DST 3, 1452.4-1488.7 m, Flowed gas at 90 600 m ³ /day.	Wandoan Sandstone

PRODUCTION & INFRASTRUCTURE :

Discovered in December 1969, gas production from Kincora commenced in 1977. An LPG plant was commissioned in 1985 and gas from the plant is transferred into the Roma to Brisbane gas pipeline. Oil production commenced in 1980, when oil was trucked to the Moonie-Brisbane oil pipeline after treatment at Kincora.

RESERVES (as at 30/6/96):**GAS :**

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Wandoan Ss	210	196	14
Evergreen Fm	900	872	28

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Wandoan Ss	55	50	5

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Wandoan Ss	8	7	1
Evergreen Fm	24	21	3

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Wandoan Ss	4	4	very small
Evergreen Fm	67	60	7

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	88.61
Ethane	5.07
Propane	1.86
Isobutane	0.42
N-butane	0.41
Isopentane	0.08
N-pentane	0.02
Hexanes +	1.95
N ₂ + O ₂	1.50
CO ₂	0.14
H ₂ S	-
Specific Gravity	0.671
BTU/ft ³ (gross)	1161

OIL :

FLUID PROPERTIES	OIL Wandoan Ss
API Gravity @ 60°F	27.0°
Base	-
Sulphur (% wt)(ppm)	Low
Initial GOR (ft ³ /bbl)	-
Pour Point	20.8°C
Specific Gravity	0.8927
Colour	-
Viscosity (cp@100°F)	5.50
Bubble Point (psig)	-

STRATIGRAPHY (Kincora-2) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	213.4
	Bungil	397.8
	Mooga Sandstone	525.8
JURASSIC	Orallo Fm	600.5
	Gubberamunda Sandstone	795.5
	Westbourne Fm	935.1
	Springbok Sandstone	1013.5
	Walloon Coal Measures	1077.5
	Eurombah Fm	1239.0
	Hutton Sandstone	1259.4
	Evergreen Fm	1438.7
	Precipice Sandstone	1536.8
TRIASSIC	Moolayember Fm	1540.8
DEVONIAN	Timbury Hills Fm	1598.1

* Picked by Geological Survey Queensland

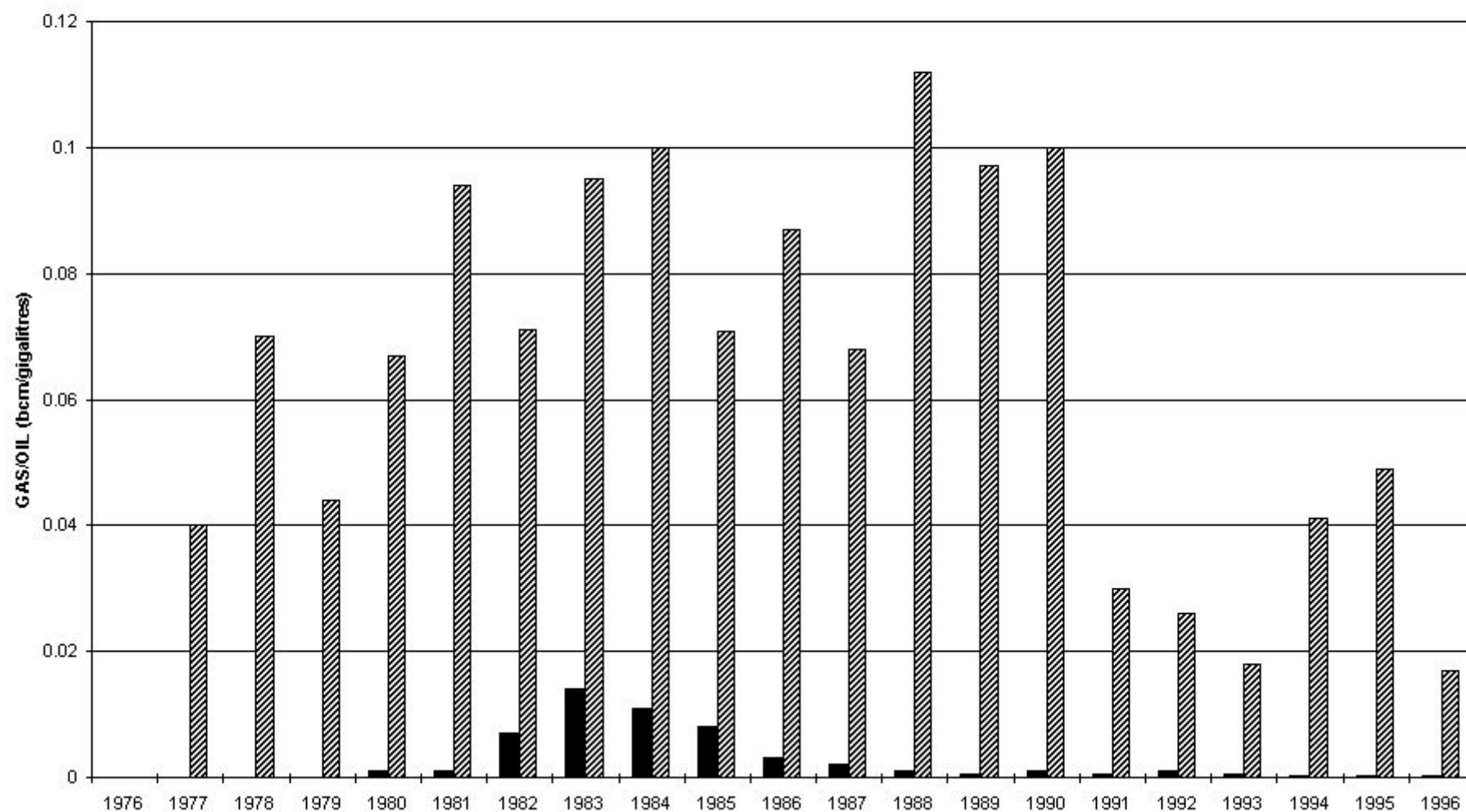
POROSITY AND PERMEABILITY DATA (Kincora-10) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1452.5	4.3	0.1	0.1	Evergreen Fm
1453.1	10.9	0.4	0.1	Evergreen Fm
1453.5	9.9	0.1	0.1	Evergreen Fm
1453.8	12.2	0.2	0.1	Evergreen Fm
1454.1	13.8	0.9	1.1	Evergreen Fm
1454.5	19.1	0.8	0.5	Evergreen Fm
1454.8	23.0	4.2	2.0	Evergreen Fm
1455.0	22.6	4.3	2.5	Evergreen Fm
1455.3	16.9	1.4	0.7	Evergreen Fm
1455.7	22.6	3.7	2.4	Evergreen Fm
1456.1	17.9	28.0	22.0	Evergreen Fm
1456.4	4.5	0.3	0.2	Evergreen Fm
1457.1	15.1	6.7	1.6	Evergreen Fm
1457.8	15.8	194.0	120.0	Evergreen Fm
1458.3	16.9	8.3	1.2	Evergreen Fm
1458.9	13.7	4.6	0.6	Evergreen Fm
1460.1	15.5	0.1	0.1	Evergreen Fm

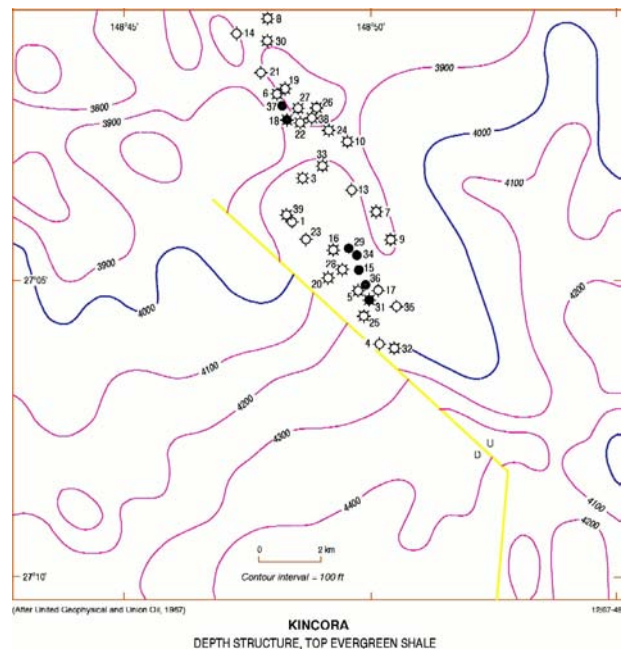
KINCORA, OIL & GAS PRODUCTION (Evergreen Formation & Wandoan' Formation)

Discovered 1 February 1970 Production commenced March 1977

Total wells = 39



KINCORA MAP



KINKABILLA

PRESENT OPERATOR:	Jeffreys NL
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	136 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	559-P
BASIN:	Bowen
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Kinkabilla-1
Longitude (E):	149.6439
Latitude (S):	-27.5506
Date total depth reached:	25 APR 66
Ground level:	306.3 m
Kelly bushing:	310.3 m
Operator:	Union Oil Development Corporation
Total depth:	3582 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Rewan Formation
CONTENTS:	Oil and Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT;	Fluvial to lacustrine
FORMATION TOP (mKB):	2744.4 m

TEST DATA FROM THE DISCOVERY WELL (Kinkabilla-1):

DST 1, 2921.8-2929.7 m, Flowed gas at 280 m ³ /day and recovered 30 m of heavy oil.	Rewan Formation
 DST 2, 2941.6-2969.1 m, Flowed gas at 1420 m ³ /day with a trace of oil.	 Rewan Formation

STRATIGRAPHY (Kinkabilla-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Bungil	684.9
	Mooga Sandstone	918.0
JURASSIC	Orallo Fm	990.6
	Gubberamunda Sandstone	1225.0
	Westbourne Fm	1424.6
	Springbok Sandstone	1489.6
	Walloon Coal Measures	1655.1
	Eurombah Fm	1905.6
	Hutton Sandstone	1939.1
	Evergreen Fm	2119.0
	Precipice Sandstone	2236.9
TRIASSIC	Moolayember Fm	2262.5
	Snake Creek Mudstone Mbr	2684.1
	Showgrounds Sandstone	2720.6
	Rewan Fm	2744.4
PERMIAN	Blackwater Group	3076.3
	Back Creek Group	3215.0
CARBONIFEROUS	Kuttung	3569.8

* Picked by Geological Survey of Queensland

KUNGARRI

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 55 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 22
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Kungarri-1
 Longitude (E): 148.9944
 Latitude (S): -27.0522
 Date total depth reached: 20 AUG 87
 Ground level: 273.1 m
 Kelly bushing: 277.7 m
 Operator: Hartogen Energy Ltd
 Total depth: 1757 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Blackwater Group
 CONTENTS: Gas
 FORMATION: Blackwater Group
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to paludal
 FORMATION TOP (mKB): 1696.5 m

TEST DATA FROM THE DISCOVERY WELL (Kungarri-1):

DST 1, 1720.6-1756.6 m, Blackwater Group
 Flowed gas at 123 000 m³/day and
 recovered 3 m of gas and condensate
 cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Blackwater Group	26	13	13

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Blackwater Group	2	1	1

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Blackwater Group	3	1	2

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Blackwater Gp
Methane	88.31
Ethane	5.64
Propane	1.90
Isobutane	0.30
N-butane	0.45
Isopentane	1.86 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	1.10
CO ₂	0.44
H ₂ S	-
Specific Gravity	0.674
BTU/ft ³ (gross)	1169

STRATIGRAPHY (Kungarri-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	33.5
	Wallumbilla Formation	154.1
	Bungil	354.2
	Mooga Sandstone	479.8
JURASSIC	Orallo Fm	617.5
	Gubberamunda Sandstone	782.7
	Westbourne Fm	934.9
	Springbok Sandstone	981.5
	Walloon Coal Measures	1063.1
	Hutton Sanstone	1278.2
	Evergreen Fm	1455.1
	Boxvale Sandstone Mbr	1521.0
TRIASSIC	Moolayember Fm	1566.1
	Snake Creek Mudstone Mbr	1677.4
	Showgrounds Sandstone	1688.6
PERMIAN	Blackwater Group	1696.5
DEVONIAN	Timbury Hills Formation	1728.5

* Picked by Geological Survey of Queensland

LAMEN

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Past Producer
 LOCATION: 20 km east-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 7
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Lamen-1
 Longitude (E): 148.9903
 Latitude (S): -26.6306
 Date total depth reached: 28 NOV 64
 Ground level: 322.8 m
 Kelly bushing: 326.1 m
 Operator: CSR Ltd
 NUMBER OF WELLS DRILLED: 3
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1199.7 m

TEST DATA FROM THE DISCOVERY WELL (Lamen-1):

DST 2, 1182.6-1244.2 m, Precipice Sandstone
 Flowed gas at 570 m³/day.

DST 3, 1196.3-1203.0 m, Precipice Sandstone
 Flowed gas at 207 850 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	66	66	very small

COMPOSITIONAL DATA :

GAS :

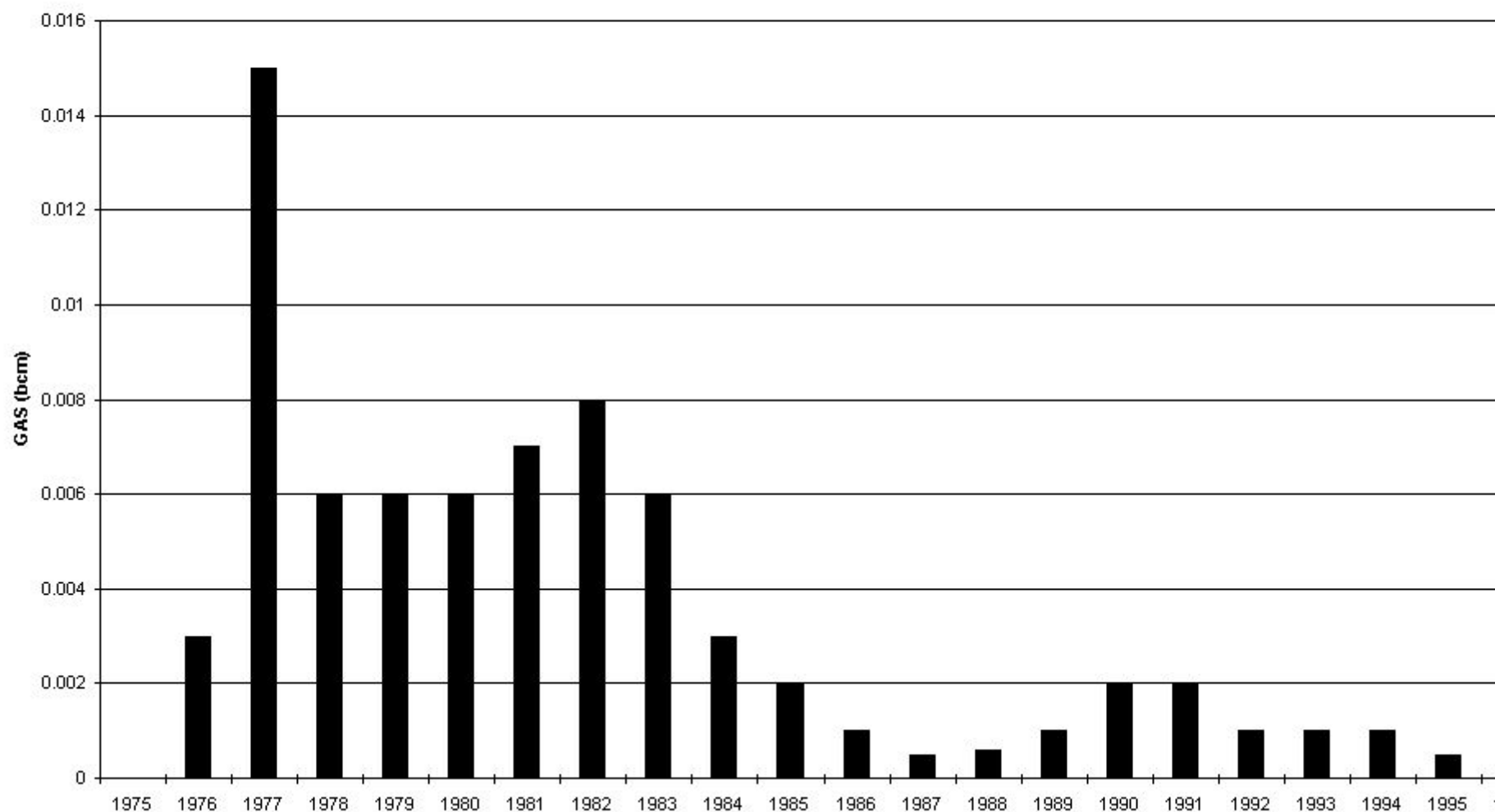
GAS PROPERTIES	GAS Precipice Ss
Methane	85.00
Ethane	4.70
Propane	2.50
Isobutane	0.74
N-butane	0.81
Isopentane	1.39 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	4.60
CO₂	0.31
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Lamen-1) :

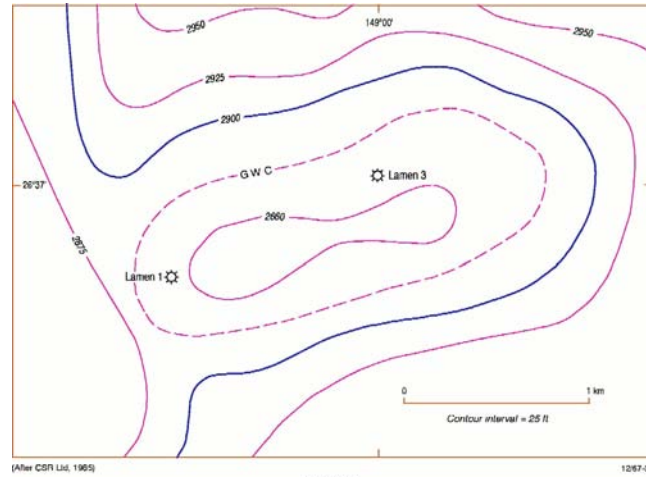
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	76.2
	Mooga Sandstone	171.3
JURASSIC	Orallo Fm	237.1
	Gubberamunda Sandstone	404.5
	Westbourne Fm	478.8
	Springbok Sandstone	596.5
	Walloon Coal Measures	643.7
	Eurombah Fm	885.8
	Hutton Sandstone	949.2
	Evergreen Fm	1076.3
	Precipice Sandstone	1199.7
TRIASSIC	Moolayember Fm	1208.5
	Snake Creek Mudstone Mbr	1229.9
CARBONIFEROUS	Granite	1235.1

* Picked by Geological Survey of Queensland

LAMEN, GAS PRODUCTION (Precipice Sandstone)
Discovered 28 November 1964 Production commenced April 1976
Total Wells = 3 (1 Producer; 1 Shut In; 1 Plugged and Abandoned)



LAMEN MAP



LAMEN
DEPTH STRUCTURE, TOP PRECIPICE SANDSTONE

LANCEWOOD

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	50 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 21
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Lancewood-1
Longitude (E):	148.7914
Latitude (S):	-27.0594
Date total depth reached:	04 SEP 83
Ground level:	345.3 m
Kelly bushing:	349.6 m
Operator:	Hartogen Energy Ltd
Total depth:	1603 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Moolayember Formation
CONTENTS:	Oil
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1531.3 m

TEST DATA FROM THE DISCOVERY WELL (Lancewood-1):

DST 3, 1467.3-1479.2 m, Recovered 183 m of muddy water and 444 m of formation water.	Evergreen Formation
DST 1, 1526.7-1547.2 m, Recovered 12.2 m of mud.	Evergreen/Moolayember Formation
DST 2, 1575.8-1603.2 m, Recovered 78 m of oil and 1180 m of formation water.	Moolayember Formation
DST 4, 1578.3-1603.2 m, Recovered 76 m of oil and 1317 m of formation water.	Moolayember Formation

STRATIGRAPHY (Lancewood-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	210.9
	Bungil	402.3
	Mooga Sandstone	529.1
JURASSIC	Orallo Fm	681.2
	Gubberamunda Sandstone	792.5
	Westbourne Fm	945.8
	Springbok Sandstone	1015.0
	Walloon Coal Measures	1075.9
	Hutton Sanstone	1257.3
	Evergreen Fm	1423.4
TRIASSIC	Moolayember Fm	1531.3
CARBONIFEROUS	Granite	1581.3

* Picked by Geological Survey of Queensland

LANDOR

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	33 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Landor-1
Longitude (E):	148.9767
Latitude (S):	-26.8450
Date total depth reached:	10 MAY 65
Ground level:	298.4 m
Kelly bushing:	301.8 m
Operator:	CSR Ltd
Total depth:	1471 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Boxvale Sandstone Member
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1329.5 m
TEST DATA FROM THE DISCOVERY WELL (Landor-1):	
DST 1, 1325.9-1338.1 m,	Evergreen Formation
Flowed gas at 230 m ³ /day and recovered 43 m of mud.	

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm
Methane	80.60
Ethane	7.90
Propane	1.21
Isobutane	3.10
N-butane	0.17
Isopentane	0.99
N-pentane	0.01
Hexanes +	1.00
N ₂ + O ₂	4.60
CO ₂	0.38
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Landor-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	216.4
	Mooga Sandstone	332.8
JURASSIC	Orallo Fm	412.1
	Gubberamunda Sandstone	597.4
	Westbourne Fm	682.8
	Springbok Sandstone	785.8
	Walloon Coal Measures	867.5
	Eurombah Fm	1063.1
	Hutton Sanstone	1127.8
	Evergreen Fm	1280.5
TRIASSIC	Moolayember Fm	1386.8
DEVONIAN	Timbury Hills Fm	1450.2

* Picked by Geological Survey of Queensland

LARK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	102 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 66
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Lark-1
Longitude (E):	149.2497
Latitude (S):	-27.4350
Date total depth reached:	16 JUN 93
Ground level:	335.0 m
Kelly bushing:	339.4 m
Operator:	Bridge Oil Ltd
Total depth:	2290 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial	

TEST DATA FROM THE DISCOVERY WELL (Lark-1):

DST 1, 2130.0-2138.0 m, No recovery.	Rewan Formation

DST 2, 2214.0-2292.3 m, Flowed gas at 4000 m ³ /day and recovered 9 bbl of gas cut mud.	Rewan Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Rewan Fm	42	29	13

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Rewan Fm	6	3	3

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Rewan Fm	9	4	5

LATEMORE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	30 km east of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 8
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Latemore-1
Longitude (E):	149.0764
Latitude (S):	-26.5869
Date total depth reached:	03 SEP 60
Ground level:	324.7 m
Kelly bushing:	327.7 m
Operator:	CSR Ltd
Total depth:	1455 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1280.2 m

TEST DATA FROM THE DISCOVERY WELL (Latemore-1):

DST 2, 1276.8-1293.4 m, Flowed gas at 280 m ³ /day.	Rewan Formation

DST 1, 1281.4-1322.8 m, Flowed gas at 5700 m ³ /day.	Rewan Formation

DST 3, 1295.1-1356.1 m, Flowed gas at 17 600 m ³ /day.	Rewan Formation

COMPOSITIONAL DATA :

GAS :

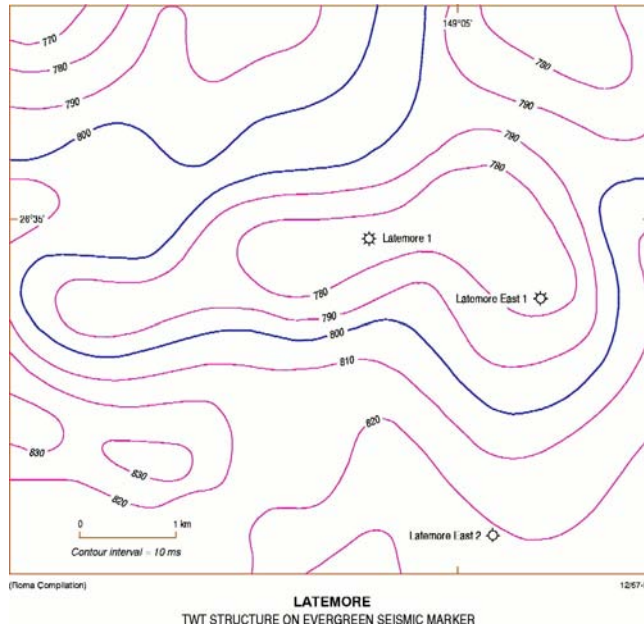
GAS PROPERTIES	GAS Rewan Fm
Methane	81.60
Ethane	6.60
Propane	3.40
Isobutane	1.00
N-butane	1.20
Isopentane	trace
N-pentane	-
Hexanes +	-
N ₂ + O ₂	3.40
CO ₂	-
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Latemore-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	45.7
	Mooga Sandstone	145.7
JURASSIC	Orallo Fm	213.4
	Gubberamunda Sandstone	362.4
	Westbourne Fm	429.8
	Springbok Sandstone	482.8
	Walloon Coal Measures	592.8
	Eurombah Fm	859.8
	Hutton Sanstone	897.6
	Evergreen Fm	1128.4
	Precipice Sandstone	1213.1
TRIASSIC	Moolayember Fm	1222.2
	Snake Creek Mudstone Mbr	1274.1
	Showgrounds Sandstone	1278.0
	Rewan Fm	1280.2
PERMIAN	Blackwater Group	1356.7
	Back Creek Group	1405.1
DEVONIAN	Timbury Hills Fm	1441.1

* Picked by Geological Survey of Queensland

LATEMORE MAP



LATEMORE SOUTH

PRESENT OPERATOR: Santos Ltd
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: 30 km east of Roma.
STATE: Queensland
PETROLEUM TITLES: PL 8
BASIN: Bowen
SUB-BASIN: Roma Shelf
DISCOVERY WELL: Latemore South-1
 Longitude (E): 149.1056
 Latitude (S): -26.6431
 Date total depth reached: 10 JUN 68
 Ground level: 312.4 m
 Kelly bushing: 316.7 m
 Operator: CSR Ltd
 Total depth: 1741 mKB
NUMBER OF WELLS DRILLED: 1
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Back Creek Group
CONTENTS: Gas
FORMATION: Back Creek Group
AGE: Late Permian
LITHOLOGY: Sandstone.
DEPOSITIONAL ENVIRONMENT: Shallow marine
FORMATION TOP (mKB): 1524.0 m

TEST DATA FROM THE DISCOVERY WELL (Latemore South-1):

DST 1, 1606.6-1610.6 m, Back Creek Group
Flowed gas at 8 m³/day and recovered 1 m
of mud.

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Back Creek Gp
Methane	86.80
Ethane	4.90
Propane	2.60
Isobutane	0.36
N-butane	0.69
Isopentane	0.20
N-pentane	0.27
Hexanes +	1.37
N ₂ + O ₂	1.68
CO ₂	1.13
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Latemore South-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	76.2
	Mooga Sandstone	194.5
JURASSIC	Orallo Fm	271.3
	Gubberamunda Sandstone	446.8
	Westbourne Fm	499.9
	Springbok Sandstone	616.9
	Walloon Coal Measures	671.2
	Eurombah Fm	909.8
	Hutton Sanstone	944.9
	Evergreen Fm	1004.3
	Precipice Sandstone	1274.7
TRIASSIC	Moolayember Fm	1281.4
	Snake Creek Mudstone Mbr	1332.0
	Showgrounds Sandstone	1336.9
	Rewan Fm	1341.1
PERMIAN	Blackwater Group	1424.0

* Picked by Geological Survey of Queensland

LEICHHARDT

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	54 km north-northwest of Moonie.
STATE:	Queensland
PETROLEUM TITLES:	PL 17
BASIN:	Surat
SUB-BASIN:	Chinchilla-Goondiwindi Slope
DISCOVERY WELL:	Leichhardt-1
Longitude (E):	150.1964
Latitude (S):	-27.2500
Date total depth reached:	22 FEB 66
Ground level:	285.6 m
Kelly bushing:	289.3 m
Operator:	Union Oil Development Corporation
Total depth:	1883 mKB
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Hutton Sandstone
CONTENTS:	Gas
FORMATION:	Hutton Sandstone
AGE:	Middle Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse grained, subrounded, poorly sorted, quartzose with a limy clay matrix..
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1357.9 m
POROSITY:	25% (average)
PERMEABILITY:	60 md (average)
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Oil
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1675.8 m
TEST DATA FROM THE DISCOVERY WELL (Leichhardt-1):	
DST 1, 1516.7-1531.0 m, Recovered 1325 m of gas cut water.	Hutton Sandstone
DST 6, 1536.8-1539.5 m, Flowed gas at 169 900 m ³ /day through an 8 mm choke	Hutton Sandstone
DST 2, 1676.4-1681.0 m, Recovered 30 m of 39° API oil and 3 m of formation water.	Precipice Sandstone
DST 3, 1676.4-1681.0 m, Recovered 30 m of oil and 3 m of water.	Precipice Sandstone

DST 4, 1677.9-1685.5 m, Precipice Sandstone
Recovered 73 m of oily, gas cut mud and
555 m of oily, gas cut water.

DST 5, 1706.9-1719.1 m, Precipice Sandstone
Recovered 1256 m of formation water.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	8	5	3

COMPOSITIONAL DATA :

OIL :

FLUID PROPERTIES	OIL Precipice Ss
API Gravity @ 60°F	39.0°
Base	-
Sulphur (% wt)(ppm)	<0.10%
Initial GOR (ft ³ /bbl)	-
Pour Point	15.6°C
Specific Gravity	0.830
Colour	Green
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

COMPOSITIONAL DATA CONTD :

CONDENSATE :

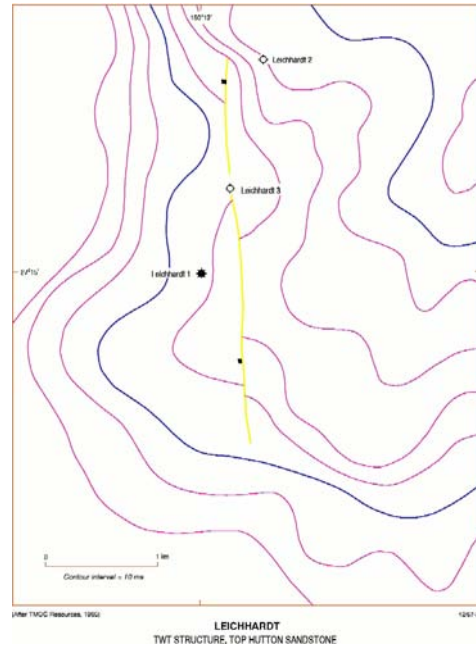
FLUID PROPERTIES	CONDENSATE Hutton Ss
API Gravity @ 60°F	47.8°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	< -6.7°C
Specific Gravity	0.789
Colour	Yellow
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Leichhardt-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	249.9
	Mooga Sandstone	413.3
JURASSIC	Orallo Fm	457.8
	Gubberamunda Sandstone	632.5
	Westbourne Fm	745.2
	Walloon Coal Measures	967.7
	Hutton Sanstone	1357.9
	Evergreen Fm	1541.7
	Precipice Sandstone	1675.8
PERMIAN	Back Creek Group	1770.3

* Picked by Geological Survey of Queensland

LEICHHARDT MAP



LINK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	105 km southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 16
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Link-1
Longitude (E):	149.2586
Latitude (S):	-27.4493
Date total depth reached:	14 MAR 93
Ground level:	342.5 m
Operator:	Bridge Oil Ltd
Total depth:	2272 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial

TEST DATA FROM THE DISCOVERY WELL (Link-1):

DST 1, 2096.5-2104.5 m, Flowed gas at 24 600 m ³ /day and recovered 12 m of condensate and 345 m of mud.	Showgrounds Sandstone
DST 2, 2105.0-2122.5 m, Flowed gas at 115 200 m ³ /day and condensate at 82 bbl/day.	Showgrounds Sandstone
DST 3, 2121.5-2139.0 m, Recovered 500 m of water cushion with a small quantity of gas cut mud.	Rewan Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss/ Rewan Fm	44	8	36

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss/ Rewan Fm	3	1	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss/ Rewan Fm	3	1	2

LOUISE

PRESENT OPERATOR: Brisbane Petroleum NL
 TYPE: Oil
 COMMERCIAL STATUS: Producer
 LOCATION: 142 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 40
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Louise-1
 Longitude (E): 149.2939
 Latitude (S): -27.8161
 Date total depth reached: 13 OCT 85
 Ground level: 229.8 m
 Kelly bushing: 235.8 m
 Operator: Bridge Oil Ltd
 Total depth: 2126 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 3.0 km² (top Boxvale Sandstone)
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 2031.6 m

TEST DATA FROM THE DISCOVERY WELL (Louise-1):

DST 2, 2030.0-2044.3 m, Showgrounds Sandstone
 Recovered a small, unmeasured quantity
 of light oil.

DST 1, 2031.2-2035.5 m, Showgrounds Sandstone
 Recovered 40 m of 53° API oil.

PRODUCTION & INFRASTRUCTURE :

Louise-1 produced 1765 bbs of oil before high water cut forced abandonment. Louise-2 is producing oil at a rate of 6 bbls/day and as at November 1996, had produced 116 000 bbls of oil. Oil from Louise is trucked to the Moonie-Brisbane oil pipeline.

RESERVES (as at 30/6/96):

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	20	19	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Showgrounds Ss
Methane	50.84
Ethane	20.67
Propane	12.88
Isobutane	4.57
N-butane	2.90
Isopentane	1.98 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	5.84
CO ₂	0.34
H ₂ S	-
Specific Gravity	0.963
BTU/ft ³ (gross)	1548

OIL :

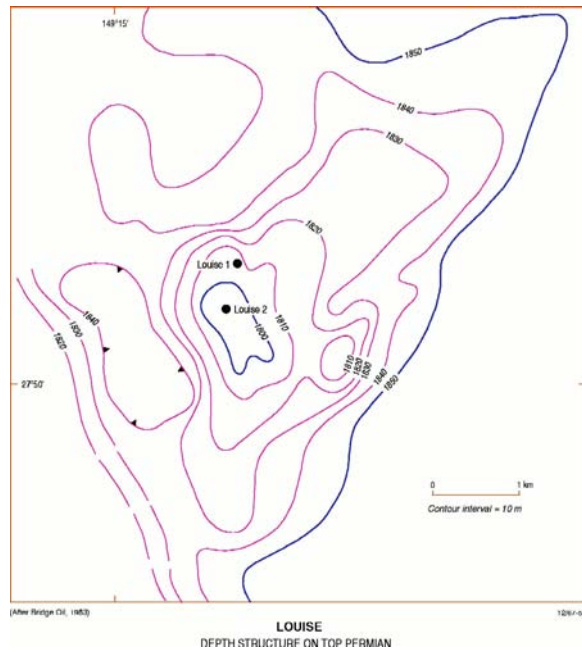
FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	59.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.740
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Louise-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	391.1
	Bungil	614.8
	Mooga Sandstone	819.8
JURASSIC	Orallo Fm	890.9
	Gubberamunda Sandstone	1104.8
	Westbourne Fm	1302.0
	Springbok Sandstone	1421.1
	Walloon Coal Measures	1458.3
	Hutton Sanstone	1631.5
	Evergreen Fm	1781.1
TRIASSIC	Wandoan Fm	1871.0
	Sub Unit 9	2010.0
	Showgrounds Sandstone	2031.6
	Rewan Fm	2039.2
PERMIAN	Kianga Fm	2043.7
CARBONIFEROUS	Kuttung Fm	2094.3

* Picked by Bridge Oil Ltd

LOUISE MAP



LOWESBY

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	260 km north of Roma.
STATE:	Queensland
PETROLEUM TITLES:	337-P
BASIN:	Bowen
SUB-BASIN:	Comet Platform
DISCOVERY WELL:	Lowesby-1
Longitude (E):	148.7140
Latitude (S):	-24.2506
Date total depth reached:	26 OCT 91
Ground level:	213.5 m
Kelly bushing:	217.5 m
Operator:	Australian Gas Light Company
Total depth:	1378.8 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Four-way dip closure formed by drape over a basement high.
AREAL CLOSURE:	27.0 km ² near the top of the Mantuan Formation.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Mantuan Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
TEST DATA FROM THE DISCOVERY WELL (Lowesby-1):	
DST 2, 750.6-769.9 m, Flowed gas at 4450 m ³ /day and recovered 47 m of mud.	Mantuan Formation
DST 3, 908.0-946.7 m, Recovered a small quantity of mud.	Catherine Sandstone
DST 4, 1097.9-1131.2 m, Recovered 19 m mud.	Freitag Formation
DST 5, 1163.8-1189.0 m, Recovered 0.4 bbl of formation water.	Freitag Fm/Aldebaran Sandstone
DST 6, 1174.0-1234.8 m, Recovered 27 m of formation water.	Aldebaran Sandstone

STRATIGRAPHY (Lowesby-1) :

AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Undifferentiated	00.0
	Rewan Formation	120.0
PERMIAN	Bandanna Formation	400.5
	Black Alley Shale	656.0
	Mantuan Formation	737.0
	Catherine Sandstone	898.0
	Ingelara Formation	1015.0
	Freitag Formation	1091.5
	Aldebaran Sandstone	1164.0

* Picked by AGL Petroleum Ltd

LYNDON CAVES

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Past Producer
 LOCATION: 25 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 9
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Lyndon Caves-1
 Longitude (E): 148.9111
 Latitude (S): -26.8092
 Date total depth reached: 28 MAY 66
 Ground level: 268.5 m
 Kelly bushing: 271.9 m
 Operator: CSR Ltd
 Total depth: 1402 mKB
 NUMBER OF WELLS DRILLED: 3
 STRUCTURE/TRAP: Structural/Stratigraphic. Channel sand draping a minor plunging nose.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone : white, fine to coarse, subangular to subrounded, poorly sorted, lithic and quartzose with abundant clay matrix.

 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1328.0 m

 TEST DATA FROM THE DISCOVERY WELL (Lyndon Caves-1):

 DST 1, 1325.9-1341.4 m, Precipice Sandstone
 Flowed gas at 65 100 m³/day and
 recovered 21 m of condensate and gas
 cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	4	4	very small

COMPOSITIONAL DATA :

GAS :

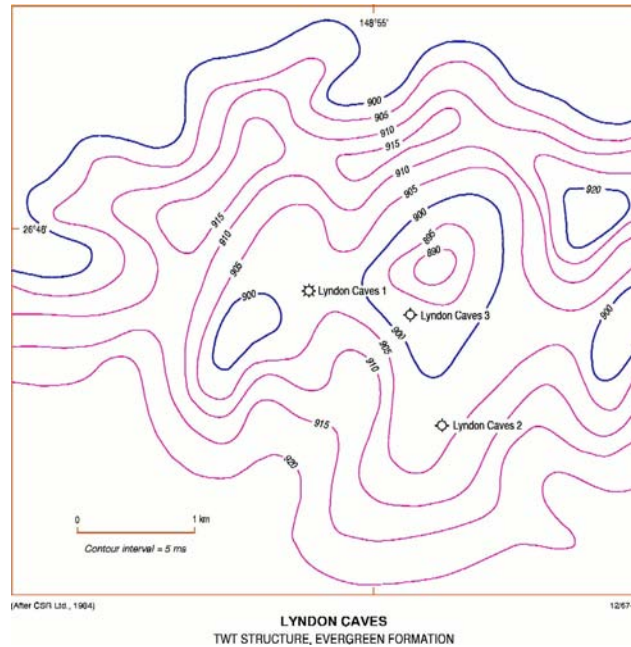
GAS PROPERTIES	GAS Precipice Ss
Methane	87.40
Ethane	5.50
Propane	0.20
Isobutane	1.81
N-butane	0.02
Isopentane	1.87 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.20
CO ₂	1.00
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Lyndon Caves-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	179.8
	Mooga Sandstone	298.4
JURASSIC	Orallo Fm	368.8
	Gubberamunda Sandstone	545.6
	Westbourne Fm	626.4
	Springbok Sandstone	780.3
	Walloon Coal Measures	834.5
	Eurombah Fm	1011.0
	Hutton Sanstone	1067.4
	Evergreen Fm	1209.4
	Precipice Sandstone	1328.0
TRIASSIC	Moolayember Fm	1334.1
	Snake Creek Mudstone Mbr	1379.2
	Showgrounds Sandstone	1383.8
DEVONIAN	Timbury Hills Fm	1390.2

* Picked by Geological Survey of Queensland

LYNDON CAVES MAP



MAFFRA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	18 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 9
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Maffra-1
Pool(s):	Precipice Sandstone (Gas).
Longitude (E):	148.7850
Latitude (S):	-26.7536
Date total depth reached:	14 JUN 65
Ground level:	316.4 m
Kelly bushing:	319.7 m
Operator:	Associated Australian Oilfields NL
Total depth:	1353.3 mKB
DISCOVERY WELL:	Maffra-2
Pool(s):	Precipice Sandstone (Oil).
Longitude (E):	148.7931
Latitude (S):	-26.7411
Date total depth reached:	23 JUN 65
Ground level:	306.3 m
Kelly bushing:	309.6 m
Operator:	Associated Australian Oilfields NL
Total depth:	1359 mKB
NUMBER OF WELLS DRILLED:	6
STRUCTURE/TRAP:	Stratigraphic. Isolated, permeable, channel sand pod located on a broad, plunging anticlinal axis.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, fine to medium grained, subangular to subrounded, fairly well sorted, quartzose with abundant clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1290.2 m (Maffra-1)
POROSITY:	19% (average)
PERMEABILITY:	150 md (average)
TEST DATA FROM THE DISCOVERY WELL (Maffra-1):	
DST 1, 1290.8-1301.5 m, Flowed gas at 208 400 m ³ /day.	Precipice Sandstone
DST 2, 1340.5-1353.3 m, Recovered 18 m of mud.	Moolayember/Timbury Hills Fm

TEST DATA FROM THE DISCOVERY WELL (Maffra-2):

DST 1, 1272.3-1289.9 m, Precipice Sandstone
 Flowed gas at 35 700 m³/day and
 recovered 37 m of clear, green 51° API oil.

DST 2, 1275.3-1348.5 m, Precipice Sandstone
 Flowed gas at 14 200 m³/day and 51°
 API oil at 41 bbl/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	36	36	very small

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	10*	9	1

* includes Hollyrood

COMPOSITIONAL DATA :

GAS :

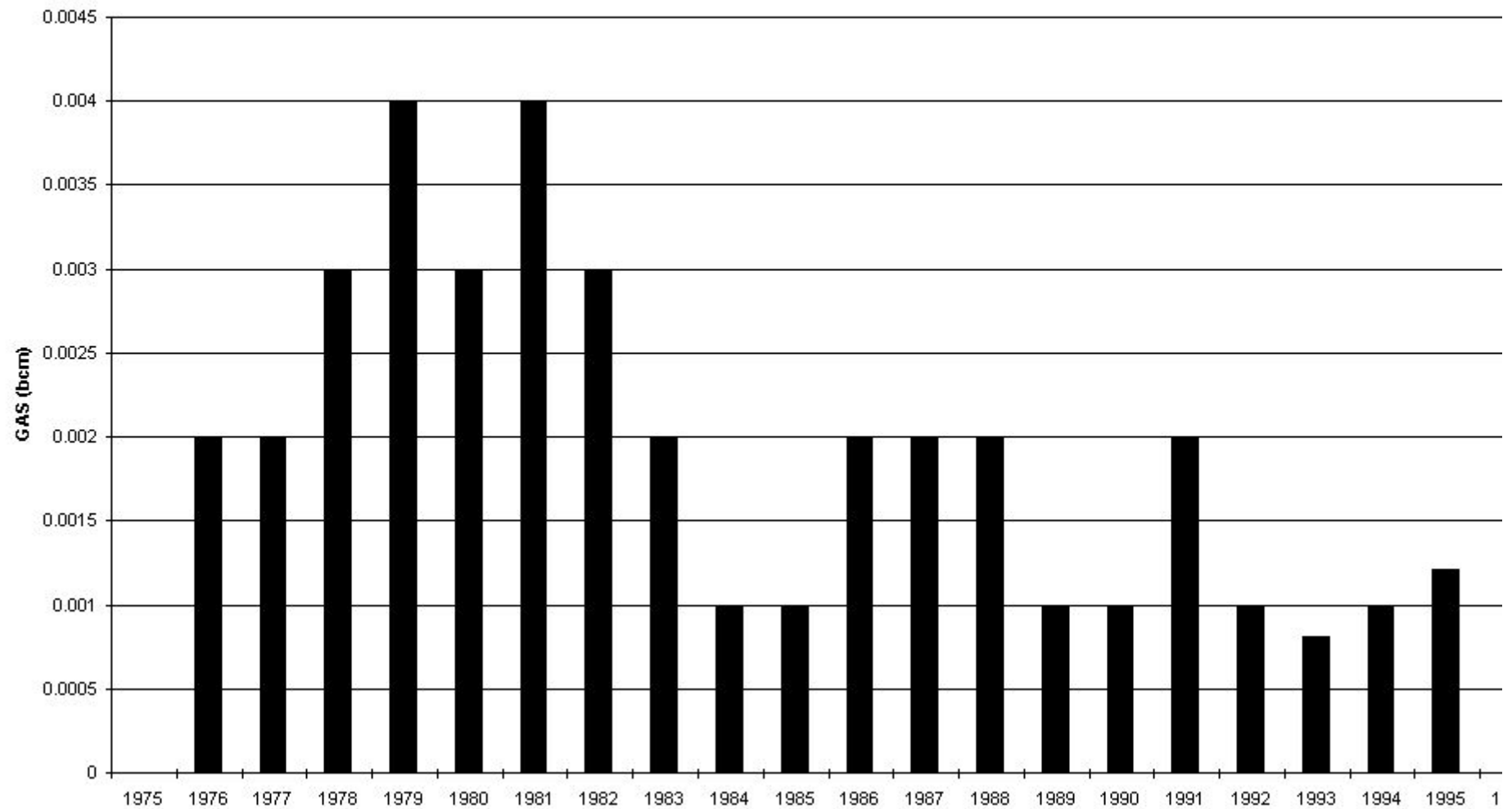
GAS PROPERTIES	GAS Precipice Ss
Methane	83.20
Ethane	6.40
Propane	3.70
Isobutane	1.31
N-butane	1.01
Isopentane	2.08 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.10
CO ₂	0.25
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Maffra-1) :

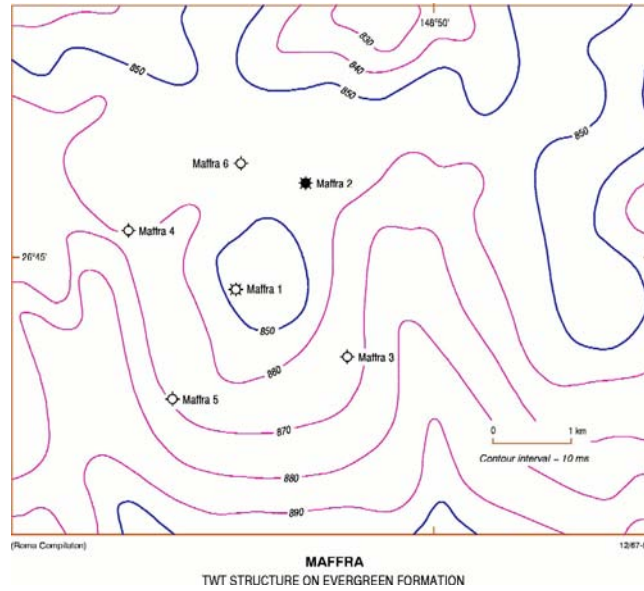
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	195.1
	Mooga Sandstone	313.9
JURASSIC	Orallo Fm	381.0
	Gubberamunda Sandstone	550.2
	Westbourne Fm	616.3
	Springbok Sandstone	732.4
	Walloon Coal Measures	794.0
	Eurombah Fm	973.8
	Hutton Sandstone	1042.4
	Evergreen Fm	1191.2
	Precipice Sandstone	1290.2
TRIASSIC	Moolayember Fm	1298.4
DEVONIAN	Timbury Hills Fm	1347.8

* Picked by Geological Survey of Queensland

MAFFRA, GAS PRODUCTION (Precipice Sandstone)
Discovered 14 June 1965 Production commenced January 1976
Total Wells = 8 (2 Shut In; 4 Plugged and Abandoned; 2 Suspended)



MAFFRA MAP



MAJOR	
PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	114 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 74
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Major-1
Longitude (E):	148.9028
Latitude (S):	-27.6228
Date total depth reached:	20 APR 65
Ground level:	264.9 m
Kelly bushing:	268.5 m
Operator:	Union Oil Development Corporation
Total depth:	1699.6 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	Fault trap.
AREAL CLOSURE:	12.9 km ² (on top of Evergreen Fm)
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : gray to white, medium to conglomeratic, subangular to subrounded, moderately well sorted, quartzose with fragments of underlying rhyolite basement.
DEPOSITIONAL ENVIRONMENT:	Non-marine.
FORMATION TOP (mKB):	1629.2 m
TEST DATA FROM THE DISCOVERY WELL (Major-1):	
DST 1, 1685.5-1699.9 m, Flowed gas at 51 000 m ³ /day and 64° API condensate at 60 bbl/day.	Showgrounds Sandstone

GAS :

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CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	13	7	6

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	18	11	7

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	80.50
Ethane	7.40
Propane	4.30
Isobutane	1.43
N-butane	1.20
Isopentane	0.37
N-pentane	0.32
Hexanes +	0.59
N ₂ + O ₂	3.50
CO ₂	0.39
H ₂ S	-
Specific Gravity	0.717
BTU/ft ³ (gross)	1201

COMPOSITIONAL DATA CONTD :

CONDENSATE :

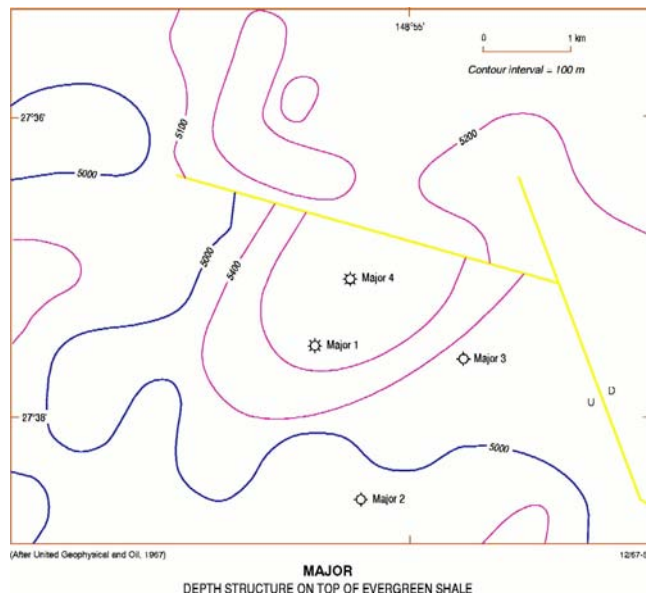
FLUID PROPERTIES	CONDENSATE Showgrounds Ss
API Gravity @ 60°F	60.5°
Base	-
Sulphur (% wt)(ppm)	< 0.10%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.737
Colour	Pale Green
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Major-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	188.4
	Wallumbilla Fm	306.0
	Bungil	507.5
	Mooga Sandstone	706.5
JURASSIC	Orallo Fm	838.2
	Gubberamunda Sandstone	960.1
	Westbourne Fm	1184.5
	Springbok Sandstone	1228.0
	Walloon Coal Measures	1263.4
	Hutton Sanstone	1420.4
	Evergreen Fm	1555.7
TRIASSIC	Moolayember Fm	1629.2
	Snake Creek Mudstone Mbr	1680.1
	Showgrounds Sandstone	1684.0
CARBONIFEROUS	Basement	1690.1

* Picked by Geological Survey of Queensland

MAJOR MAP



MAJOR SOUTH

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	116 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	212-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Major South-1
Longitude (E):	148.8924
Latitude (S):	-27.6349
Date total depth reached:	20 AUG 93
Ground level:	245.0 m
Kelly bushing:	250.5 m
Operator:	Santos Ltd
Total depth:	1701 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Moolayember Formation
CONTENTS:	Oil
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine

TEST DATA FROM THE DISCOVERY WELL (Major South-1):

DST 1, 1653.0-1657.7 m,	Moolayember Formation
Flowed gas at a rate too small to measure.	
Recovered 10.5 bbl of oil, 1.5 bbl of oil and gas cut mud and 15 bbl of oil cut water.	

DST 2, 1671.9-1683.0 m,	Showgrounds Sandstone
Flowed oil cut water at 200 bbl/day.	

MAMAREE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	138 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Mamaree-1
Longitude (E):	149.4736
Latitude (S):	-27.6883
Date total depth reached:	09 AUG 70
Ground level:	276.5 m
Kelly bushing:	280.7 m
Operator:	Union Oil Development Corporation
Total depth:	2770.6 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Moolayember Fm (Wandoan Ss)
CONTENTS:	Oil and Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2122.0 m

TEST DATA FROM THE DISCOVERY WELL (Mamaree-1):

DST 1, 2317.7-2331.0 m, Recovered 0.3 m of oil.	Moolayember Fm (Wandoan Ss)
DST 4, 2334.2-2339.3 m, Flowed a mixture estimated at 40% water 10% oil and 50% emulsion.	Moolayember Fm (Wandoan Ss)/Rewan
DST 2, 2335.4-2395.4 m, Flowed gas at 1410 m ³ /day and water at 1000 bbl/day.	Moolayember Fm (Wandoan Ss)
DST 3, 2350.0-2395.4 m, Recovered 30 m of mud.	Rewan Formation
DST 5, 2507.0-2515.5 m, Recovered 9 m of mud with an oil scum.	Blackwater Group
DST 6, 2572.2-2582.9 m, Gas to surface at a rate too small to measure.	Blackwater Group
DST 7, 2610.3-2623.4 m, Recovered 1524 m of gas cut water.	Back Creek Group

STRATIGRAPHY (Mamaree-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	289.0
	Wallumbilla Formation	382.2
	Bungil Formation	641.6
JURASSIC	Orallo Formation	1019.0
	Gubberamunda Sandstone	1161.0
	Westbourne Formation	1436.2
	Springbok Sandstone	1468.8
	Walloon Coal Measures	1542.0
	Eurombah Formation	1745.0
	Hutton Sandstone	1771.8
	Evergreen Fm	1918.4
	Boxvale Sandstone Mbr	1963.2
TRIASSIC	Precipice Sandstone	2001.0
	Moolayember Formation	2037.3
	Snake Creek Mudstone Mbr	2285.4
	Showgrounds Sandstone	2310.4
PERMIAN	Rewan Formation	2349.4
	Blackwater Group	2436.6
	Back Creek Group	2609.1
CARBONIFEROUS	Volcanics	2671.9

* Picked by Geological Survey of Queensland

MARTINI

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Oil and Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 80 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 470-P
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Martini-1
 Longitude (E): 148.9076
 Latitude (S): -27.3280
 Date total depth reached: 22 NOV 91
 Ground level: 234.2 m
 Kelly bushing: 239.7 m
 Operator: Oil Company of Australia Ltd
 Total depth: 1681 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Moolayember Formation
 CONTENTS: Oil and Gas
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 1575.9 m

TEST DATA FROM THE DISCOVERY WELL (Martini-1):

DST 2, 1623.4-1680.1 m, Moolayember Formation
 Misrun.

DST 1, 1636.8-1680.1 m, Moolayember Formation
 Flowed oil at 75 bbl/day and gas at
 2800 m³/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Moolayember Fm	7	2	5

STRATIGRAPHY (Martini-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	236.8
	Bungil	414.8
	Mooga Sandstone	572.7
JURASSIC	Orallo Fm	732.4
	Gubberamunda Sandstone	840.0
	Westbourne Fm	984.8
	Springbok Sandstone	1091.5
	Walloon Coal Measures	1161.6
	Hutton Sandstone	1367.9
	Evergreen Fm	1498.9
	Boxvale Sandstone Mbr	1531.0
TRIASSIC	Moolayember Fm	1575.8
CARBONIFEROUS	Basement	1656.9

* Picked by Geological Survey of Queensland

MASCOTTE

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 34 km east-northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 5
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Mascotte-1
 Longitude (E): 149.1114
 Latitude (S): -26.5242
 Date total depth reached: 17 MAY 78
 Ground level: 353.9 m
 Kelly bushing: 357.2 m
 Operator: Jimbilly Pty Ltd
 Total depth: 1272.5 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1182.6 m

TEST DATA FROM THE DISCOVERY WELL (Mascotte-1):

DST 1, 1187.5-1196.7 m, Precipice Sandstone
 Flowed gas at 169 900 m³/day and
 recovered 0.6 m of water with a trace
 of condensate.

RESERVES (as at 30/6/96):

GAS :

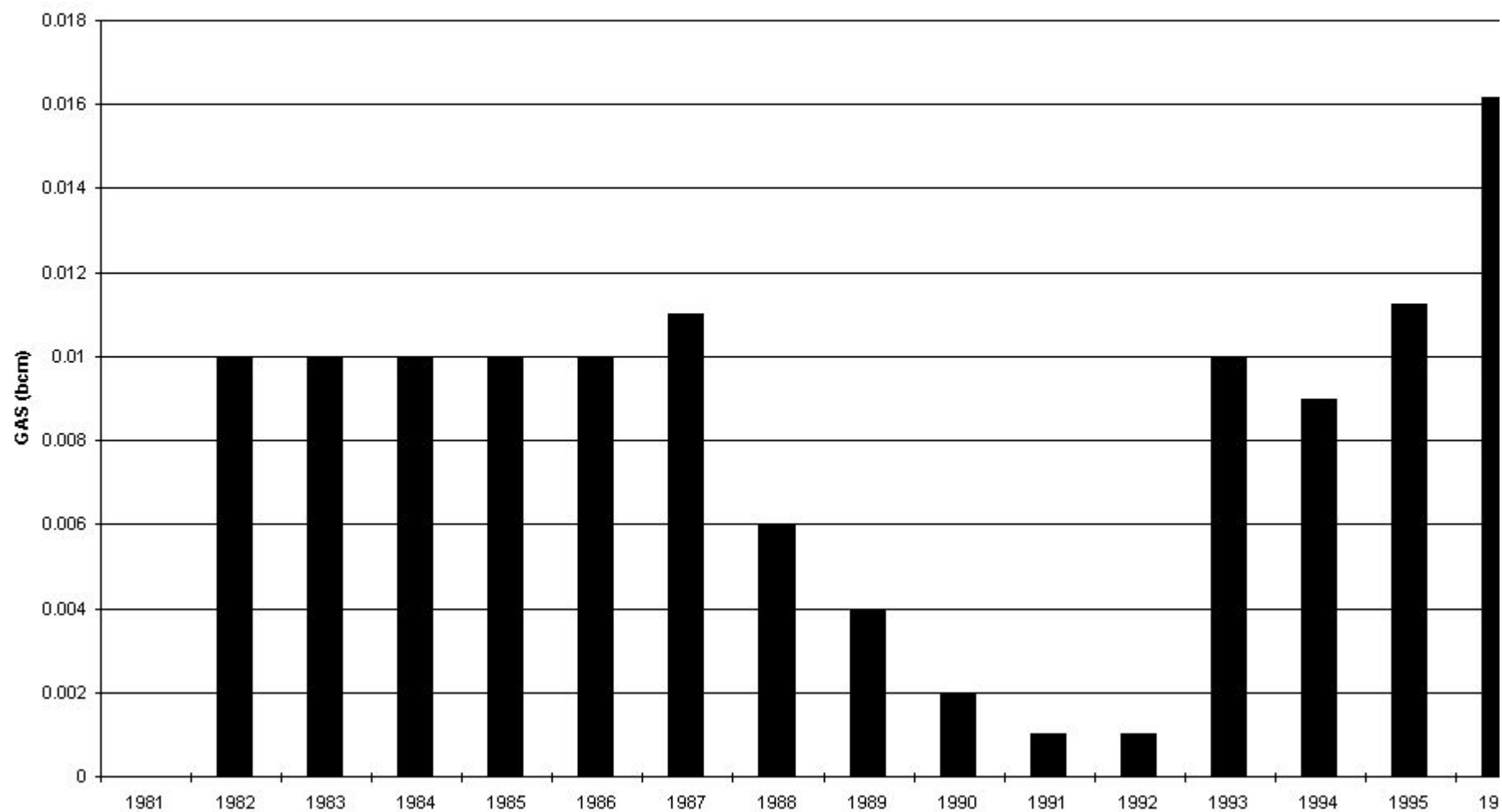
RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	147	115	32

STRATIGRAPHY (Mascotte-1) :

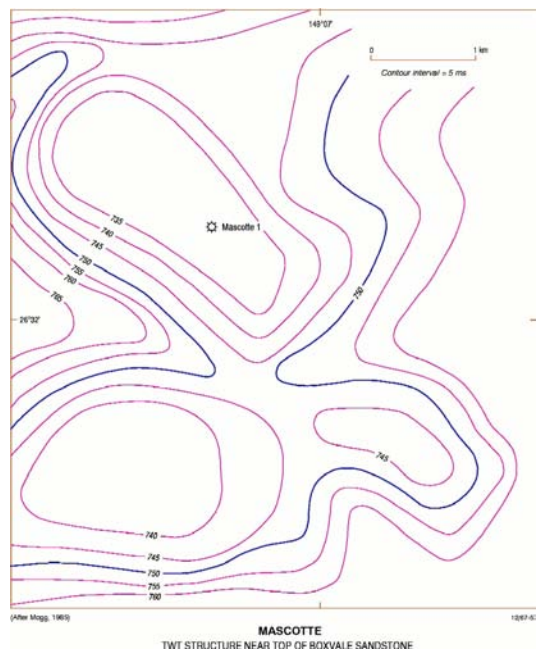
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Blythesdale Fm	00.0
JURASSIC	Gubberamunda Sandstone	323.1
	Injune Creek Beds	388.6
	Hutton Sanstone	815.3
	Evergreen Fm	1073.5
	Precipice Sandstone	1182.6
TRIASSIC	Moolayember Fm	1196.7
	Showgrounds Sandstone	1251.2
	Rewan Fm	1254.9

* Picked by Jimbilly Pty Ltd

MASCOTTE, GAS PRODUCTION (Precipice Sandstone)
Discovered 17 May 1978 Production commenced February 1982
Total Wells = 1 (1 Producer)



MASCOTTE MAP



MAYFIELD

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Past Producer
 LOCATION: 22 km north-northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 13
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Mayfield-1
 Longitude (E): 148.8592
 Latitude (S): -26.4181
 Date total depth reached: 25 JAN 85
 Ground level: 403.7 m
 Kelly bushing: 407.3 m
 Operator: Associated Australian Resources Ltd
 Total depth: 1085 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1037.0 m

TEST DATA FROM THE DISCOVERY WELL (Mayfield-1):

DST 1, 1040.0-1083.0 m, Precipice Sandstone
 Flowed gas at 360 m³/day and recovered
 20 m of gas cut mud and condensate.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	5	5	very small

COMPOSITIONAL DATA :

GAS :

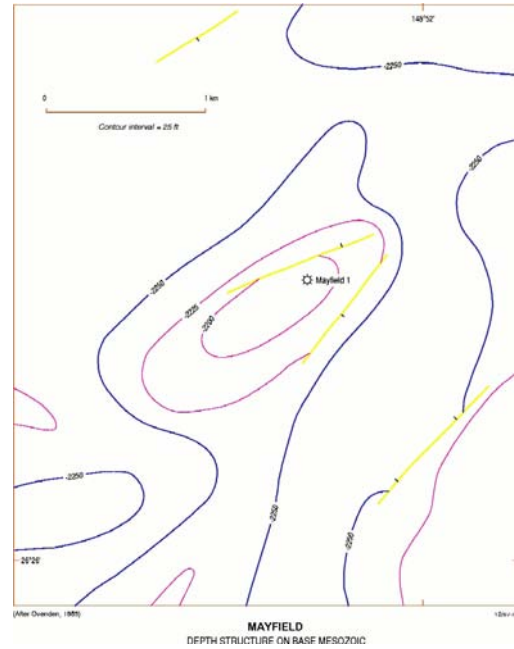
GAS PROPERTIES	GAS Precipice Ss
Methane	88.70
Ethane	2.65
Propane	0.26
Isobutane	0.37
N-butane	0.01
Isopentane	0.23 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	5.68
CO₂	2.10
H₂S	-
Specific Gravity	0.624
BTU/ft³ (gross)	975

STRATIGRAPHY (Mayfield-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo	00.0
	Gubberamunda Sandstone	249.0
	Injune Creek Beds	313.0
	Hutton Sanstone	708.0
	Evergreen Fm	933.0
	Precipice Sandstone	1037.0
CARBONIFEROUS	Granite Wash	1072.0

* Picked by Associated Australian Resources Ltd

MAYFIELD MAP



MCGREGOR

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	127 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 18
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	McGregor-1
Longitude (E):	149.0061
Latitude (S):	-27.7211
Date total depth reached:	24 NOV 86
Ground level:	278.9 m
Kelly bushing:	284.6 m
Operator:	Bridge Oil Ltd
Total depth:	2150 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1854.2 m

TEST DATA FROM THE DISCOVERY WELL (McGregor-1):

DST 2, 1850.6-1856.1 m, Recovered 103 m of water cut mud.	Showgrounds Sandstone

DST 1, 1851.7-1861.6 m, Recovered 260 m of oil and 10 bbl of oily, gas cut mud.	Showgrounds Sandstone

STRATIGRAPHY (McGregor-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	264.0
	Wallumbilla Fm	391.8
	Bungil	582.5
	Mooga Sandstone	825.4
JURASSIC	Orallo Fm	968.5
	Gubberamunda Sandstone	1068.0
	Westbourne Fm	1279.3
	Springbok Sandstone	1369.0
	Birkhead Formation	1410.4
	Hutton Sandstone	1527.2
	Evergreen Fm	1706.0
	Boxvale Sandstone Mbr	1744.0
TRIASSIC	Moolayember Fm	1775.0
	Snake Creek Mudstone Mbr	1848.2
	Showgrounds Sandstone	1854.5
CARBONIFEROUS	Volcanics	1857.4
	Basement	2104.4

* Picked by Geological Survey of Queensland

MCWHIRTER

PRESENT OPERATOR: Sunland Petroleum Corp NL
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 123 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 18
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: McWhirter-1
 Longitude (E): 148.9953
 Latitude (S): -27.6956
 Date total depth reached: 01 DEC 85
 Ground level: 266.4 m
 Kelly bushing: 272.5 m
 Operator: Sunland Petroleum Corporation NL
 Total depth: 1903.2 mKB
 NUMBER OF WELLS DRILLED: 3
 STRUCTURE/TRAP: Faulted anticline
 AREAL CLOSURE: 1.0 km² (on top Kianga Formation)
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1843.9 m

TEST DATA FROM THE DISCOVERY WELL (McWhirter-1):

DST 1, 1840.4-1850.1 m, Showgrounds Sandstone
 Flowed 50° API oil at 150 bbl/day.

DST 2, 1843.1-1846.2 m, Showgrounds Sandstone
 Flowed oil at 104 bbl/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	4*	very small	4

* includes McWhirter East

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Showgrounds Ss
Methane	36.69
Ethane	9.82
Propane	14.35
Isobutane	10.23
N-butane	8.95
Isopentane	12.93 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	6.90
CO ₂	0.13
H ₂ S	-
Specific Gravity	0.7758
BTU/ft ³ (gross)	2150

OIL :

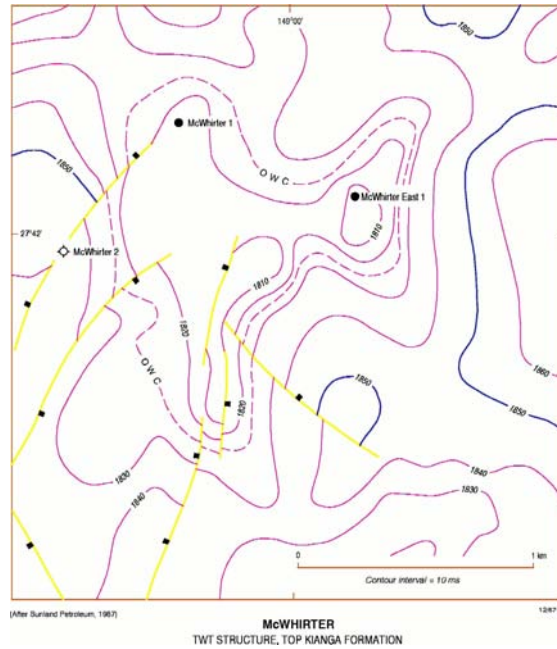
FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	50.0°
Base	-
Sulphur (% wt)(ppm)	0.02 ppm
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.7758
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (McWhirter-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	273.4
	Wallumbilla Fm	394.7
	Bungil Fm	621.2
	Mooga Sandstone	702.6
JURASSIC	Orallo Fm	952.2
	Gubberamunda Sandstone	1058.9
	Westbourne Fm	1240.5
	Springbok Sandstone	1355.4
	Walloon Coal Measures	1387.1
	Hutton Sandstone	1537.4
	Evergreen Fm	1687.1
	Precipice Sandstone	1731.6
TRIASSIC	Moolayember Fm	1743.8
	Showgrounds Sandstone	1843.8
CARBONIFEROUS	Kuttung Fm	1846.8

* Picked by Sunland Petroleum Corporation NL

McWHIRTER MAP



MENTOR

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 56 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 53
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Mentor-1
 Longitude (E): 149.1422
 Latitude (S): -27.0130
 Date total depth reached: 12 JUN 92
 Ground level: 263.0 m
 Kelly bushing: 269.0 m
 Operator: Oil Company of Australia NL
 Total depth: 1958 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 1730 m

TEST DATA FROM THE DISCOVERY WELL (Mentor-1):

DST 1, 1765.0-1784.0 m, Rewan Formation
 Flowed gas at 83 250 m³/day and
 recovered 18 m of condensate and gas cut
 mud.

DST 2, 1785-1805 m, Blackwater Group
 Recovered 6 m of drilling mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Rewan Fm	28	very small	28

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Rewan Fm	2	very small	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Rewan Fm	4	very small	4

STRATIGRAPHY (Mentor-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil	321.0
	Mooga Sandstone	435.0
JURASSIC	Orallo Fm	573.2
	Gubberamunda Sandstone	735.2
	Westbourne Fm	872.0
	Springbok Sandstone	974.3
	Walloon Coal Measures	1061.0
	Hutton Sandstone	1305.4
	Evergreen Fm	1507.1
	Precipice Sandstone	1589.0
TRIASSIC	Moolayember Fm	1597.0
	Snake Creek Mudstone Mbr	1713.0
	Showgrounds Sandstone	1727.6
	Rewan Formation	1730.0
PERMIAN	Blackwater Group	1774.4
DEVONIAN	Timbury Hills Formation	1910.0

* Picked by Geological Survey of Queensland

MERIVALE

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	128 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 44
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Merivale-1
Longitude (E):	148.3261
Latitude (S):	-25.5372
Date total depth reached:	02 JAN 82
Ground level:	545.3 m
Kelly bushing:	550.8 m
Operator:	Associated Australian Resources Ltd
Total depth:	1650 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Faulted anticline
AREAL CLOSURE:	44 km ² (top Aldebaran Sandstone)
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	1263.7 m

PETROLEUM BEARING UNIT No.2:	Reids Dome Beds
CONTENTS:	Gas
FORMATION:	Reids Dome Beds
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1468.3 m

TEST DATA FROM THE DISCOVERY WELL (Merivale-1):

DST 1, 1260.0-1330.0 m, Flowed gas at 2800 m ³ /day and recovered 56 m of gas cut mud.	Aldebaran Sandstone
DST 6, 1322.0-1340 m, Recovered 90 m of slightly gas cut mud.	Aldebaran Sandstone
DST 5, 1350-1368 m, Gas to surface at a rate too small to measure.	Aldebaran Sandstone
DST 2, 1397.6-1417.0 m, Flowed gas at 84 950 m ³ /day and recovered 0.5 bbl of oily, gas cut mud.	Aldebaran Sandstone

DST 4, 1472.0-1482.5 m,
Flowed gas at 6800 m³/day and recovered
18 m of oily, gas cut mud.

Reids Dome Beds

DST 3, 1484-1494.5 m,
Gas to surface at a rate too small to
measure.

Reids Dome Beds

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	566	448	118
Reids Dome Beds	93	61	32

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss
Methane	83.20
Ethane	6.50
Propane	2.60
Isobutane	0.53
N-butane	0.72
Isopentane	1.55 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	0.88
CO ₂	4.04
H ₂ S	-
Specific Gravity	0.706
BTU/ft ³ (gross)	1145

STRATIGRAPHY (Merivale-1) :

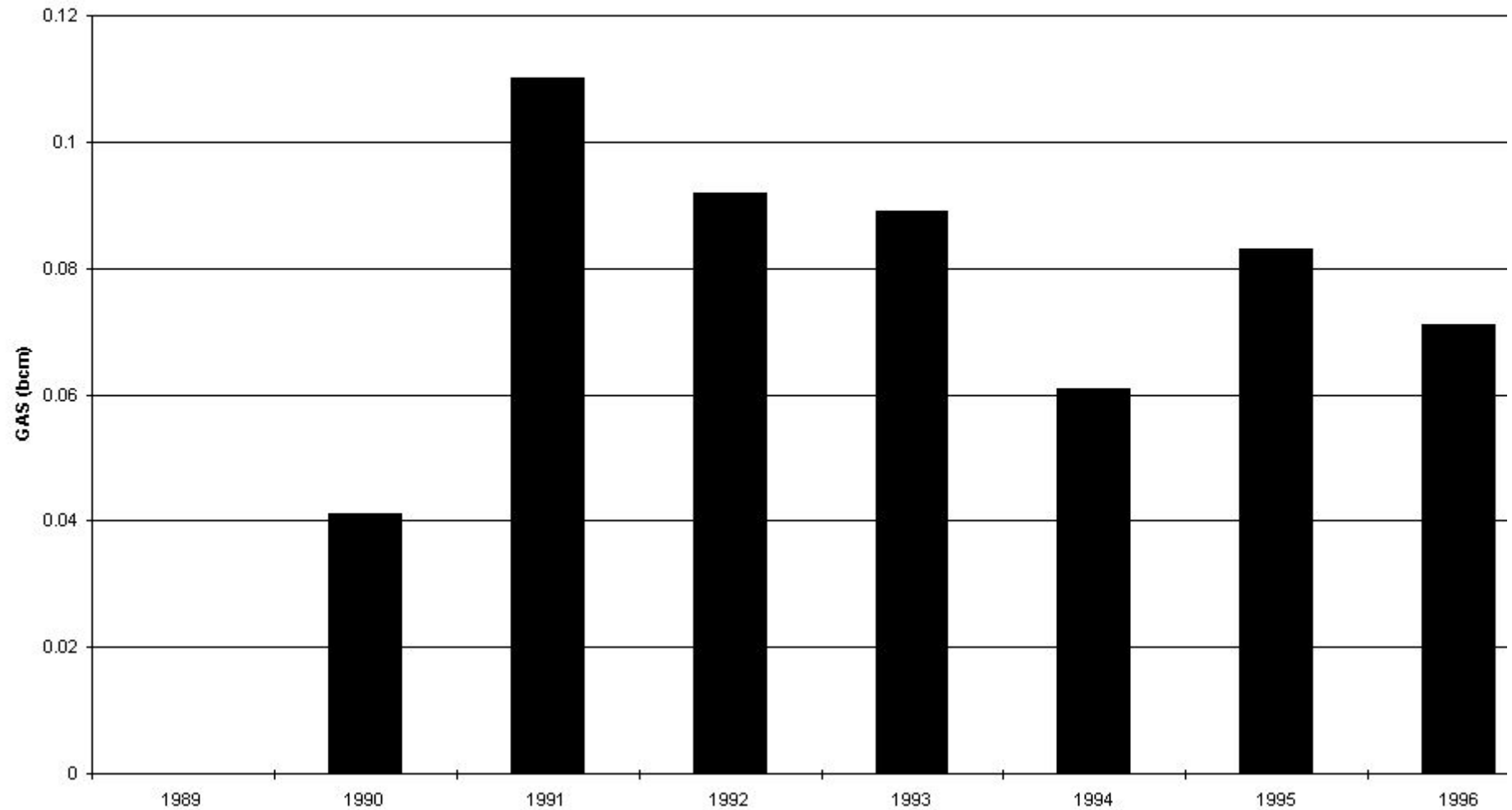
AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Injune Creek Beds	00.0
	Hutton Sandstone	8.00
	Evergreen Fm	225.4
	Precipice Sandstone	363.4
TRIASSIC	Moolayember Fm	450.3
	Clematis Sandstone	483.3
	Rewan Fm	597.2
PERMIAN	Bandanna Fm	885.6
	Black Alley Shale	993.5
	Mantuan Fm	1069.2
	Peawaddy Fm	1125.4
	Ingelara Fm	1163.2
	Aldebaran Sandstone	1263.7
	Cattle Creek Fm	1408.7
	Reids Dome Beds	1468.3

* Picked by Associated Australian Resources Ltd

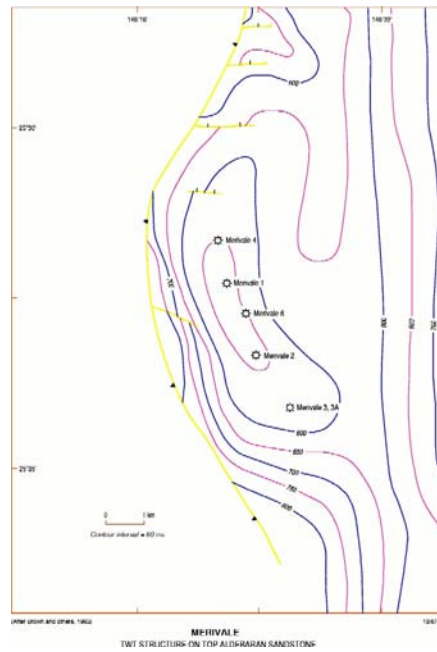
MERIVALE, GAS PRODUCTION (Aldebaran Sandstone & Reids Dome beds)

Discovered 2 January 1982 Production commenced July 1990

Total Wells = 7 (5 Producers; 1 Shut In; 1 Plugged and Abandoned)



MERIVALE MAP



MERRIT

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 20 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 9
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Merrit-1
 Longitude (E): 148.9005
 Latitude (S): -26.7715
 Date total depth reached: 13 JAN 85
 Ground level: 270.4 m
 Kelly bushing: 274.4 m
 Operator: Associated Australian Resources Ltd
 Total depth: 1378 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Oil and Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1279.0 m

TEST DATA FROM THE DISCOVERY WELL (Merrit-1):

DST 1, 1278.0-1300.0 m, Precipice Sandstone
 Flowed gas at 130 260 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	21	21	very small

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	15	12	3

COMPOSITIONAL DATA :

GAS :

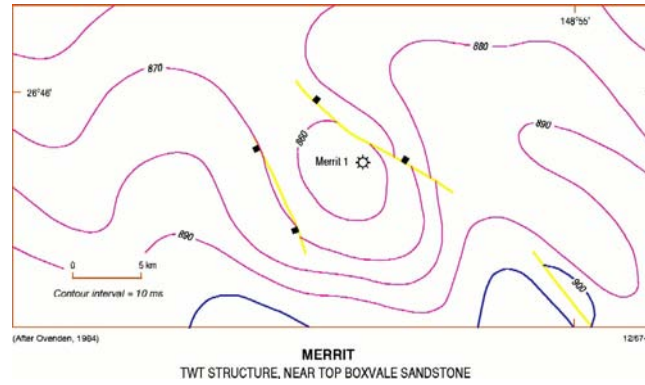
GAS PROPERTIES	GAS Precipice Ss
Methane	85.89
Ethane	3.93
Propane	3.65
Isobutane	1.42
N-butane	0.94
Isopentane	1.33 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	1.95
CO₂	0.90
H₂S	-
Specific Gravity	0.691
BTU/ft³ (gross)	1170

STRATIGRAPHY (Merrit-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	149.0
	Mooga Sandstone	282.0
JURASSIC	Orallo Fm	393.0
	Gubberamunda Sandstone	531.0
	Injune Creek Group	593.0
	Hutton Sanstone	987.0
	Evergreen Fm	1169.0
	Precipice Sandstone	1279.0
TRIASSIC	Moolayember Fm	1291.0
	Snake Creek Mudstone Mbr	1337.0
	Showgrounds Sandstone	1342.0
DEVONIAN	Timbury Hills Fm	1348.0

* Picked by Associated Australian Resources Ltd

MERRIT MAP



MERROOMBIL

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 107 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 15
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Merroombil-1
 Longitude (E): 149.1842
 Latitude (S): -27.4942
 Date total depth reached: 10 JUN 87
 Ground level: 313.1 m
 Kelly bushing: 318.8 m
 Operator: Bridge Oil Ltd
 Total depth: 2203 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Anticline
 AREAL: 1.5 km² (on top Permian)
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 2029.0 m

TEST DATA FROM THE DISCOVERY WELL (Merroombil-1):

DST 1, 2023.0-2035.0 m, Showgrounds Sandstone
 Flowed gas at 26 000 m³/day and recovered
 8 liters of condensate.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	10	very small	10

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	1	very small	1

LPG :

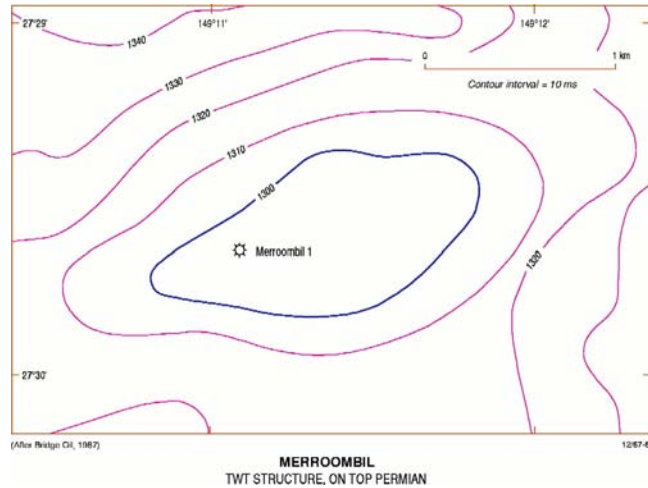
RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	3	very small	3

STRATIGRAPHY (Merroombil-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	253.0
	Wallumbilla Fm	383.7
	Bungil Fm	587.7
	Mooga Sandstone	736.0
JURASSIC	Orallo Fm	942.2
	Gubberamunda Sandstone	1050.5
	Westbourne Formation	1256.0
	Springbok Sandstone	1353.0
	Walloon Coal Measures	1424.0
	Hutton Sandstone	1633.2
	Evergreen Fm	1775.5
	Boxvale Sandstone Mbr	1843.0
TRIASSIC	Moolayember Fm	1875.0
	Snake Creek Mudstone Mbr	2011.0
	Showgrounds Sandstone	2029.2
PERMIAN	Blackwater Group	2030.9
DEVONIAN	Timbury Hills Fm	2080.4

* Picked by Geological Survey of Queensland.

MERROOMBIL MAP



MINDAGABIE

PRESENT OPERATOR: Jakabar Pty Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 24 km south-southwest of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 586-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Goondiwindi Slope
 DISCOVERY WELL: Mindagabie-1
 Longitude (E): 150.2589
 Latitude (S): -27.9089
 Date total depth reached: 07 AUG 87
 Ground level: 258.1 m
 Kelly bushing: 263.0 m
 Operator: Sydney Oil Company Pty Ltd
 Total depth: 1898 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 0.3 km² (on top Precipice Sandstone)
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Evergreen Formation
 CONTENTS: Oil
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine
 FORMATION TOP (mKB): 1481.0 m

TEST DATA FROM THE DISCOVERY WELL (Mindagabie-1):

DST 1, 1606.8-1611.5 m, Evergreen Formation
 Flowed 41° API oil at 38 bbl/day.

DST 2, 1643.3-1649.9 m, Precipice Sandstone
 Test abandoned.

RESERVES (as at 30/6/96) :

OIL :

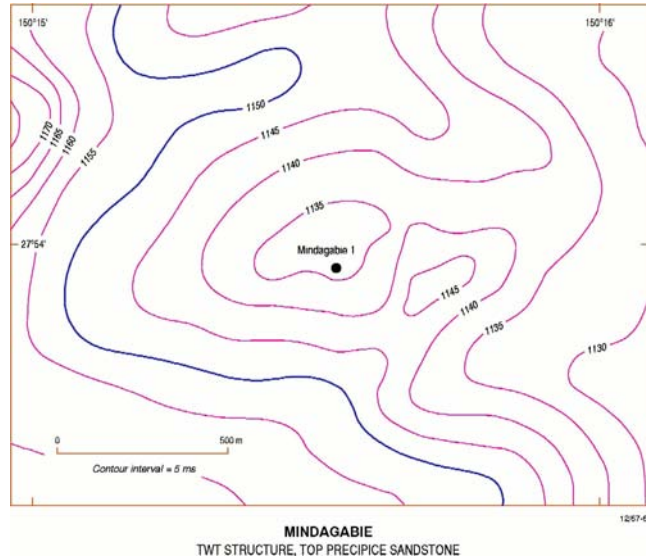
RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	very small	very small	very small

STRATIGRAPHY (Mindagabie-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	274.5
	Mooga Sandstone	482.0
JURASSIC	Orallo Fm	565.0
	Gubberamunda Sandstone	669.0
	Westbourne Formation	822.5
	Springbok Sandstone	952.5
	Walloon Coal Measures	986.0
	Hutton Sanstone	1305.0
	Evergreen Fm	1402.0
CARBONIFEROUS	Precipice Sandstone	1641.5
	Basement	1647.0

* Picked by Geological Survey of Queensland.

MINDAGABIE MAP



MOOGA

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 23 km north-northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 13
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Mooga-1
 Longitude (E): 148.8381
 Latitude (S): -26.4167
 Date total depth reached: 26 JUL 69
 Ground level: 362.4 m
 Kelly bushing: 365.8 m
 Operator: CSR Ltd
 NUMBER OF WELLS DRILLED: 4
 STRUCTURE/TRAP: Stratigraphic. Reservoir sand restricted to the flanks of a north trending basement ridge.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1011.9 m

 TEST DATA FROM THE DISCOVERY WELL (Mooga-1):

 DST 1, 1009.2-1024.4 m, Precipice Sandstone
 Flowed gas at 127 400 m³/day. Recovered
 24.4 m of water.

 DST 2, 1030.2-1048.5 m, Precipice Sandstone
 Recovered 548.6 m of water.

 DST 3, 1054.6-1088.1 m, Blackwater Group
 Recovered 109 m of gas cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	50	48	2

COMPOSITIONAL DATA :

GAS :

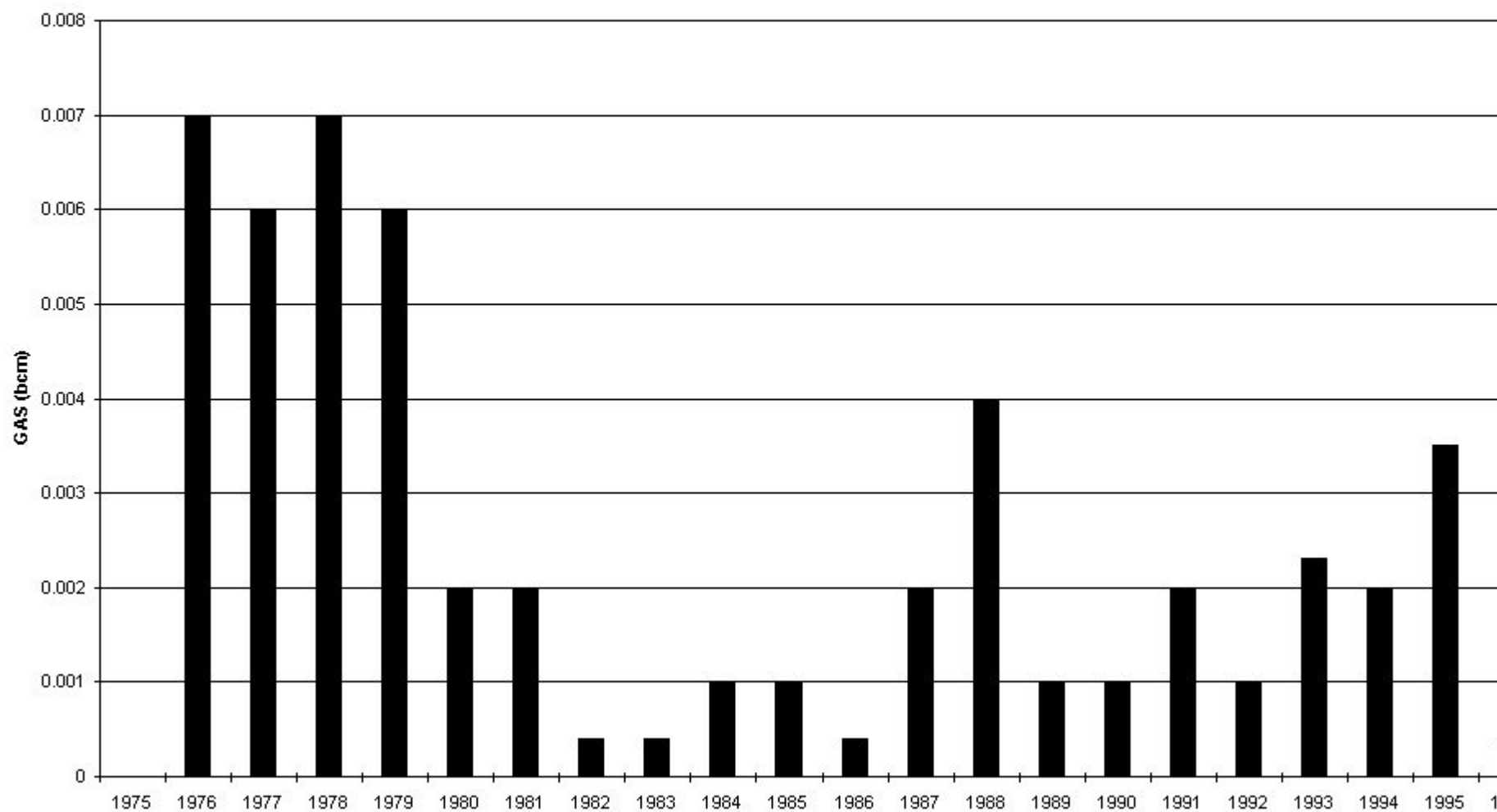
GAS PROPERTIES	GAS Precipice Ss
Methane	94.10
Ethane	0.74
Propane	-
Isobutane	0.30
N-butane	-
Isopentane	0.19 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	3.10
CO₂	1.59
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	984

STRATIGRAPHY (Mooga-1) :

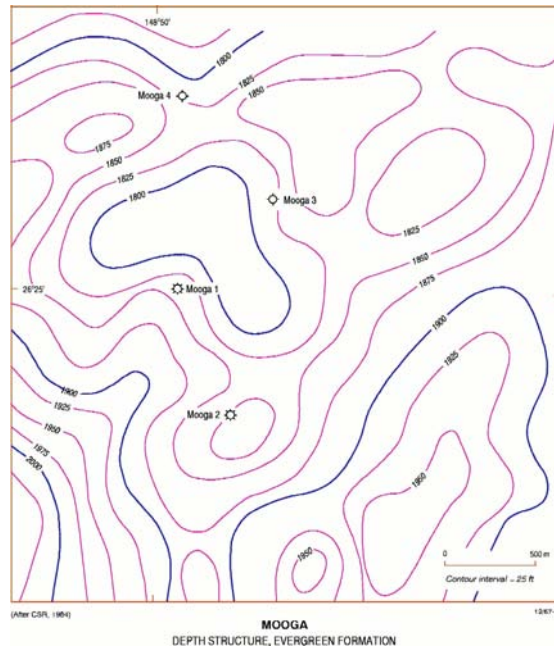
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Mooga Sandstone	00.0
JURASSIC	Orallo Fm	60.0
	Gubberamunda Sandstone	214.6
	Westbourne Fm	289.3
	Springbok Sandstone	360.3
	Walloon Coal Measures	465.7
	Eurombah Fm	643.1
	Hutton Sandstone	689.5
	Evergreen Fm	911.1
PERMIAN	Precipice Sandstone	1011.9
	Blackwater Group	1045.8

* Picked by Geological Survey of Queensland

MOOGA, GAS PRODUCTION (Precipice Sandstone)
Discovered 26 July 1969 Production commenced January 1976
Total Wells = 4 (1 Producer; 2 Plugged and Abandoned; 1 Suspended)



MOOGA MAP



MOONIE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Producer
LOCATION:	11 km west-southwest of Moonie.
STATE:	Queensland
PETROLEUM TITLES:	PL 1
BASIN:	Surat
SUB-BASIN:	Chinchilla-Goondiwindi Slope
DISCOVERY WELL:	Moonie-1
Longitude (E):	150.2570
Latitude (S):	-27.7483
Date total depth reached:	06 DEC 61
Ground level:	267.9 m
Kelly bushing:	272.2 m
Operator:	Union Oil Development Corporation
Total depth:	1861.1 mKB
NUMBER OF WELLS DRILLED:	38
STRUCTURE/TRAP:	Anticline.
AREAL CLOSURE:	28.0 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone (multiple reservoirs)
CONTENTS:	Oil
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : light gray, medium to very coarse grained, quartzose, streak sorted, cross-bedded with occasional carbonaceous laminations and thin shale interbeds.
DEPOSITIONAL ENVIRONMENT:	Fluvial
POROSITY:	18% (average)
PERMEABILITY:	290 md (average)
TEST DATA FROM THE DISCOVERY WELL (Moonie-1):	
DST, 1704.4-1709 m, Recovered 79 m of oil and 3 m of mud.	Precipice Sandstone
DST, 1711.0-1711.5 m, Recovered 5 m of mud.	Precipice Sandstone
DST, 1721.8-1722.1 m, Recovered 1780 m of water.	Precipice Sandstone
DST, 1721.8-1722.1 m, Recovered 541 m of water.	Precipice Sandstone
DST, 1722.1 m, Recovered 143 m of oil, 41 m of gas cut mud, 140 m of gas and oil cut mud and 107 m of oil cut water.	Precipice Sandstone
DST, 1723.9-1725.5 m, Recovered 1570 m of mud cut oil and 107 m of oil cut water.	Precipice Sandstone

DST, 1728.2-1728.5 m, Recovered 30 m of water cut mud, 65 m of mud and 67 m of muddy water.	Precipice Sandstone
DST, 1770.3-1780.0 m, Misrun.	Precipice Sandstone
DST, 1770.3-1780.0 m, Flowed oil at 71 bbl/day and gas at 200 m ³ /day.	Precipice Sandstone
DST, 1772.7-1805.9 m, Flowed oil at 250 bbl/day and water at 250 bbl/day.	Precipice Sandstone
DST, 1779.7-1780.0 m, Flowed oil at 85 bbl/day and gas at 1670 m ³ /day.	Precipice Sandstone
DST, 1780.0 m, Flowed oil at 1440 bbl/day and gas at 2830 m ³ /day.	Precipice Sandstone
Production Test, 1767.2-1780.0 m, Flowed 45° API oil at 666 bbl/day and gas at 3510 m ³ /day.	Precipice Sandstone
PRODUCTION & INFRASTRUCTURE : Discovered in 1961, Moonie was brought into production in 1964 after the construction of the Moonie-Brisbane oil pipeline. Oil production peaked in 1966 at a rate of 9000 bbls/day. Between 1982 and 1984 , 10 wells were put on reader pumps to improve flow rates. Of the 38 wells drilled on the Moonie structure to 1991, 32 were economic oil producers.	

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	3859	3686	173

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Precipice Ss
Methane	95.50
Ethane	0.53
Propane	0.17
Isobutane	0.28
N-butane	0.15
Isopentane	0.55
N-pentane	0.22
Hexanes +	1.66
N₂ + O₂	0.95
CO₂	-
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

OIL :

FLUID PROPERTIES	OIL Precipice Ss (56-4 Sand)	OIL Precipice Ss (58-0 Sand)
API Gravity @ 60°F	50.0°	44.4°
Base	Napthenic to Paraffinic	Napthenic to Paraffinic
Sulphur (% wt)(ppm)	0.002%	0.002%
Initial GOR (ft³/bbl)	110 to 315	110 to 315
Pour Point	3.9°C	3.9°C
Specific Gravity	0.7796	0.8036
Colour	Black	Black
Viscosity (cp@100°F)	-	-
Bubble Point (psig)	720 to 1680	720 to 1680

STRATIGRAPHY (Moonie-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo Fm	00.0
	Gubberamunda Sandstone	737.6
	Westbourne Fm	878.1
	Springbok Sandstone	1041.8
	Walloon Coal Measures	1078.4
	Hutton Sanstone	1400.5
	Evergreen Fm	1569.7
	Precipice Sandstone	1716.0
CARBONIFEROUS	Basement Volcanics	1808.4

* Picked by Associated Australian Resources Ltd

POROSITY AND PERMEABILITY DATA:

(Moonie-1)

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1463.4	15.0	0.0	0.0	Hutton Sandstone
1803.9	3.5	0.0	0.0	Precipice Sandstone

Moonie-35 :

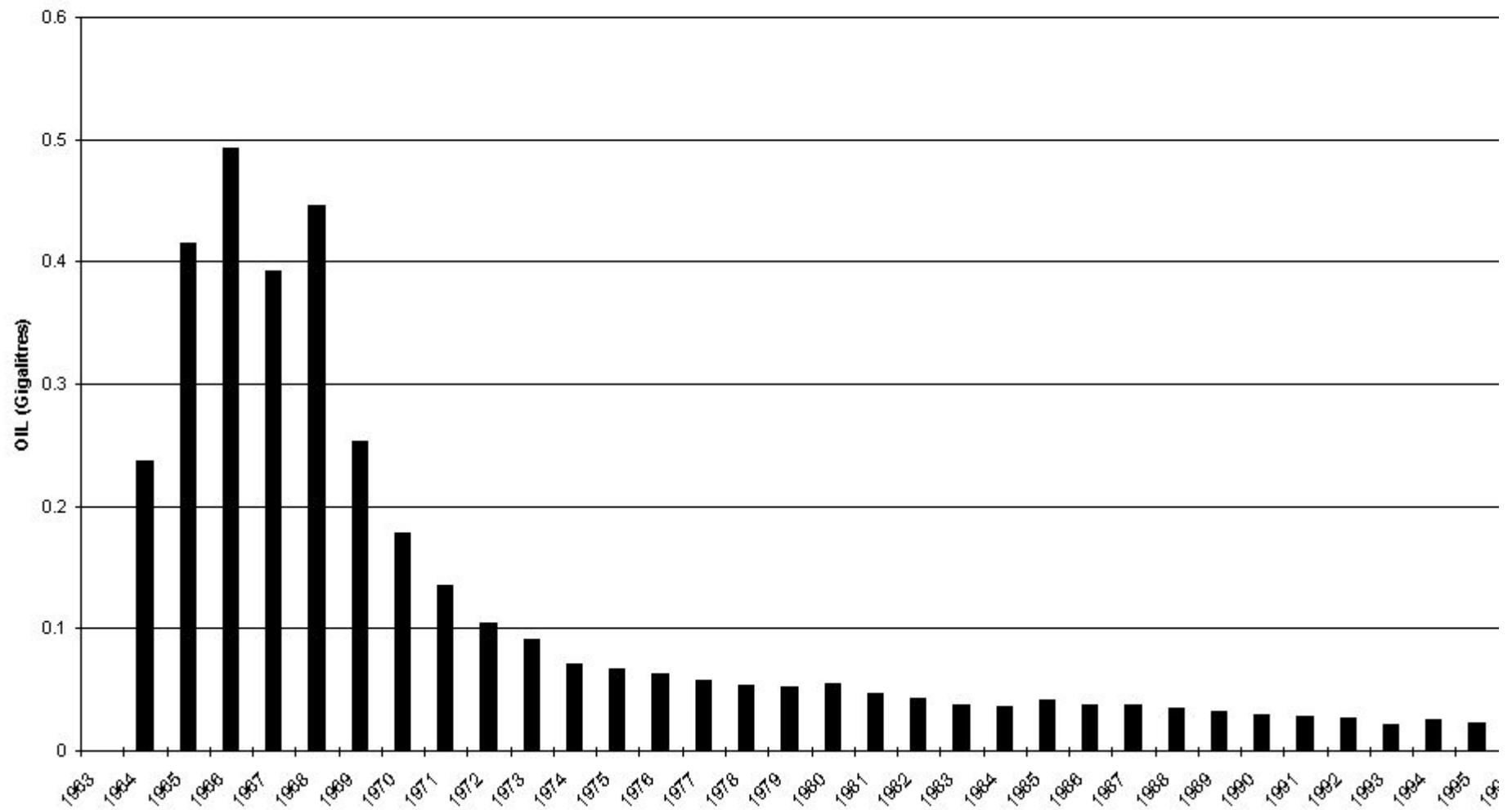
DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1766.0	14.0	0.7	0.1	Precipice Sandstone
1766.3	11.0	0.1	0.1	Precipice Sandstone
1766.6	19.1	6.8	28.1	Precipice Sandstone
1766.9	12.3	0.3	0.2	Precipice Sandstone
1767.2	9.7	0.1	0.1	Precipice Sandstone
1767.5	12.2	0.4	0.2	Precipice Sandstone
1767.8	8.9	0.1	0.1	Precipice Sandstone
1768.1	11.3	0.2	0.1	Precipice Sandstone
1768.4	17.8	2.8	0.1	Precipice Sandstone
1768.8	11.5	0.1	0.1	Precipice Sandstone
1769.1	11.6	1.2	0.1	Precipice Sandstone
1769.4	9.8	0.1	0.1	Precipice Sandstone
1769.7	16.9	14.4	10.5	Precipice Sandstone
1770.0	17.0	12.6	12.6	Precipice Sandstone
1770.3	16.5	16.3	5.0	Precipice Sandstone
1770.6	19.3	171.2	91.1	Precipice Sandstone
1770.9	20.9	181.5	142.1	Precipice Sandstone
1771.2	17.2	109.3	1.3	Precipice Sandstone
1771.5	17.1	10.7	-	Precipice Sandstone
1771.8	18.9	91.9	39.6	Precipice Sandstone
1772.1	11.4	13.8	2.8	Precipice Sandstone
1772.4	18.4	53.3	38.5	Precipice Sandstone
1772.7	17.8	53.7	11.5	Precipice Sandstone
1773.0	18.7	182.4	56.9	Precipice Sandstone
1773.3	13.6	6.3	-	Precipice Sandstone

POROSITY AND PERMEABILITY DATA CONTD :

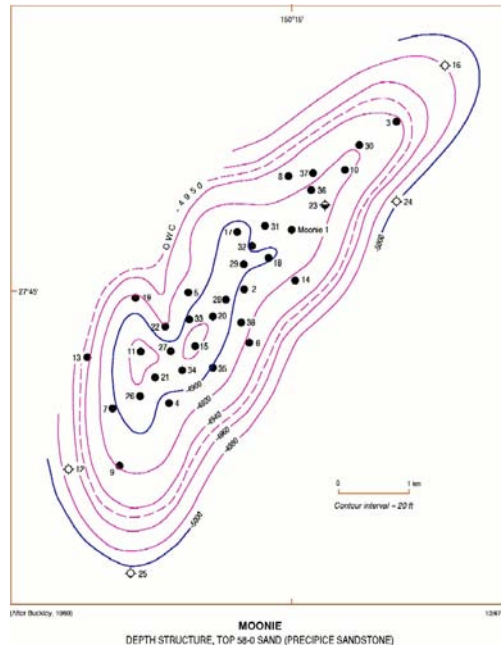
Moonie-36 :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1771.5	11.1	0.8	0.5	Precipice Sandstone
1771.8	10.4	0.3	0.3	Precipice Sandstone
1772.1	13.9	2.1	1.5	Precipice Sandstone
1772.4	16.8	69.0	10.0	Precipice Sandstone
1773.0	14.5	8.3	5.0	Precipice Sandstone
1773.3	13.9	3.5	1.1	Precipice Sandstone
1773.6	13.7	6.5	0.8	Precipice Sandstone
1773.9	16.4	51.0	36.0	Precipice Sandstone
1774.5	12.9	2.1	0.7	Precipice Sandstone
1774.9	12.5	1.4	4.8	Precipice Sandstone

MOONIE, OIL PRODUCTION (Precipice Sandstone)
 Discovered 6 December 1961 Production commenced February 1964
Total Wells = 38 (19 Producers; 5 Shut In; 6 Plugged and Abandoned; 8 Water Injectors)



MOONIE MAP



MOOROOLOO

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	290 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 54
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Moorooloo-1
Longitude (E):	148.4083
Latitude (S):	-24.0108
Date total depth reached:	23 JUN 84
Ground level:	202.2 m
Kelly bushing:	206.5 m
Operator:	CSR Ltd
Total depth:	1146 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	20.0 km ² (top of Mantuan Formation)
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Catherine Sandstone
CONTENTS:	Gas
FORMATION:	Catherine Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	689.8 m

TEST DATA FROM THE DISCOVERY WELL (Moorooloo-1):

DST 1, 689.0-701.0 m,	Catherine Sandstone
Flowed gas at 19 070 m ³ /day and recovered	
3 m of mud.	

DST 2, 945.0-965.0 m,	Freitag Formation
Recovered 9 m of mud.	

DST 4, 1043.5-1084.0 m,	Freitag Fm/Aldebaran Sandstone
Recovered 20 m of mud and 57 m of	
water cut mud.	

PRODUCTION & INFRASTRUCTURE :

See Arcturus.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Catherine Ss	40	26	14

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Catherine Ss
Methane	94.50
Ethane	< 0.01
Propane	-
Isobutane	-
N-butane	-
Isopentane	0.04 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	5.33
CO ₂	0.50
H ₂ S	-
Specific Gravity	0.579
BTU/ft ³ (gross)	964

STRATIGRAPHY (Moorooloo-1) :

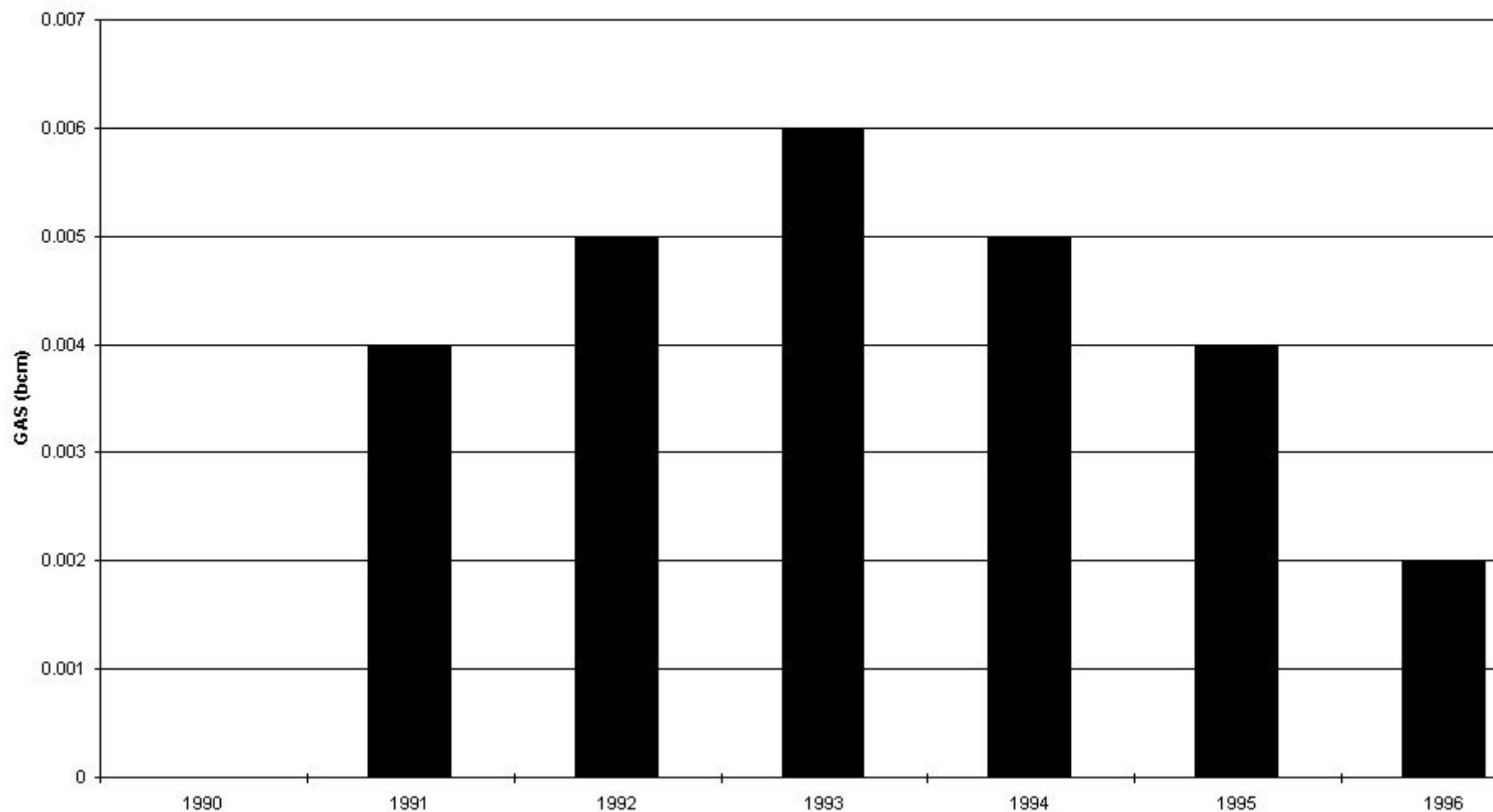
AGE	UNIT	FORMATION TOP * (mKB)
TERTIARY	Alluvium	00.0
PERMIAN	Bandanna Fm	197.0
	Black Alley Shale	426.8
	Mantuan Fm	508.0
	Peawaddy Fm	644.2
	Catherine Sandstone	689.8
	Ingelara Fm	802.0
	Freitag Fm	944.5
	Aldebaran Sandstone	1044.0

* Picked by CSR Ltd

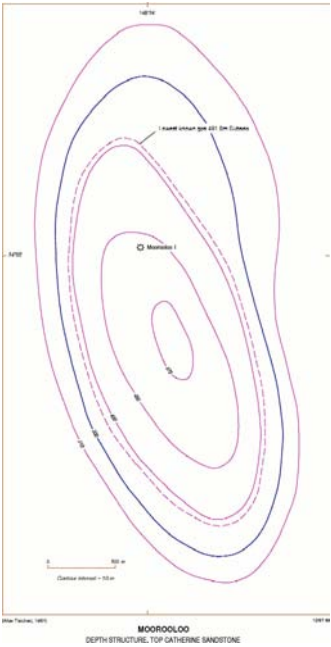
MOOROOLOO, GAS PRODUCTION (Catherine Sandstone)

Discovered 23 June 1984 Production commenced May 1991

Total wells = 1 (1 Producer)



MOOROLOO MAP



MOUNT BASSETT

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 14 km northeast of Roma
 STATE: Queensland
 PETROLEUM TITLES: PL 3
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Mount Bassett (RBO 3)
 Longitude (E): 148.8459
 Latitude (S): -26.4917
 Date total depth reached: 02 MAR 40
 Ground level: 354.5 m
 Operator: Roma Blocks Oil Company NL
 Total depth: 1106.1 mKB
 NUMBER OF WELLS DRILLED: 6
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Moolayember Formation
 CONTENTS: Gas
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 972.9 m

TEST DATA FROM THE DISCOVERY WELL (Mount Bassett (RBO 3)):

DST 1, 1093.0-1106.1 m, Moolayember Formation
 Flowed gas at 1700 m³/day.

STRATIGRAPHY (Mount Bassett(RBO-3)) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Formation	00.0
	Blythesdale Group	91.4
JURASSIC	Walloon Coal Measures	146.3
	Bundamba Group	707.7
TRIASSIC	Moolayember Shale	972.9
CARBONIFEROUS	Basement	1100.6

* Picked by Roma Blocks Oil Company NL.

MYALL CREEK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	67 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	375-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Myall Creek-1
Longitude (E):	149.2031
Latitude (S):	-27.0797
Date total depth reached:	20 JAN 64
Ground level:	245.1 m
Kelly bushing:	249.3 m
Operator:	Union Oil Development Corporation
Total depth:	2182.1 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Stratigraphic. Reservoir sands draped over an anticlinal nose.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1858.7 m
TEST DATA FROM THE DISCOVERY WELL (Myall Creek-1):	
DST 1, 1895.2-1902.0 m, Flowed gas at 570 m ³ /day.	Rewan Formation
DST 2, 2123.8-2130.2 m, Recovered 91.4 m of watery mud and 48.8 m of muddy water with an oil scum.	Back Creek Group

COMPOSITIONAL DATA :

GAS :

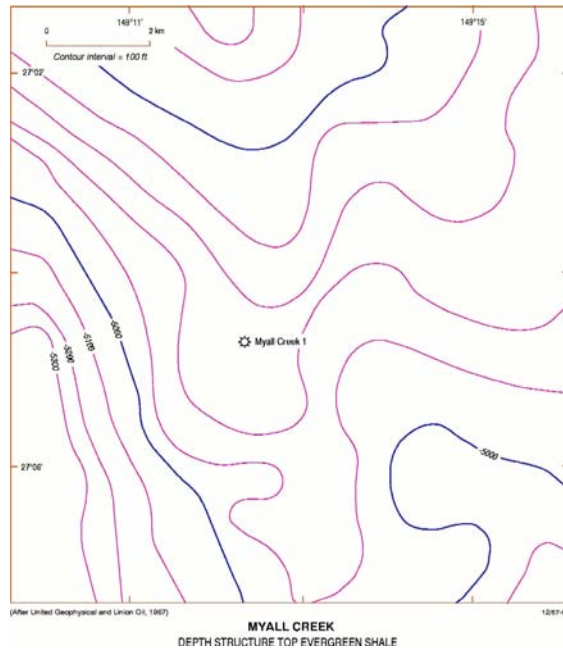
GAS PROPERTIES	GAS Rewan Fm
Methane	81.00
Ethane	5.10
Propane	3.50
Isobutane	1.10
N-butane	1.28
Isopentane	0.41
N-pentane	0.50
Hexanes +	0.98
N ₂ + O ₂	2.00
CO ₂	0.09
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Myall Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	326.1
	Mooga Sandstone	472.4
JURASSIC	Orallo Fm	620.9
	Gubberamunda Sandstone	786.4
	Westbourne Fm	896.1
	Springbok Sandstone	1012.9
	Walloon Coal Measures	1063.8
	Eurombah Fm	1318.0
	Hutton Sandstone	1347.2
	Evergreen Fm	1545.0
	Precipice Sandstone	1649.0
	Moolayember Fm	1656.6
TRIASSIC	Snake Creek Mudstone Mbr	1828.8
	Showgrounds Sandstone	1845.3
	Rewan Fm	1858.7
	Blackwater Group	1946.2
PERMIAN	Back Creek Group	2017.2
	Timbury Hills Fm	2162.3

* Picked by Geological Survey of Queensland

MYALL CREEK MAP



MYRTLEVILLE

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 148 km north-northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 43
 BASIN: Bowen
 SUB-BASIN: Denison Trough
 DISCOVERY WELL: Myrtleville-1
 Longitude (E): 148.3042
 Latitude (S): -25.3553
 Date total depth reached: 26 FEB 84
 Ground level: 532.6 m
 Kelly bushing: 537.2 m
 Operator: CSR Ltd
 Total depth: 1532 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Faulted anticline
 AREAL CLOSURE: 5.0 km²
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Aldebaran Sandstone
 CONTENTS: Gas
 FORMATION: Aldebaran Sandstone
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvio-deltaic
 FORMATION TOP (mKB): 590.0 m

TEST DATA FROM THE DISCOVERY WELL (Myrtleville-1):

DST 1, 608.0-619.0 m, Aldebaran Sandstone
 Flowed gas at 16 300 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	172	103	69

COMPOSITIONAL DATA :

GAS :

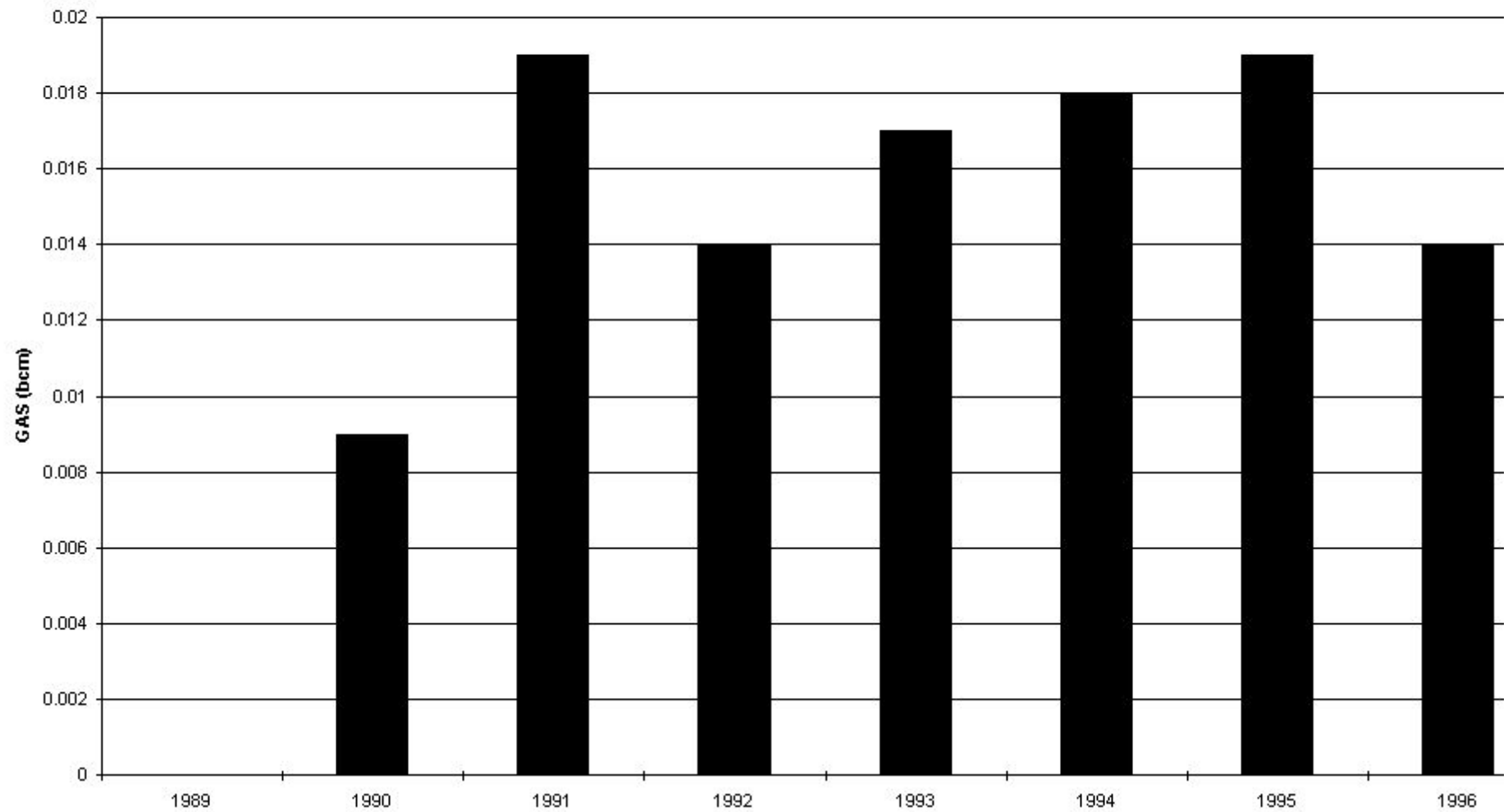
GAS PROPERTIES	GAS Aldebaran Ss
Methane	79.63
Ethane	8.20
Propane	3.26
Isobutane	0.59
N-butane	0.73
Isopentane	0.40 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	5.02
CO₂	2.15
H₂S	-
Specific Gravity	0.696
BTU/ft³ (gross)	1101

STRATIGRAPHY (Myrtleville-1) :

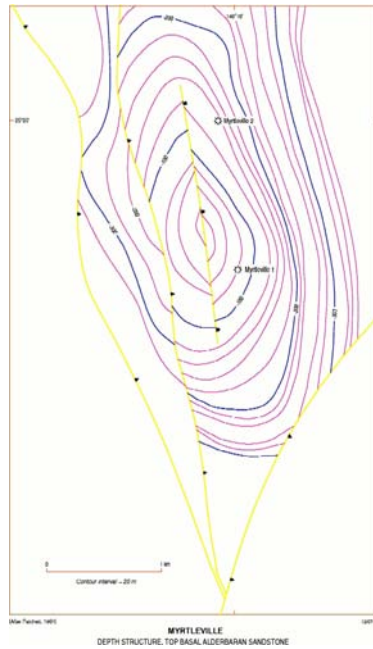
AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Evergreen Fm	00.0
	Precipice Sandstone	83.0
TRIASSIC	Rewan Fm	136.0
PERMIAN	Bandanna Fm	323.0
	Black Alley Shale	397.0
	Mantuan/Peawaddy Fm	537.0
	Ingelara Fm	552.0
	Aldebaran Sandstone	590.0
	Cattle Creek Fm	619.0
	Reids Dome Beds	636.0

* Picked by CSR Ltd

MYRTLEVILLE, GAS PRODUCTION (Aldebaran Sandstone)
Discovered 26 February 1984 Production commenced July 1990
Total Wells = 1 (1 Producer)



MYRTLEVILLE MAP



NAMARAH

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	102 km southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	470-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Namarah-1
Longitude (E):	149.3225
Latitude (S):	-27.3808
Date total depth reached:	08 OCT 81
Ground level:	379.5 m
Kelly bushing:	383.4 m
Operator:	Hematite Petroleum
Total depth:	2382.9 mKB
NUMBER OF WELLS DRILLED:	4
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	2183.9 m

PETROLEUM BEARING UNIT No.2:	Timbury Hills Formation
CONTENTS:	Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Indurated sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental
FORMATION TOP (mKB):	2322.6 m

TEST DATA FROM THE DISCOVERY WELL (Namarah-1):

DST 1, 426.2-452.2 m, No gas to surface.	Wallumbilla Formation

DST 2, 2191.0-2211.0 m, Flowed gas at 1020 m ³ /day.	Rewan Formation

DST 3, 2215.6-2231.1 m, Flowed gas at 11 050 m ³ /day.	Rewan Formation

DST 5, 2336.3-2373.8 m, Flowed gas at 135 600 m ³ /day and condensate at 20 bbl/day.	Timbury Hills Formation

PRODUCTION & INFRASTRUCTURE :

Discovered in 1981, production testing of the Namarah-2 and Namarah-3 wells was carried out in 1992. After the drilling of a further successful appraisal well in 1993 (Namarah-4), the joint development of the Namarah, Parknook and Warroon gas fields was completed in May 1994. Production commenced at 170-250 MCM/day. Condensate is stripped from the gas stream at Yarrabend before being sent to Brisbane via Kincora and Wallumbilla.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Timbury Hills Fm	very small	very small	very small
Rewan Fm	180	59	121

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Timbury Hills Fm	very small	very small	very small
Rewan Fm	12	5	7

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Timbury Hills Fm	very small	very small	very small
Rewan Fm	24	8	16

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Rewan Fm	GAS Timbury Hills Fm
Methane	86.38	81.72
Ethane	7.33	8.70
Propane	3.12	3.71
Isobutane	0.61	0.59
N-butane	0.67	0.88
Isopentane	0.52 (C5+)	1.63 (C5+)
N-pentane	na	na
Hexanes +	na	na
N₂ + O₂	0.70	1.37
CO₂	0.62	0.59
H₂S	-	-
Specific Gravity	0.6604	0.7008
BTU/ft³ (gross)	1149	1201

STRATIGRAPHY (Namarah-1) :

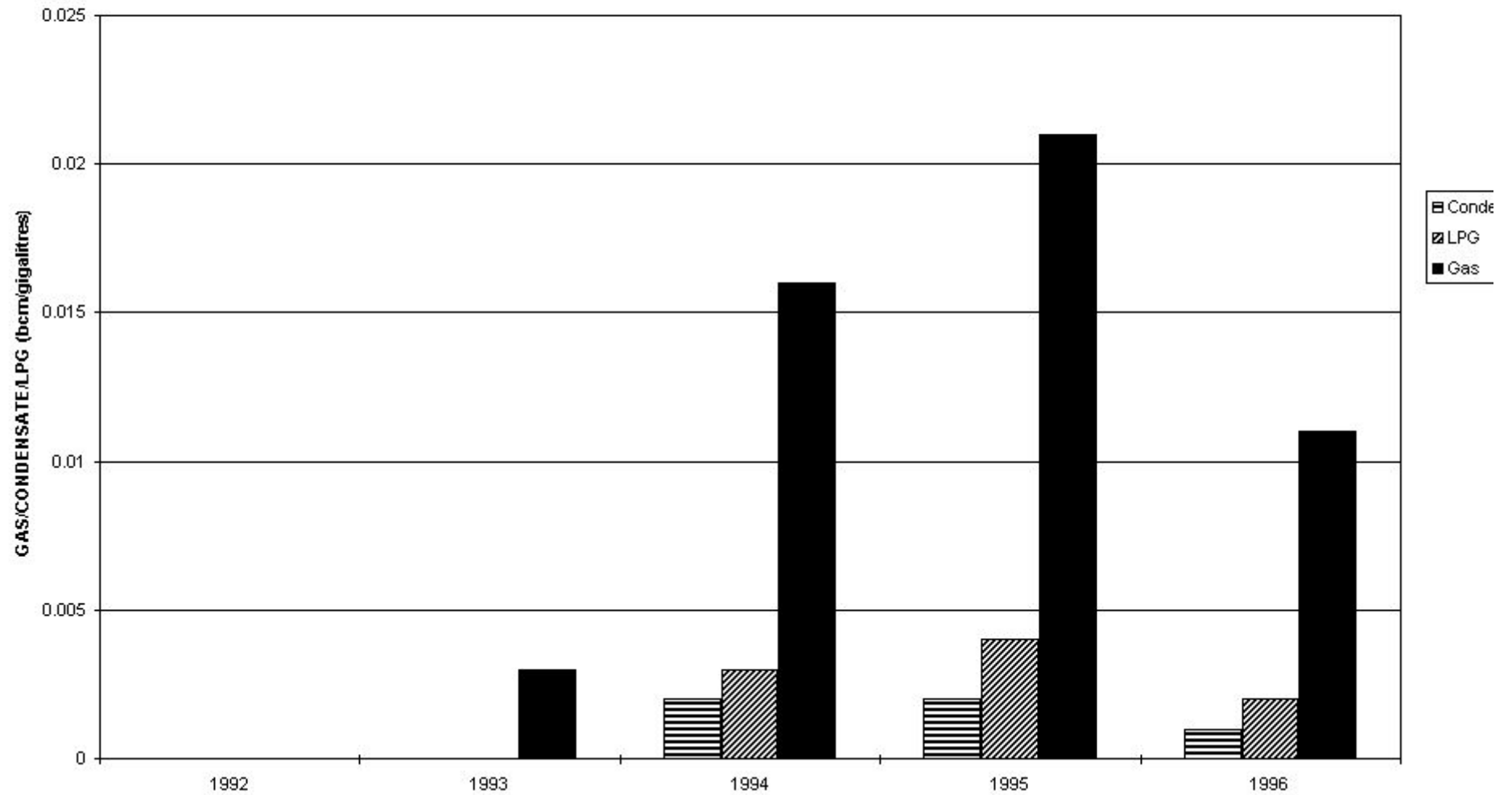
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	296.3
	Wallumbilla Formation	381.0
	Bungil Formation	613.3
	Mooga Sandstone	768.1
JURASSIC	Orallo Formation	960.1
	Gubberamunda Sandstone	1133.9
	Westbourne Formation	1257.0
	Springbok Sandstone	1344.8
	Birkhead Formation	1432.9
	Hutton Sandstone	1649.6
	Evergreen Fm	1836.1
	Boxvale Sandstone Mbr	1877.8
TRIASSIC	Moolayember Fm	1951.3
	Snake Creek Mudstone Mbr	2144.6
	Showgrounds Sandstone	2165.6
	Rewan Fm	2183.9
PERMIAN	Blackwater Group	2246.4
DEVONIAN	Timbury Hills Fm	2322.6

* Picked by Geological Survey of Queensland

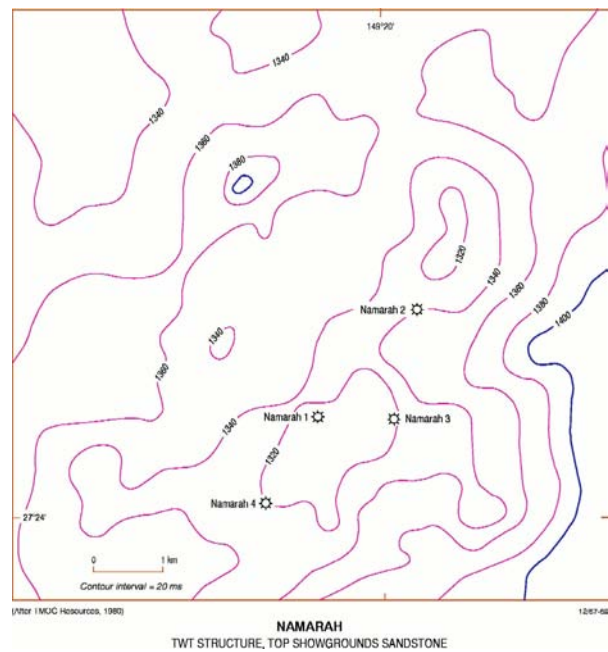
NAMARAH, GAS / CONDENSATE / LPG PRODUCTION ('Rewan' Formation)

Discovered 8 October 1981 Production commenced 1993

Total Wells = 4



NAMARAH MAP



NARROWS

PRESENT OPERATOR: Brisbane Petroleum NL
 TYPE: Oil
 COMMERCIAL STATUS: Past Producer
 LOCATION: 140 km south-southeast of Roma
 STATE: Queensland
 PETROLEUM TITLES: PL 40
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Narrows-1
 Longitude (E): 149.2531
 Latitude (S): -27.8025
 Date total depth reached: 13 JUL 86
 Ground level: 233.0 m
 Kelly bushing: 238.7 m
 Operator: Bridge Oil Ltd
 Total depth: 2114 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1977.5 m

TEST DATA FROM THE DISCOVERY WELL (Narrows-1):

DST 1, 1975.0-1990.1 m, Showgrounds Sandstone
 Recovered 52 bbl of 59.7° API oil and
 flowed associated gas at 390 000 m³/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Sandstone	5	5	very small

COMPOSITIONAL DATA :

OIL :

FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	59.7°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Narrows-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	252.7
	Wallumbilla Fm	361.3
	Bungil Fm	591.0
	Mooga Sandstone	811.3
JURASSIC	Orallo Fm	957.6
	Gubberamunda Sandstone	1087.1
	Westbourne Fm	1282.4
	Springbok Sandstone	1408.6
	Birkhead Formation	1440.5
	Hutton Sandstone	1605.0
	Evergreen Fm	1734.3
	Boxvale Sandstone Mbr	1798.0
	Precipice Sandstone	1831.0
TRIASSIC	Moolayember Fm	1839.2
	Snake Creek Mudstone Mbr	1959.5
	Showgrounds Sandstone	1977.5
PERMIAN	Blackwater Group	1990.0
CARBONIFEROUS	Volcanics	2024.2
	Roma Granite	2059.5

* Picked by Geological Survey of Queensland

NEWINGTON

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other Discovery
 LOCATION: 55 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 22
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Newington-2
 Longitude (E): 148.9806
 Latitude (S): -27.0554
 Date total depth reached: 06 APR 82
 Ground level: 269.1 m
 Kelly bushing: 273.4 m
 Operator: Hartogen Energy Ltd
 Total depth: 1735.8 mKB
 NUMBER OF WELLS DRILLED: 2
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Blackwater Group
 CONTENTS: Gas
 FORMATION: Blackwater Group
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to paludal
 FORMATION TOP (mKB): 1674.9 m

TEST DATA FROM THE DISCOVERY WELL (Newington-2):

DST 1, 1671.5-1681.9 m, Showgrounds Ss/Blackwater Group
 Flowed water at 400 bbl/day.

DST 2, 1695.6-1704.7 m, Blackwater Group
 Flowed gas at 114 100 m³/day.

DST 3, 1705.1-1714.2 m, Blackwater Group
 Flowed gas at 41 340 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Blackwater Group	1	very small	1

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Blackwater Group	very small	very small	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Blackwater Group	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Blackwater Gp
Methane	89.30
Ethane	5.50
Propane	1.10
Isobutane	0.25
N-butane	0.36
Isopentane	1.25 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	1.80
CO ₂	0.18
H ₂ S	-
Specific Gravity	0.644
BTU/ft ³ (gross)	1122

STRATIGRAPHY (Newington-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	179.8
	Bungil Fm	351.7
	Mooga Sandstone	471.8
JURASSIC	Orallo Fm	626.4
	Gubberamunda Sandstone	800.1
	Westbourne Fm	946.1
	Springbok Sandstone	989.7
	Walloon Coal Measures	1072.9
	Hutton Sandstone	1259.4
	Evergreen Fm	1478.3
TRIASSIC	Moolayember Fm	1585.6
	Snake Creek Mudstone Mbr	1690.4
	Showgrounds Sandstone	1697.7
PERMIAN	Blackwater Group	1705.4
DEVONIAN	Timbury Hills Fm	1758.7

* Picked by Geological Survey of Queensland

NEWSTEAD

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	65 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 27
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Newstead-1
Longitude (E):	148.8803
Latitude (S):	-27.1828
Date total depth reached:	14 DEC 80
Ground level:	243.4 m
Kelly bushing:	246.6 m
Operator:	Hartogen Energy Ltd
Total depth:	1496.9
NUMBER OF WELLS DRILLED:	9
STRUCTURE/TRAP:	Fault dependent closure.
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1356.4 m

PETROLEUM BEARING UNIT No.2:	Wandoan Sandstone Member
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1449.3 m

TEST DATA FROM THE DISCOVERY WELL (Newstead-1):

DST 3, 1415.8-1424.9 m, Recovered 1416 m of water.	Evergreen Formation

DST 2, 1442.9-1452.1 m, Flowed gas at 220 870 m ³ /day.	Evergreen Formation

DST 1, 1463.0-1472.2 m, Flowed gas at 240 700 m ³ /day.	Wandoan Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	373	349	24
Wandoan Ss	3	2	1

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	38	36	2
Wandoan Ss	very small	very small	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	86	80	6
Wandoan Ss	very small	very small	very small

STRATIGRAPHY (Newstead-1) :

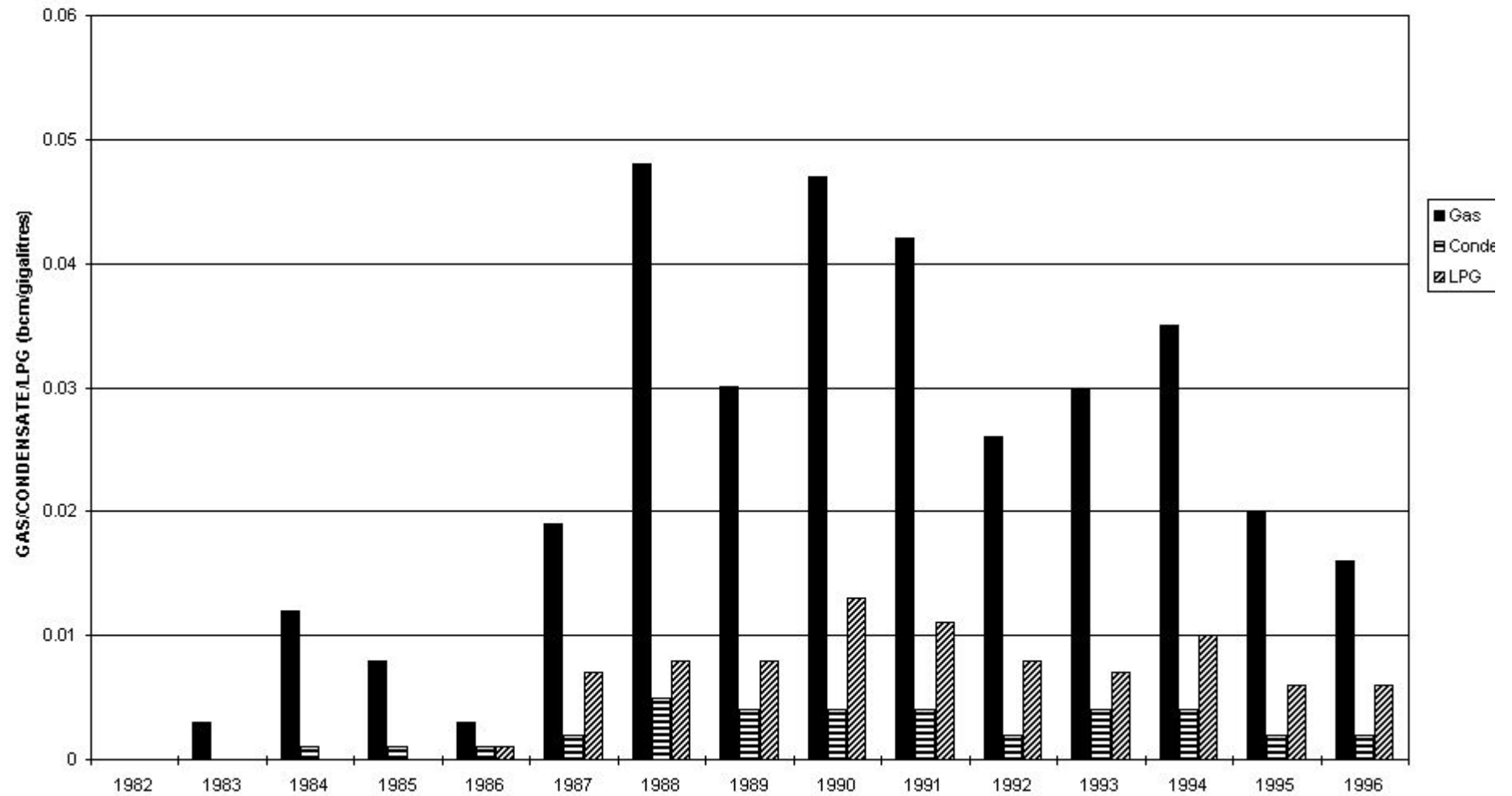
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	345.9
	Mooga Sandstone	461.8
JURASSIC	Orallo Fm	588.9
	Gubberamunda Sandstone	734.6
	Westbourne Fm	892.1
	Springbok Sandstone	996.7
	Walloon Coal Measures	1033.3
	Hutton Sandstone	1252.7
	Evergreen Fm	1356.4
TRIASSIC	Moolayember Fm	1449.3
CARBONIFEROUS	Granite	1471.3

* Picked by Geological Survey of Queensland

NEWSTEAD, GAS / CONDENSATE / LPG PRODUCTION (Evergreen Formation & 'Wandoan' Formation)

Discovered 14 December 1980 Production commenced October 1983

Total Wells = 9



NOORINDOO

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	70 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Noorindoo-1
Longitude (E):	149.1864
Latitude (S):	-27.1236
Date total depth reached:	09 OCT 70
Ground level:	277.0 m
Kelly bushing:	280.7 m
Operator:	Union Oil Development Corporation
Total depth:	2286.9 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Structural/Stratigraphic. Faulted anticline with gas distribution in the north of the structure limited by a permeability barrier.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Back Creek Group
CONTENTS:	Oil and Gas
FORMATION:	Back Creek Group
AGE:	Late Permian
LITHOLOGY:	Sandstone : gray, coarse, sublabile, moderately to poorly sorted, subangular and micaceous with common clay matrix.
DEPOSITIONAL ENVIRONMENT:	Shallow marine.
FORMATION TOP (mKB):	2136.7 m
POROSITY:	Variable. (24% average)
PERMEABILITY:	Variable. (190 md average)
TEST DATA FROM THE DISCOVERY WELL (Noorindoo-1):	
DST 1, 2002.5-2019.3 m, No gas to surface.	Rewan Formation
DST 5, 2187.4-2284.8 m, Flowed gas at 7070 m ³ /day and recovered 183 m of condensate.	Back Creek Group
DST 6, 2192.1-2284.8 m, Flowed gas at 116 670 m ³ /day with associated condensate at up to 170 barrels/day.	Back Creek Group
DST 2, 2193.0-2212.2 m, Flowed gas at 37 660 m ³ /day and recovered 1 m of 56.5° API condensate.	Back Creek Group

Production Test, 2194.5-2205.2 m,
Flowed gas at 42 460 m³/day, condensate
at 70 bbl/day and water at 120 bbl/day.

Back Creek Group

DST 3, 2324.4-2220.8 m,
No gas to surface.

Timbury Hills Formation

NOTE : A small, uneasured quantity of 26.0° API oil was recovered from the Back Creek Group in Noorindoo-1 ('Beta Sand').

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Back Creek Group	12	6	6

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Back Creek Group	4	2	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Back Creek Group	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Back Creek Gp
Methane	71.60
Ethane	9.40
Propane	10.25
Isobutane	3.25
N-butane	2.42
Isopentane	0.64
N-pentane	0.48
Hexanes +	0.26
N₂ + O₂	1.20
CO₂	0.36
H₂S	-
Specific Gravity	0.824
BTU/ft³ (gross)	1484

CONDENSATE :

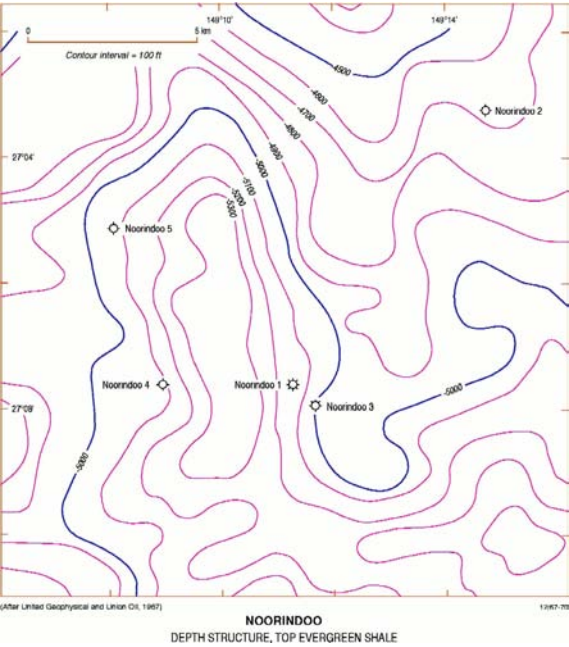
FLUID PROPERTIES	CONDENSATE Back Creek Gp
API Gravity @ 60°F	50.9°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft³/bbl)	-
Pour Point	-4.2°C
Specific Gravity	0.7752
Colour	Very light amber
Viscosity (cp@100°F)	1.0
Bubble Point (psig)	na

STRATIGRAPHY (Noorindoo-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	430.7
	Mooga Sandstone	539.5
JURASSIC	Orallo Fm	696.8
	Gubberamunda Sandstone	886.4
	Westbourne Fm	1005.7
	Springbok Sandstone	1130.2
	Walloon Coal Measures	1207.6
	Hutton Sanstone	1492.9
	Evergreen Fm	1649.0
	Precipice Sandstone	1753.5
TRIASSIC	Moolayember Fm	1765.4
	Snake Creek Mudstone Mbr	1962.0
	Showgrounds Sandstone	1977.5
	Rewan Fm	1991.9
PERMIAN	Blackwater Group	2069.0
	Back Creek Group	2136.7
DEVONIAN	Timbury Hills Fm	2286.9

* Picked by Geological Survey of Queensland

NOORINDOO MAP



NORTH BOUNDARY

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 102 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 71
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: North Boundary-1
 Longitude (E): 149.2513
 Latitude (S): -27.4050
 Date total depth reached: 26 APR 94
 Kelly bushing: 327.0 m
 Operator: Bridge Oil Ltd
 Total depth: 2275 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (North Boundary-1):

DST 1, 2085.0-2095.0 m, Showgrounds Sandstone
 Flowed gas at 1800 m³/day and recovered
 193 m of condensate and 335 m of water
 cushion.

DST 3, 2095.0-2134.0 m, Showgrounds Ss/Rewan Formation
 No fluids to surface.

DST 2, 2108.0-2134.0 m, Rewan Formation
 No fluids to surface.

DST 4, 2215.0-2238.0 m, Kianga Formation/Timbury Hills Formation
 Gas to surface at a rate too small to
 measure.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	16	very small	16

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	5	very small	5

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	4	very small	4

NORTH BOXLEIGH

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 113 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 15
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: North Boxleigh-1
 Longitude (E): 149.0630
 Latitude (S): -27.5906
 Date total depth reached: 20 APR 91
 Ground level: 263.3 m
 Kelly bushing: 267.6 m
 Operator: Bridge Oil Ltd
 Total depth: 2067 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 1.6 km² (on top Permian)
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1904.3 m

TEST DATA FROM THE DISCOVERY WELL (North Boxleigh-1):

DST 1, 1903.4-1911.7 m, Showgrounds Sandstone
 Flowed gas at 127 430 m³/day and
 recovered 12 m of water and 36.5 m
 of condensate.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	68	58	10

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	13	8	5

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	23	13	10

STRATIGRAPHY (North Boxleigh-1) :

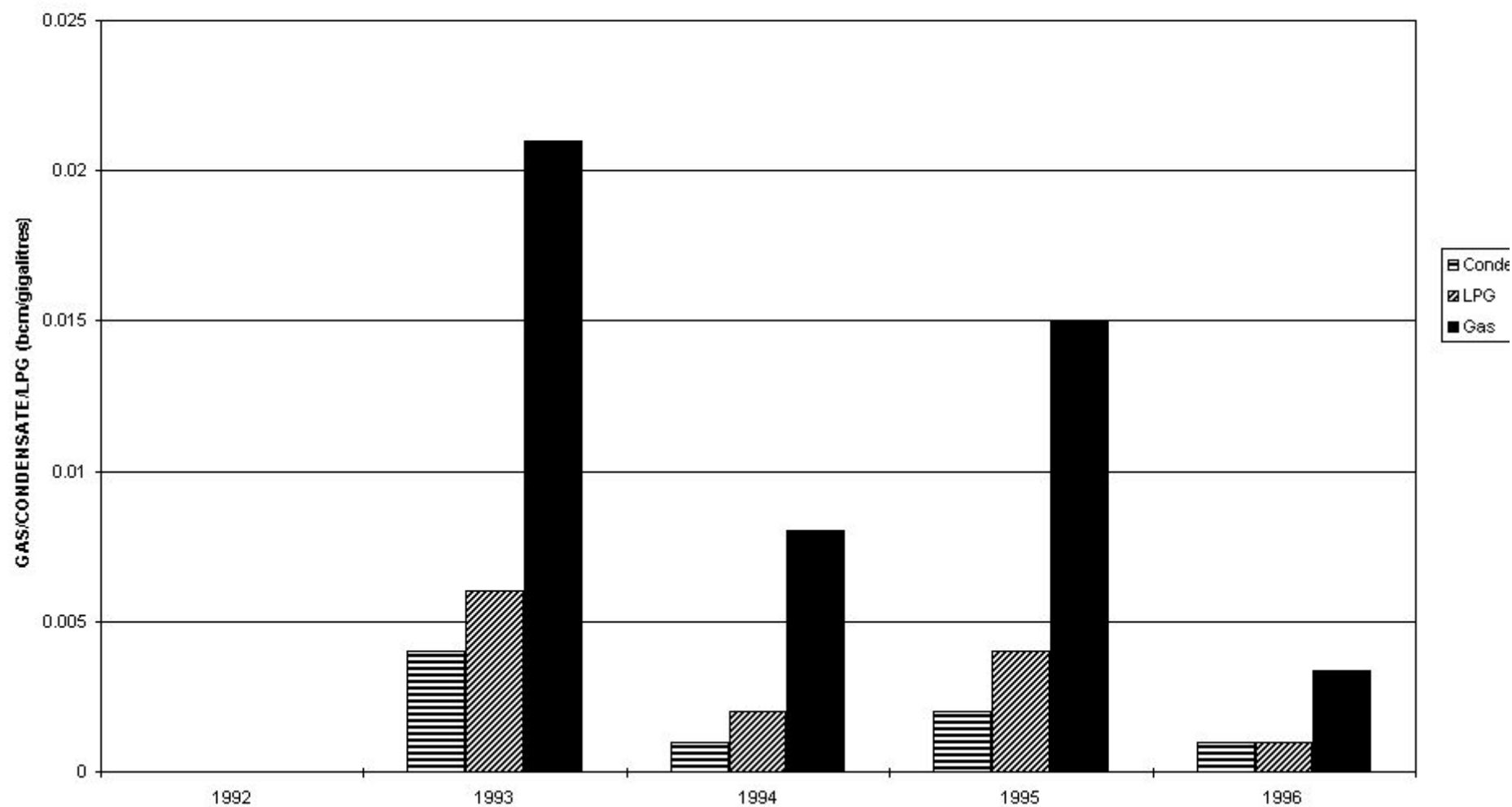
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	380.0
	Bungil Fm	563.0
	Mooga Sandstone	734.5
JURASSIC	Orallo Fm	928.0
	Gubberamunda Sandstone	1044.5
	Westbourne Formation	1245.5
	Springbok Sandstone	1333.6
	Walloon Coal Measures	1386.5
	Hutton Sandstone	1541.0
	Evergreen Fm	1715.2
TRIASSIC	Moolayember Fm	1802.2
	Snake Creek Mudstone Mbr	1890.0
	Showgrounds Sandstone	1904.3
PERMIAN	Blackwater Group	1911.8
CARBONIFEROUS	Kuttung Formation	1995.7

* Geological Survey of Queensland.

NORTH BOXLEIGH, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 20 April 1991 Production commenced 1993

Total Wells = 1 (1 Producer)



NORTH SIRRAH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	120 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	North Sirrah-1
Longitude (E):	149.1845
Latitude (S):	-27.6278
Date total depth reached:	21 MAR 91
Ground level:	315.2 m
Kelly bushing:	320.9 m
Operator:	Bridge Oil Ltd
Total depth:	2080 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.2 km ²
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Kianga Formation
CONTENTS:	Gas
FORMATION:	Kianga Formation
AGE:	Late Permian-Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	2004.3 m

TEST DATA FROM THE DISCOVERY WELL (North Sirrah-1):

DST 3, 1987.1-1997.7 m, Recovered 1560 m of water.	Showgrounds Sandstone

DST 2, 2012.9-2079.7 m, Flowed gas at 6500 m ³ /day and recovered 8 m of mud.	Kianga Formation

DST 1, 2015.7-2020.6 m, Misrun.	Kianga Formation

STRATIGRAPHY (North Sirrah-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	255.2
	Wallumbilla Fm	390.2
	Bungil Fm	598.2
	Mooga Sandstone	768.0
JURASSIC	Orallo Fm	977.3
	Gubberamunda Sandstone	1100.0
	Westbourne Formation	1277.6
	Springbok Sandstone	1383.4
	Walloon Coal Measures	1439.8
	Hutton Sandstone	1636.0
	Evergreen Fm	1774.2
	Precipice Sandstone	1858.0
TRIASSIC	Moolayember Fm	1864.5
	Snake Creek Mudstone Mbr	1976.0
	Showgrounds Sandstone	1992.7
PERMIAN	Blackwater Group	2005.0
DEVONIAN	Timbury Hills Formation	2026.5

* Geological Survey of Queensland.

NORWOOD

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 45 km east-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 336-P
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Norwood-1
 Longitude (E): 149.2181
 Latitude (S): -26.7614
 Date total depth reached: 14 APR 85
 Ground level: 287.1 m
 Kelly bushing: 290.8 m
 Operator: Sunland Petroleum Corporation NL
 Total depth: 2126.6 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Back Creek Group
 CONTENTS: Gas
 FORMATION: Back Creek Group
 AGE: Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Paralic
 FORMATION TOP (mKB): 1945.8 m

TEST DATA FROM THE DISCOVERY WELL (Norwood-1):

DST 1, 1979.4-1986.7 m, Back Creek Group
 Flowed gas at 57 480 m³/day and
 recovered 40 m of gas cut mud and a
 trace of condensate.

DST 2, 2067.2-2086.1 m, Back Creek Group
 Flowed gas at 850 m³/day and recovered
 54.9 m of slightly gas cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Back Creek Group	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

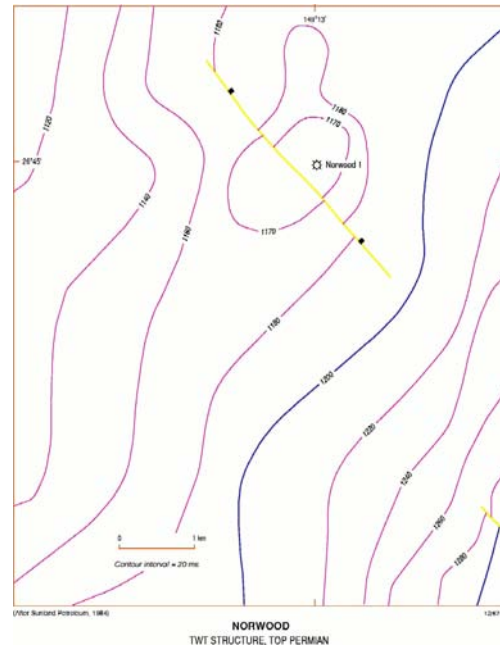
GAS PROPERTIES	GAS Back Creek Gp
Methane	83.84
Ethane	6.31
Propane	3.50
Isobutane	0.52
N-butane	1.23
Isopentane	1.29 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	1.63
CO ₂	1.68
H ₂ S	-
Specific Gravity	0.696
BTU/ft ³ (gross)	1165

STRATIGRAPHY (Norwood-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	176.8
	Mooga Sandstone	274.6
JURASSIC	Orallo Fm	411.5
	Gubberamunda Sandstone	550.7
	Westbourne Formation	643.1
	Eurombah Formation	1088.1
	Hutton Sandstone	1139.3
	Evergreen Fm	1347.5
	Boxvale Sandstone Mbr	1390.2
	Precipice Sandstone	1428.9
TRIASSIC	Moolayember Fm	1433.9
	Snake Creek Mudstone Mbr	1615.4
	Showgrounds Sandstone	1631.6
	Rewan Fm	1642.9
PERMIAN	Blackwater Group	1819.4
	Back Creek Group	1893.4
DEVONIAN	Basement	2120.8

* Picked by Geological Survey of Queensland

NORWOOD MAP



OBERINA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	36 km south of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 12
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Oberina-1
Longitude (E):	148.8033
Latitude (S):	-26.9250
Date total depth reached:	04 FEB 64
Ground level:	306.0 m
Kelly bushing:	310.3 m
Operator:	Amalgamated Petroleum NL
Total depth:	1513.6 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Stratigraphic. Isolated permeable sandstone lens located on a plunging anticlinal axis.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, fine grained, garnetiferous, quartzose with common, thin shale and siltstone lenses and white/brown clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1438.7 m
POROSITY:	18 to 20%
PERMEABILITY:	10 to 120 md
TEST DATA FROM THE DISCOVERY WELL (Oberina-1):	
DST 2, 1379.2-1386.8 m, Air blow, dead in 40 minutes.	Evergreen Fm (Boxvale Ss Mbr)
DST 1, 1435.6-1443.2 m, Flowed gas at 141 600 m ³ /day and recovered 3.1 m of condensate.	Precipice Sandstone
DST 4, 1436.2-1442.6 m, Flowed gas at 114 680 m ³ /day and recovered a quantity of condensate.	Precipice Sandstone
DST 3, 1496.6-1510.6 m, Air blow, dead in 5 minutes.	Moolayember Formation

RESERVES (as at 30/6/96):

GAS :

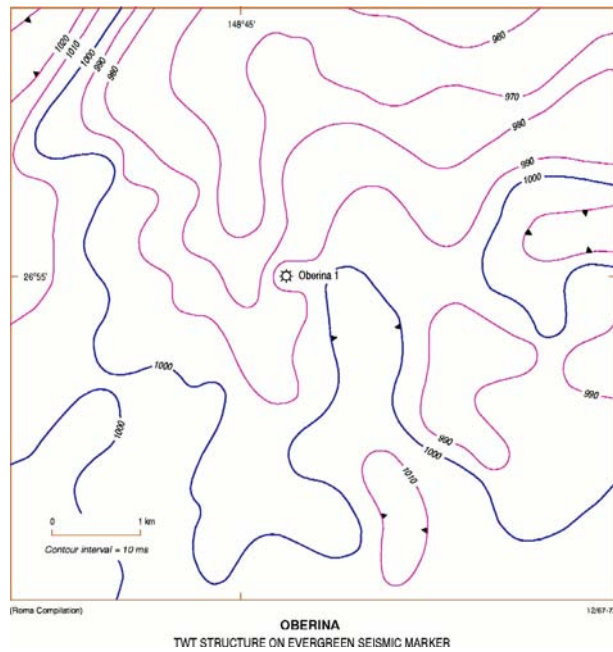
RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	23	2	21

STRATIGRAPHY (Oberina-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	299.0
	Mooga Sandstone	425.5
JURASSIC	Orallo Fm	498.3
	Gubberamunda Sandstone	677.3
	Westbourne Fm	810.8
	Springbok Sandstone	901.0
	Walloon Coal Measures	955.9
	Eurombah Fm	1121.7
	Hutton Sandstone	1159.2
	Evergreen Fm	1340.5
	Precipice Sandstone	1438.7
TRIASSIC	Moolayember Fm	1441.7
DEVONIAN	Timbury Hills Fm	1511.8

* Picked by Geological Survey of Queensland

OBERINA MAP



PARKNOOK

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 94 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 71
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Parknook-1
 Longitude (E): 149.2758
 Latitude (S): -27.3264
 Date total depth reached: 27 DEC 78
 Ground level: 358.1 m
 Kelly bushing: 362.4 m
 Operator: BHP Petroleum
 Total depth: 2209.8 mKB
 NUMBER OF WELLS DRILLED: 5
 RESERVOIR UNITS: 2

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 2124.5 m

PETROLEUM BEARING UNIT No.2: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 2138.2 m

TEST DATA FROM THE DISCOVERY WELL (Parknook-1):

DST 1, 2133.6-2138.2 m, Showgrounds Sandstone
 Flowed gas at 280 m³/day.

DST 2, 2142.7-2167.7 m, Rewan Formation
 Flowed gas at 2800 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	48	6	42
Rewan Fm	102	53	49

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	3	1	2
Rewan Fm	9	6	3

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	5	1	4
Rewan Fm	15	9	6

STRATIGRAPHY (Parknook-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	349.0
	Bungil Fm	565.4
	Mooga Sandstone	772.7
JURASSIC	Orallo Fm	919.6
	Gubberamunda Sandstone	1054.6
	Westbourne Fm	1242.1
	Springbok Sandstone	1360.9
	Walloon Coal Measures	1388.4
	Hutton Sandstone	1605.7
	Evergreen Fm	1806.9
	Precipice Sandstone	1907.4
TRIASSIC	Moolayember Fm	1917.2
	Snake Creek Mudstone Mbr	2104.6
	Showgrounds Sandstone	2124.5
	Rewan Fm	2138.2
PERMIAN	Bandanna Fm	2191.5

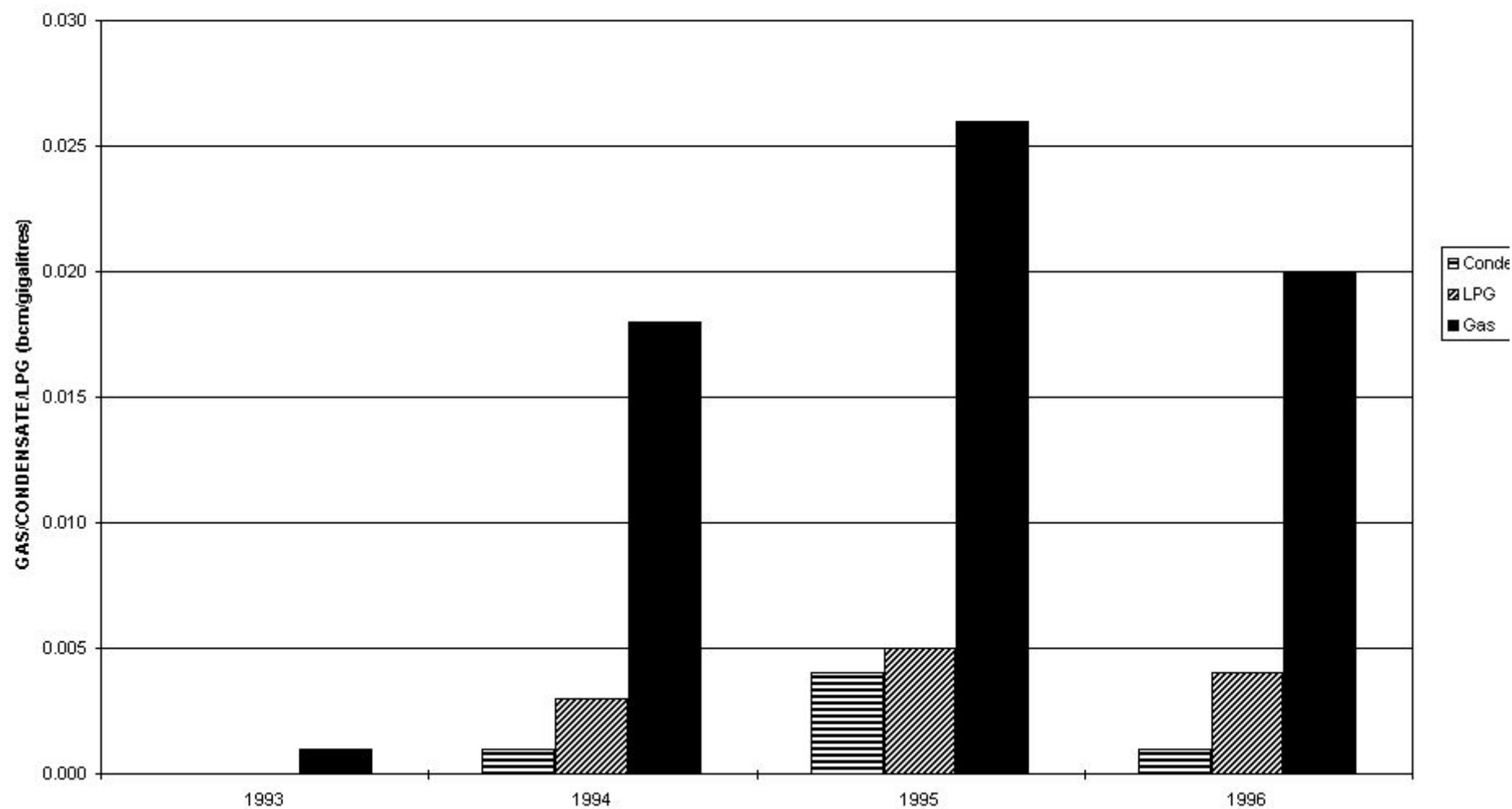
* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Parknook-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
2131.8	16.4	0.1	0.1	Showgrounds Sandstone
2132.3	14.1	1.8	-	Showgrounds Sandstone
2132.9	21.8	16.9	15.3	Showgrounds Sandstone
2137.4	4.8	0.1	0.1	Showgrounds Sandstone
2140.7	13.4	0.4	0.6	Rewan Fm
2144.1	13.3	0.5	0.1	Rewan Fm
2145.6	4.3	0.1	0.1	Rewan Fm
2147.2	13.1	0.5	0.1	Rewan Fm
2149.0	14.1	0.2	0.1	Rewan Fm
2149.6	15.6	2.1	0.2	Rewan Fm
2150.3	19.3	5.0	7.6	Rewan Fm
2150.7	17.4	27.0	8.2	Rewan Fm
2151.8	17.4	1.1	6.2	Rewan Fm
2152.3	14.4	0.5	0.2	Rewan Fm
2153.5	10.8	0.5	0.1	Rewan Fm
2154.5	11.4	0.1	0.1	Rewan Fm
2155.5	6.2	0.1	0.1	Rewan Fm
2156.6	8.9	0.1	0.1	Rewan Fm
2156.8	9.8	0.1	0.1	Rewan Fm

PARKNOOK, GAS / CONDENSATE / LPG PRODUCTION ('Rewan' Formation & Showgrounds Sandstone)

Discovered 27 December 1978 Production commenced 1993

Total wells = 5

PICKANJINNIE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	33 km east of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 5
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Pickanjinie-1
Pool(s):	Precipice Sandstone; Moolayember Formation; Showgrounds Sandstone; Rewan Formation.
Longitude (E):	149.1217
Latitude (S):	-26.5950
Date total depth reached:	12 JUL 60
Ground level:	322.8 m
Kelly bushing:	325.8 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1589.9 mKB
DISCOVERY WELL:	Pickanjinie-2
Pool(s):	Timbury Hills Formation.
Longitude (E):	149.1333
Latitude (S):	-26.6167
Date total depth reached:	13 FEB 61
Ground level:	317.6 m
Kelly bushing:	320.6 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1704 mKB
DISCOVERY WELL:	Pickanjinie-6
Pool(s):	Evergreen Formation.
Longitude (E):	149.1483
Latitude (S):	-26.5881
Date total depth reached:	21 SEP 64
Ground level:	320.0 m
Kelly bushing:	323.4 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1419 mKB
DISCOVERY WELL:	Pickanjinie-10
Pool(s):	Tinowon Formation.
Longitude (E):	149.1503
Latitude (S):	-26.5818
Date total depth reached:	06 SEP 86
Ground level:	322.0 m
Kelly bushing:	326.0 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1617 mKB
NUMBER OF WELLS DRILLED:	11
STRUCTURE/TRAP:	Structural/Stratigraphic. Anticline with the Precipice Sandstone reservoir stratigraphically controlled to the north. The Showgrounds Sandstone reservoir is restricted in the west by a permeability barrier.
AREAL CLOSURE:	6.5 square kilometres
RESERVOIR UNITS:	7

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white to gray, coarse to very coarse, subangular to angular, quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to very coarse, moderately well sorted subrounded, quartzose with white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1221.3 m (Pickanjinnee-1)
POROSITY:	20% (average)
PERMEABILITY:	175 md (average)
PETROLEUM BEARING UNIT No.3:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
PETROLEUM BEARING UNIT No.4:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : white, medium to very coarse, subangular to angular, poorly sorted and quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1269.8 m (Pickanjinnee-1)
POROSITY:	15% (average)
PERMEABILITY:	1040 md (average)
PETROLEUM BEARING UNIT No.5:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1275.6 m (Pickanjinnee-1)
PETROLEUM BEARING UNIT No.6:	Tinowon Formation
CONTENTS:	Gas
FORMATION:	Tinowon Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine

PETROLEUM BEARING UNIT No.7:	Timbury Hills Formation
CONTENTS:	Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Indurated sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental
FORMATION TOP (mKB):	1600.2 m (Pickanjinnee-2)

TEST DATA FROM THE DISCOVERY WELL (Pickanjinnee-1):

DST 1, 1204.6-1228.3 m, Flowed gas at 68 360 m ³ /day and recovered 13 m of gas cut mud.	Precipice Sandstone
DST 7, 1211.9-1331.4 m, Flowed gas at 158 660 m ³ /day.	Precipice Ss/Moolayember Fm /Showgrounds Ss
DST 8, 1211.9-1331.4 m, Flowed gas at 185 220 m ³ /day.	Precipice Ss/Moolayember Fm /Showgrounds Ss
DST 2, 1228.3-1236.0 m, Flowed gas at 28 030 m ³ /day.	Moolayember Formation
DST 3, 1261.0-1307.6 m, Flowed gas at 708 m ³ /day.	Showgrounds Sandstone
DST 6, 1338.7-1362.5 m, Flowed gas at 425 m ³ /day.	Rewan Formation

TEST DATA FROM THE DISCOVERY WELL (Pickanjinnee-2):

DST 2, 1221.0-1280.2 m, Flowed gas at 2100 m ³ /day.	Moolayember Formation
DST 1, 1252.7-1280.2 m, No recovery (packer failure).	Moolayember Formation
DST 3, 1530.1-1595.0 m, Recovered gas cut mud.	Rewan Formation
DST 4, 1603.6-1671.5 m, No recovery (packer failure).	Timbury Hills Formation
DST 5, 1606.3-1671.5 m, Flowed gas at 2100m ³ /day.	Timbury Hills Formation

TEST DATA FROM THE DISCOVERY WELL (Pickanjinnee-6):

DST 1, 1244.2-1252.1 m, Flowed gas at 158 600 m ³ /day.	Evergreen Formation
DST 2, 1286.3-1295.4 m, Flowed gas at 211 800 m ³ /day.	Precipice Sandstone

TEST DATA FROM THE DISCOVERY WELL (Pickanjinnee-10):

DST 1, 1244.0-1262.0 m,
Flowed gas at 172 200 m³/day.

Precipice Sandstone

DST 4, 1522.0-1550.0 m,
Flowed gas at 26 180 m³/day.

Tinowon Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	261	248	13
Showgrounds Ss	258	241	17
Tinowon Fm	11	9	2

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss	GAS Showgrounds Ss	GAS Rewan
Methane	96.20	97.20	91.50
Ethane	0.35	0.41	1.26
Propane	0.02	0.02	0.41
Isobutane	0.09	0.06	0.24
N-butane	0.01	0.01	0.16
Isopentane	trace	0.01	0.17
N-pentane	trace	0.01	0.12
Hexanes +	0.21	0.34	0.95
N ₂ + O ₂	2.90	1.77	4.80
CO ₂	0.24	0.22	0.44
H ₂ S	-	-	-
Specific Gravity	0.579	0.577	-
BTU/ft ³ (gross)	995	1012	-

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Precipice Ss
API Gravity @ 60°F	60.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.738
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Pickanjinnee-1) :

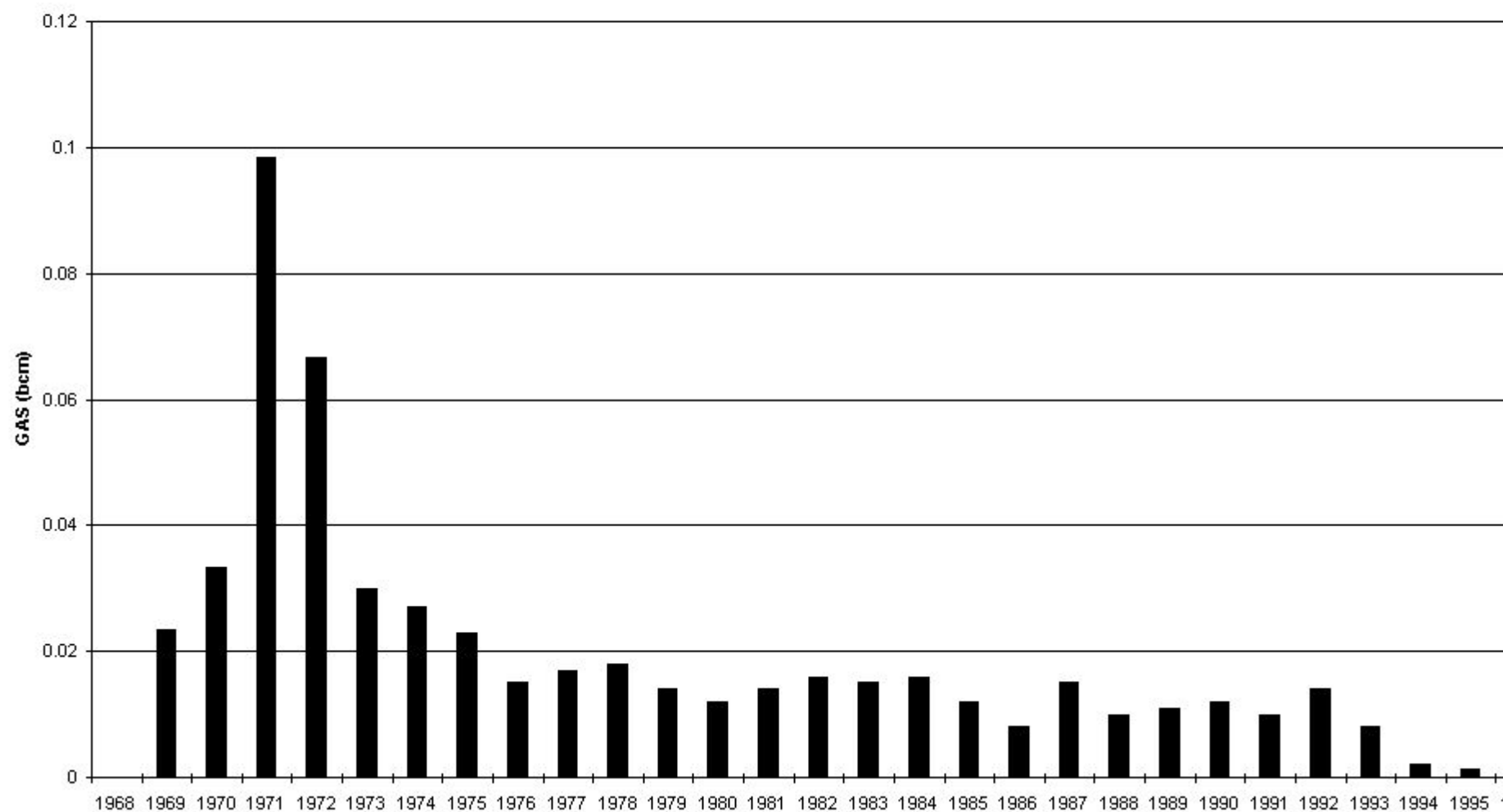
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	42.7
	Mooga Sandstone	144.2
JURASSIC	Orallo Fm	228.6
	Gubberamunda Sandstone	381.6
	Westbourne Fm	435.3
	Springbok Sandstone	533.7
	Walloon Coal Measures	609.6
	Hutton Sandstone	883.0
	Evergreen Fm	1100.3
	Precipice Sandstone	1221.3
TRIASSIC	Moolayember Fm	1227.7
	Snake Creek Mudstone Mbr	1261.9
	Showgrounds Sandstone	1269.8
	Rewan Fm	1275.6
PERMIAN	Blackwater Group	1368.6
	Back Creek Group	1423.4
DEVONIAN	Timbury Hills Fm	1473.7

* Picked by Geological Survey of Queensland

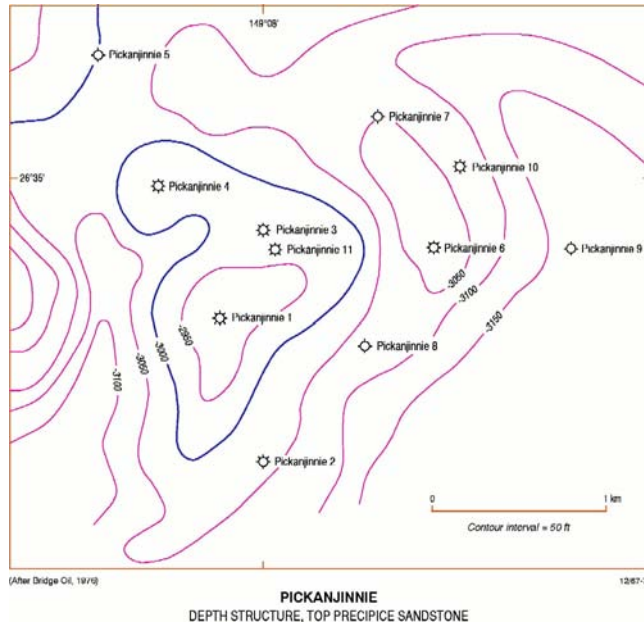
PICKANJINNIE, GAS PRODUCTION (Precipice Sandstone, Showgrounds Sandstone & Timbury Hills Formation)

Discovered 12 July 1960 Production into gas gathering system commenced May 1969

Total wells = 11 (4 Producers; 2 Shut In; 4 P&A; 1 Suspended)



PICKANJINNIE MAP



PINE RIDGE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	26 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 4
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Pine Ridge-1
Pool(s):	Evergreen Formation.
Longitude (E):	149.0172
Latitude (S):	-26.4931
Date total depth reached:	21 JAN 65
Ground level:	320.7 m
Kelly bushing:	322.5 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1098.5 mKB
DISCOVERY WELL:	Pine Ridge-4
Pool(s):	Moolayember Formation.
Longitude (E):	149.0106
Latitude (S):	-26.4786
Date total depth reached:	08 JUN 65
Ground level:	324.3 m
Kelly bushing:	327.7 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1082 mKB
DISCOVERY WELL:	Pine Ridge-8
Pool(s):	Precipice Sandstone.
Longitude (E):	148.9928
Latitude (S):	-26.4944
Date total depth reached:	09 AUG 65
Ground level:	333.5 m
Kelly bushing:	336.8 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1081 mKB
DISCOVERY WELL:	Pine Ridge-15
Pool(s):	Showgrounds Sandstone.
Longitude (E):	149.0218
Latitude (S):	-26.4760
Date total depth reached:	31 MAY 88
Ground level:	328.4 m
Kelly bushing:	332.4 m
Operator:	CSR Ltd
Total depth:	1096 mKB
NUMBER OF WELLS DRILLED:	16
STRUCTURE/TRAP:	Structural/Stratigraphic trap on an anticlinal nose
RESERVOIR UNITS:	4

PETROLEUM BEARING UNIT No.1: Evergreen Formation
 CONTENTS: Gas
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone : white, fine grained, well rounded, well sorted, quartzose with traces of kaolin matrix.
 DEPOSITIONAL ENVIRONMENT: Shallow marine shoreline sand.
 POROSITY: 23% (average in Pine Ridge-6)
 PERMEABILITY: 275 md (average in Pine Ridge-6)

PETROLEUM BEARING UNIT No.2: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

PETROLEUM BEARING UNIT No.3: Moolayember Formation
 CONTENTS: Gas
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine

PETROLEUM BEARING UNIT No.4: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (Pine Ridge-1):

DST 1, 1040.9-1054.6 m, Evergreen Formation
 Flowed gas at 130 260 m³/day.

DST 2, 1080.5-1089.4 m, Rewan Formation
 Recovered 6 m of mud.

TEST DATA FROM THE DISCOVERY WELL (Pine Ridge-4):

DST 3, 1022.6-1031.8 m, Evergreen Formation
 Flowed gas at 5660 m³/day and recovered 1.5 m of mud.

DST 1, 1036.3-1050.0 m, Precipice Sandstone
 Recovered 9 m of gas cut mud.

DST 4, 1051.6-1075.7 m, Moolayember Formation
 Flowed gas 156 300 m³/day and recovered 1 m of water and 0.3 m of condensate.

TEST DATA FROM THE DISCOVERY WELL (Pine Ridge-8):

DST 1, 1044.0-1080.5 m, Precipice Sandstone
Flowed gas at 94 900 m³/day.

DST 2, 1046.4-1057.1 m, Precipice Sandstone
Flowed gas at 80 700 m³/day.

TEST DATA FROM THE DISCOVERY WELL (Pine Ridge-15):

DST 2, 1046.0-1058.0 m, Precipice Sandstone
No recovery.

DST 1, 1065.0-1077.0 m, Showgrounds Sandstone
Flowed gas at 104 800 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	140	135	5
Showgrounds Ss	10	10	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss	GAS Showgrounds Ss	GAS Moolayember Fm
Methane	94.90	94.50	94.70
Ethane	2.20	2.40	2.50
Propane	0.17	0.01	0.14
Isobutane	0.19	0.37	0.27
N-butane	0.04	0.01	0.01
Isopentane	0.05	0.17	0.08
N-pentane	0.01	-	0.01
Hexanes +	0.13	0.35	0.24
N ₂ + O ₂	1.67	1.85	1.73
CO ₂	0.58	0.35	0.30
H ₂ S	-	-	-
Specific Gravity	0.587	0.595	-
BTU/ft ³ (gross)	1020	1035	-

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Precipice Ss
API Gravity @ 60°F	60.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.738
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Pine Ridge-1) :

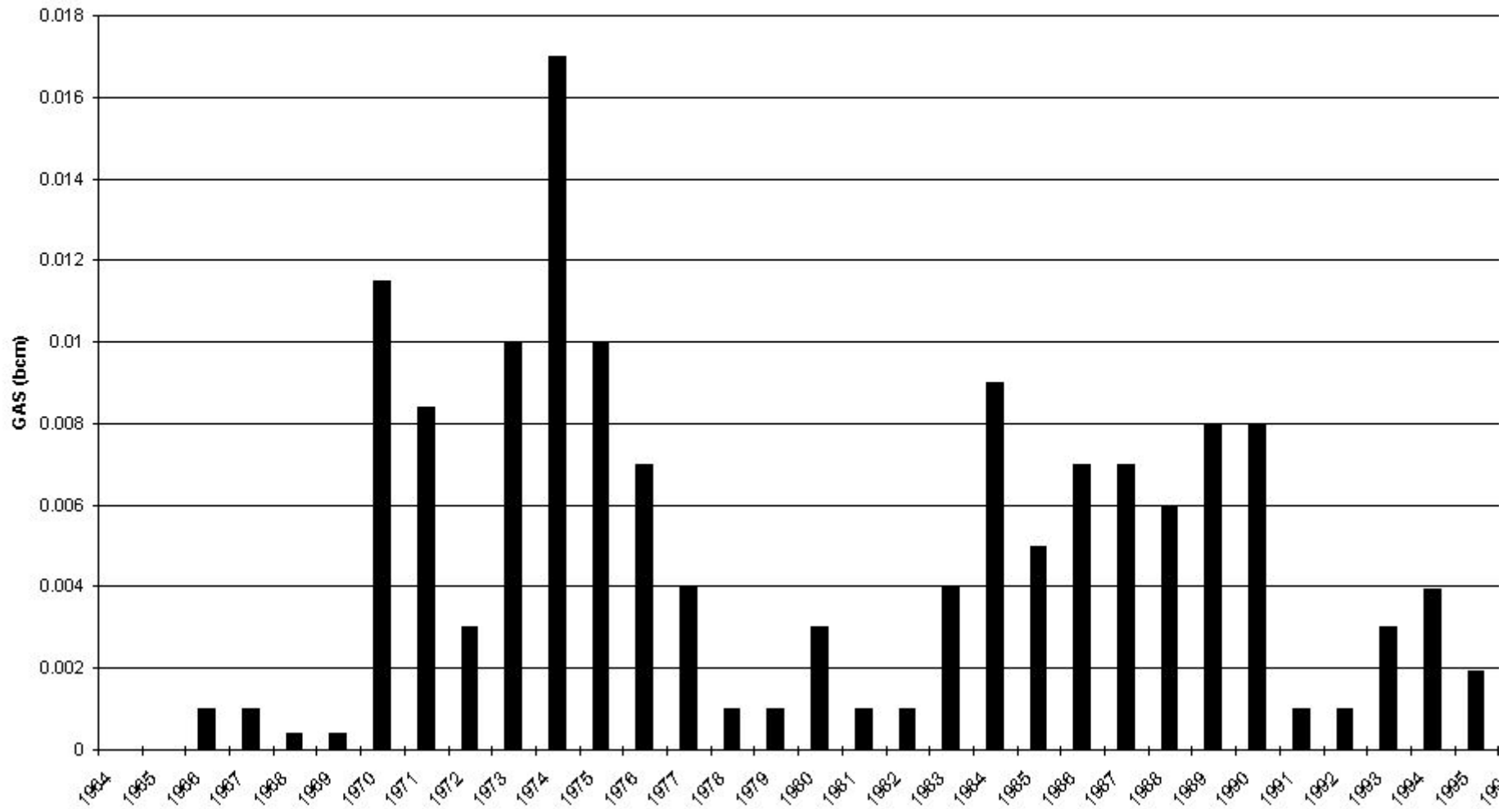
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	3.4
JURASSIC	Orallo Fm	45.7
	Gubberamunda Sandstone	194.5
	Westbourne Fm	265.2
	Springbok Sandstone	358.4
	Walloon Coal Measures	452.6
	Hutton Sanstone	721.8
	Evergreen Fm	946.1
	Precipice Sandstone	1040.6
TRIASSIC	Moolayember Fm	1055.8
CARBONIFEROUS	Granite	1081.1

* Picked by Geological Survey of Queensland

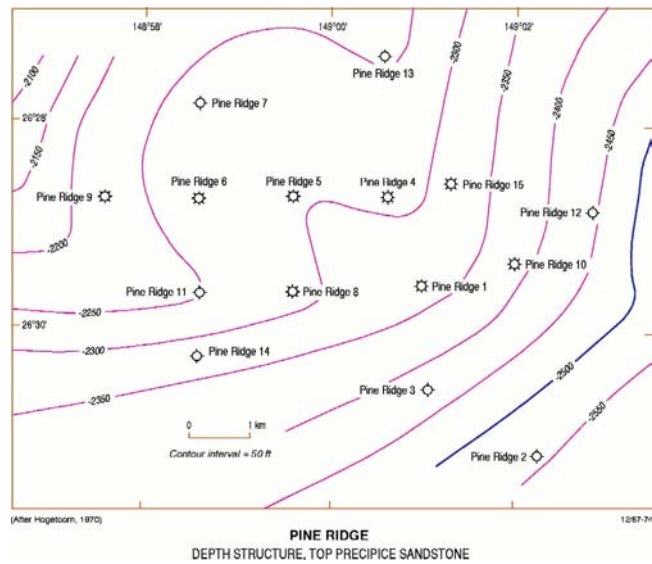
PINE RIDGE, GAS PRODUCTION (Showgrounds Sandstone & Precipice Sandstone)

Discovered 25 January 1965 Production commenced June 1965

Total Wells = 16 (1 Producer; 5 Shut In; 8 plugged and Abandoned; 2 Suspended)



PINE RIDGE MAP



PLEASANT HILLS

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	30 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 4
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Pleasant Hills -2
Pool(s):	Showgrounds Sandstone.
Longitude (E):	149.0025
Latitude (S):	-26.3889
Date total depth reached:	07 DEC 68
Ground level:	391.4 m
Kelly bushing:	394.4 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1238.4 mKB
DISCOVERY WELL:	Pleasant Hills -8
Pool(s):	Weald Sandstone.
Longitude (E):	149.0178
Latitude (S):	-26.4033
Date total depth reached:	29 JAN 69
Ground level:	395.0 m
Kelly bushing:	398.4 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1123 mKB
DISCOVERY WELL:	Pleasant Hills -11
Pool(s):	Precipice Sandstone.
Longitude (E):	148.9742
Latitude (S):	-26.3872
Date total depth reached:	16 JUL 70
Ground level:	435.3 m
Kelly bushing:	438.6 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1217 mKB
DISCOVERY WELL:	Pleasant Hills -13
Pool(s):	Evergreen Formation.
Longitude (E):	148.9867
Latitude (S):	-26.3792
Date total depth reached:	06 DEC 70
Ground level:	417.3 m
Kelly bushing:	420.0 m
Operator:	Associated Australian Oilfields Ltd
NUMBER OF WELLS DRILLED:	22
STRUCTURE/TRAP:	Combination structural/stratigraphic trap overlying the flanks of a basement high. Four-way dip closure at Showgrounds Sandstone level. Combination structural/stratigraphic trap at Precipice Sandstone level (pool limited by poor permeability in the east). Trapping in the Evergreen Formation reservoir is entirely stratigraphic.
AREAL CLOSURE:	33.6 km ² (on mid-Evergreen reflector).
RESERVOIR UNITS:	4

PETROLEUM BEARING UNIT No.1:	Weald Sandstone
CONTENTS:	Gas
FORMATION:	Injune Creek Beds
AGE:	Middle-Late Jurassic
LITHOLOGY:	Sandstone : coarse, angular to subrounded, quartzose with minor white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
POROSITY:	>20%
PETROLEUM BEARING UNIT No.2:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, fine to coarse grained, subangular to rounded, moderately well sorted, quartzose with a white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Shallow marine shoreline sand deposit.
POROSITY:	>20%
PERMEABILITY:	>100 md
PETROLEUM BEARING UNIT No.3:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white to gray, fine to medium grained, subangular, poorly sorted, quartzose with a white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial
POROSITY:	>20%
PETROLEUM BEARING UNIT No.4:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : white to gray, coarse, subangular, poorly sorted, quartzose with thin interbeds of siltstone and shale.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1061.3 m (Pleasant Hills -2)
POROSITY:	18% (average)
PERMEABILITY:	130 md (average)
TEST DATA FROM THE DISCOVERY WELL (Pleasant Hills -2):	
DST 1, 993.7-1024.1 m, No recovery.	Showgrounds Sandstone
DST 2, 1019.9-1124.4 m, Flowed gas at 92 700 m ³ /day and water at 120 bbl/day.	Showgrounds Sandstone
DST 3, 1019.3-1068.6 m, Flowed gas at 90 600 m ³ /day and water at 120 bbl/day.	Showgrounds Sandstone

DST 4, 1063.8-1124.7 m,
Recovered 963 m of water.

Showgrounds Ss/Rewan Formation

TEST DATA FROM THE DISCOVERY WELL (Pleasant Hills -8):

DST 1, 1049.1-1056.1 m,
Flowed gas at 104 780 m³/day.

Weald Sandstone

TEST DATA FROM THE DISCOVERY WELL (Pleasant Hills -11):

DST 1, 1094.5-1110.4 m,
Flowed gas at 133 090 m³/day.

Precipice Sandstone

TEST DATA FROM THE DISCOVERY WELL (Pleasant Hills -13):

DST 1, 1051.6-1067.7 m,
Flowed gas at 132 000 m³/day.

Evergreen Formation

DST 2, 1072.9-1097.3 m,
Flowed gas at 114 700 m³/day.

Precipice Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	393	378	15
Showgrounds Ss	770	741	29
Weald Ss	17	14	3

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm	GAS Precipice Ss	GAS Showgrounds Ss
Methane	95.10	90.80	93.40
Ethane	0.85	2.30	0.18
Propane	0.05	0.20	0.15
Isobutane	0.07	0.26	0.23
N-butane	trace	0.03	0.02
Isopentane	-	0.07	0.06
N-pentane	-	0.01	trace
Hexanes +	-	0.20	0.06
N ₂ + O ₂	3.50	5.00	4.60
CO ₂	0.38	1.17	1.32
H ₂ S	-	-	-
Specific Gravity	0.579	0.612	0.596
BTU/ft ³ (gross)	984	987	965

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Showgrounds Ss
API Gravity @ 60°F	60.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.738
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Pleasant Hills-1) :

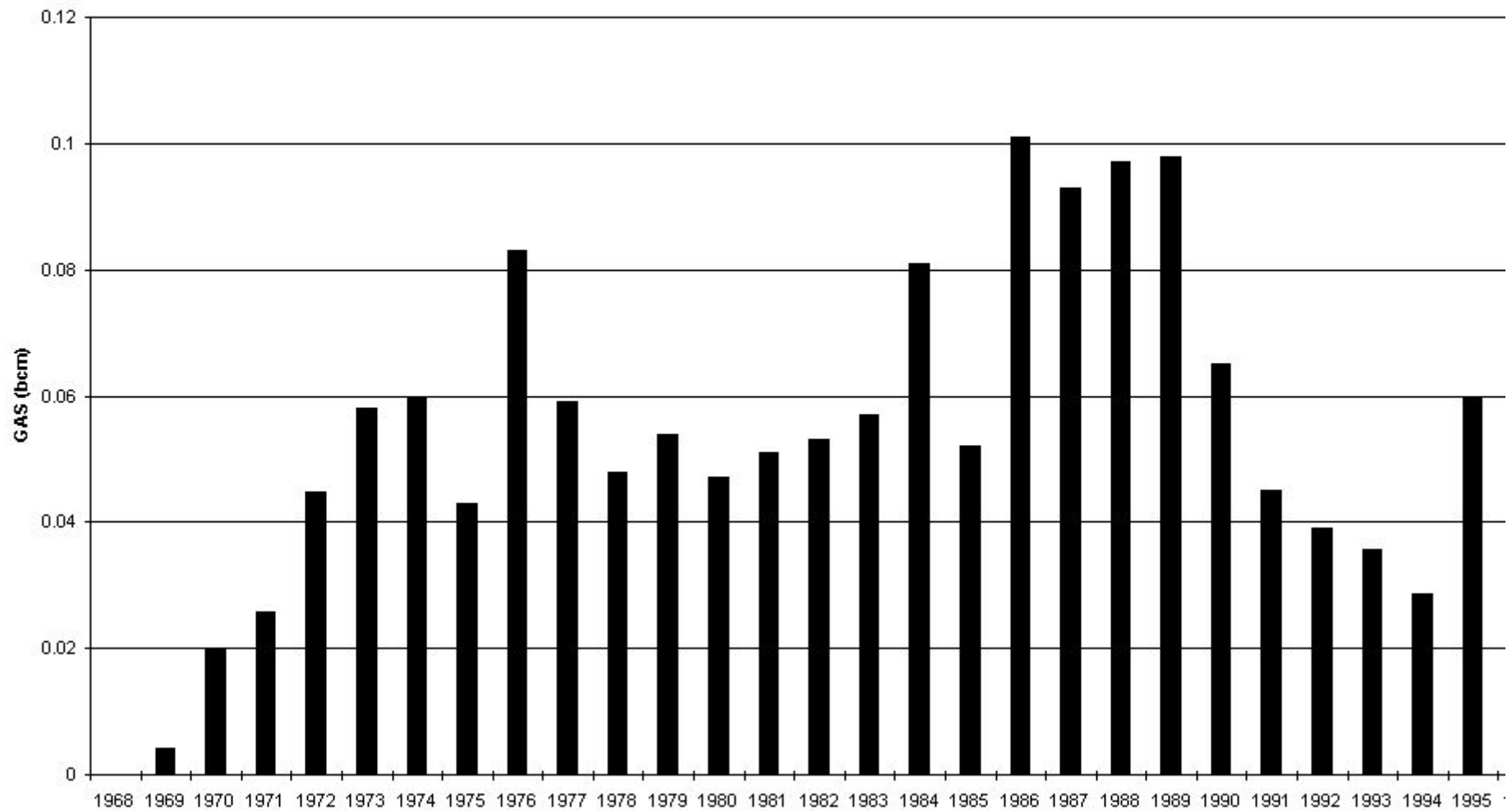
AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo Fm	00.0
	Gubberamunda Sandstone	158.5
	Westbourne Fm	213.7
	Springbok Sandstone	321.6
	Walloon Coal Measures	397.5
	Eurombah Fm	617.8
	Hutton Sanstone	676.8
	Evergreen Fm	908.6
	Precipice Sandstone	1005.5
TRIASSIC	Moolayember Fm	1019.3
	Showgrounds Sandstone	1061.3
	Rewan Fm	1075.0
PERMIAN	Blackwater Group	1146.7
DEVONIAN	Timbury Hills Fm	1194.8

* Picked by Geological Survey of Queensland

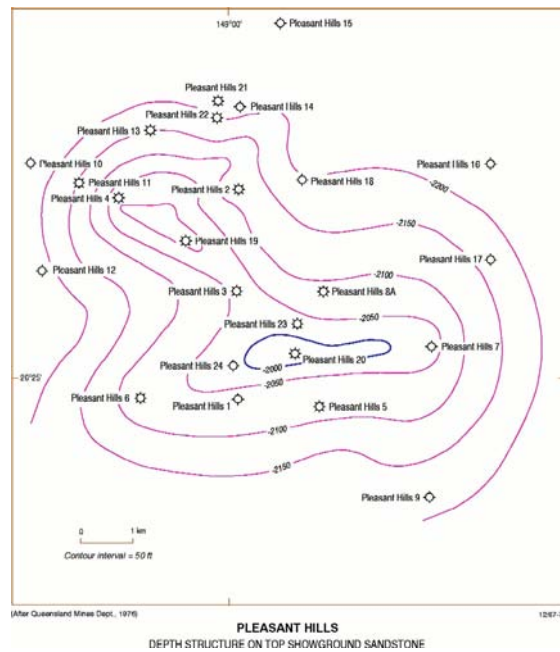
PLEASANT HILLS, GAS PRODUCTION (Precipice Sandstone, Showgrounds Sandstone & 'Weald' Sandstone)

Discovered 7 November 1968 Production commenced September 1969

Total Wells = 24 (9 Producers; 3 Shut In; 8 Plugged and Abandoned; 4 Suspended)



PLEASANT HILLS MAP



PRINGLE DOWNS

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	16 km south-southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 6
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Pringle Downs-1
Pool(s):	Evergreen Formation.
Longitude (E):	148.7139
Latitude (S):	-26.6778
Date total depth reached:	14 OCT 67
Ground level:	306.3 m
Kelly bushing:	309.7 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1240.2 mKB
DISCOVERY WELL:	Pringle Downs-2
Pool(s):	Timbury Hills Formation.
Longitude (E):	148.7167
Latitude (S):	26.6847
Date total depth reached:	06 DEC 67
Ground level:	294.7 m
Kelly bushing:	298.1 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1222 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE:	Structural/Stratigraphic trap
AREAL CLOSURE:	2.6 km ² (on Evergreen resistivity marker)
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Oil and Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse grained, subangular to rounded, quartzose.
DEPOSITIONAL ENVIRONMENT:	Shallow marine ?
FORMATION TOP (mKB):	1097.5 m (Pringle Downs-1)
PETROLEUM BEARING UNIT No.2:	Timbury Hills Formation
CONTENTS:	Gas
FORMATION:	Timbury Hills Formation
AGE:	Devonian
LITHOLOGY:	Sandstone : brown, fine grained, slightly metamorphosed, lithic.
DEPOSITIONAL ENVIRONMENT:	Continental

TEST DATA FROM THE DISCOVERY WELL (Pringle Downs-1):

DST 1, 1194.8-1206.7 m, Evergreen Formation
Flowed 58.5° API oil at 560 bbl/day and
gas at 42 500 m³/day.

DST 2, 1223.5-1240.2 m, Timbury Hills Formation
Recovered 9 m of mud.

TEST DATA FROM THE DISCOVERY WELL (Pringle Downs-2):

DST 1, 1184.2-1222.3 m, Timbury Hills Formation
Flowed gas at 96 300 m³/day and
recovered 1 m of condensate and 19 m
of gas cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Timbury Hills Fm	30	27	3

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Evergreen Fm	GAS Timbury Hills Fm
Methane	16.70	34.50
Ethane	10.60	11.70
Propane	24.20	16.80
Isobutane	13.70	9.50
N-butane	14.30	9.90
Isopentane	6.10	5.40
N-pentane	4.80	3.40
Hexanes +	8.40	6.90
N₂ + O₂	0.82	1.70
CO₂	0.40	0.19
H₂S	-	-
Specific Gravity	1.668	1.401
BTU/ft³ (gross)	2755	2321

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Timbury Hills Fm
API Gravity @ 60°F	58.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft³/bbl)	-
Pour Point	-
Specific Gravity	0.747
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

OIL :

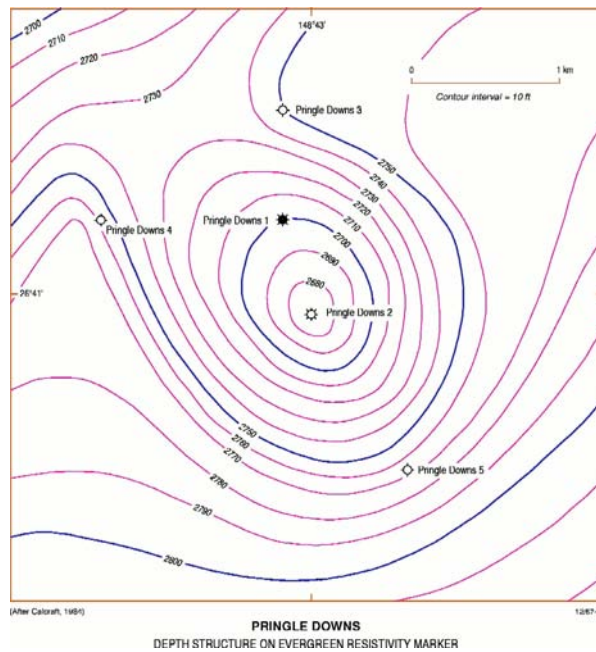
FLUID PROPERTIES	OIL Evergreen Fm
API Gravity @ 60°F	57.7°
Base	-
Sulphur (% wt)(ppm)	< 0.01%
Initial GOR (ft³/bbl)	2680:1
Pour Point	< -12.2°C
Specific Gravity	0.748
Colour	Yellow-green
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Pringle Downs-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	140.2
	Mooga Sandstone	261.2
JURASSIC	Orallo Fm	362.7
	Gubberamunda Sandstone	481.0
	Westbourne Fm	556.9
	Springbok Sandstone	665.1
	Walloon Coal Measures	695.9
	Eurombah Fm	915.0
	Hutton Sandstone	993.7
	Evergreen Fm	1097.9
	Precipice Sandstone	1208.8
TRIASSIC	Moolayember Fm	1211.9
DEVONIAN	Timbury Hills Fm	1229.0

* Picked by Geological Survey of Queensland

PRINGLE DOWNS MAP



PUNCHBOWL GULLY

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	140 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 43
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Punchbowl Gully-1
Longitude (E):	148.3372
Latitude (S):	-25.4211
Date total depth reached:	04 AUG 82
Ground level:	576.9 m
Kelly bushing:	581.2 m
Operator:	Associated Australian Resources Ltd
Total depth:	1398 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	5.0 km ²
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Mantuan Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Shallow marine
FORMATION TOP (mKB):	983.3 m

PETROLEUM BEARING UNIT No.2:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	1160.2 m

TEST DATA FROM THE DISCOVERY WELL (Punchbowl Gully-1):

DST 7, 680.0-709.9 m, Recovered 180 m of water.	Rewan Formation

DST 1, 710.0-723.0 m, Recovered 4.6 m of mud.	Rewan Formation

DST 2, 970.0-1039.9 m, Flowed gas at 30 300 m ³ /day and recovered 304.8 m of water and 3 m of sand.	Mantuan Formation

DST 6, 997.9-1007.0 m, Recovered 168 m of mud.	Mantuan Formation

DST 5, 1009.0-1018.9 m, Recovered 640 m of water.	Mantuan Formation

DST 3, 1165.5-1178.0 m,
Flowed gas at a rate too small to
measure.

Aldebaran Sandstone

DST 4, 1300.0-1321.0 m,
Flowed gas at 1130 m³/day and recovered
18 m of gas cut mud.

Aldebaran Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	20	1	19

COMPOSITIONAL DATA :

GAS :

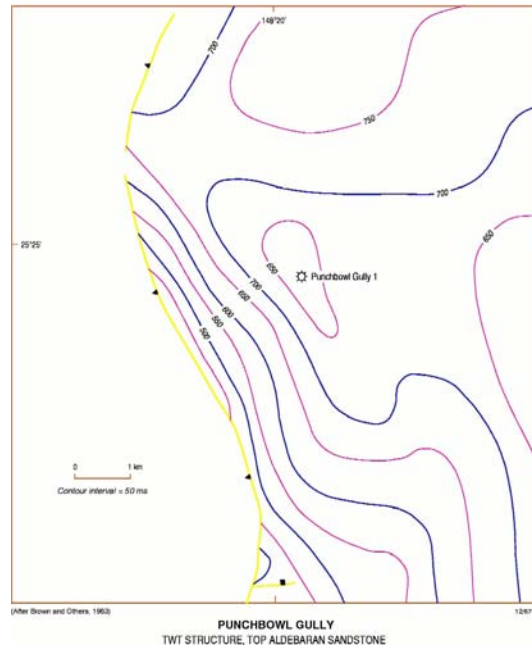
GAS PROPERTIES	GAS Mantuan Fm
Methane	90.10
Ethane	2.30
Propane	0.29
Isobutane	0.07
N-butane	0.07
Isopentane	0.18 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	6.60
CO ₂	0.45
H ₂ S	-
Specific Gravity	0.605
BTU/ft ³ (gross)	975

STRATIGRAPHY (Punchbowl Gully-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Hutton Sanstone	00.0
	Evergreen Fm	136.8
	Precipice Sandstone	234.4
TRIASSIC	Moolayember Fm	328.8
	Clematis Sandstone	333.0
	Rewan Fm	518.4
PERMIAN	Bandanna Fm	776.5
	Black Alley Shale	905.9
	Mantuan Fm	983.3
	Peawaddy Fm	1042.4
	Ingelara Fm	1074.9
	Aldebaran Sandstone	1160.2
	Cattle Creek Fm	1320.8
	Reids Dome Beds	1354.4

* Picked by Associated Australian Resources Ltd

PUNCHBOWL GULLY MAP



RASLIE

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	30 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 5
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Raslie-1
Pool(s):	Precipice Sandstone.
Longitude (E):	149.0800
Latitude (S):	-26.4944
Date total depth reached:	29 SEP 64
Ground level:	370.9 m
Kelly bushing:	374.3 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1337.5 mKB
DISCOVERY WELL:	Raslie-2
Pool(s):	Showgrounds Sandstone.
Longitude (E):	149.0689
Latitude (S):	-26.4000
Date total depth reached:	18 OCT 64
Ground level:	360.0 m
Kelly bushing:	363.3 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1256 mKB
NUMBER OF WELLS DRILLED:	6
STRUCTURE/TRAP:	Stratigraphic. Small, permeable sand pod within a structural closure.
AREAL CLOSURE:	5.2 km ²
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, fine to medium grained, subangular, slightly lithic and calcareous, commonly garnetiferous and quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1130.8 m (Raslie-1)
POROSITY:	20% (average)
PERMEABILITY:	110 md (average)
PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial

TEST DATA FROM THE DISCOVERY WELL (Raslie-1):

DST 1, 1127.8-1150.0 m, Precipice Sandstone
Flowed gas at 121 760 m³/day.

DST 2, 1200.9-1209.1 m, Showgrounds Sandstone
Recovered 1094 m of slightly oil cut mud.

Production Test 1, 1134.5-1149.7 m, Precipice Sandstone
Flowed gas at 43 830 m³/day.

Production Test 2, 1134.5-1149.7 m, Precipice Sandstone
Flowed gas at 34 320 m³/day.

TEST DATA FROM THE DISCOVERY WELL (Raslie-2):

DST 1, 1126.9-1146.1 m, Precipice Sandstone
Flowed gas at 820 m³/day and recovered
3 m of mud.

DST 3, 1162.5-1253.4 m, Showgrounds Sandstone
Flowed gas at 56 600 m³/day and
recovered 244 m of water.

DST 4, 1211.3-1253.4 m, Rewan Formation
Recovered 37 m of mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	155	148	7
Showgrounds Ss	16	15	1

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss	GAS Showgrounds Ss
Methane	95.20	90.10
Ethane	0.76	4.00
Propane	0.10	0.04
Isobutane	0.37	0.19
N-butane	trace	0.03
Isopentane	0.13	0.07
N-pentane	trace	0.01
Hexanes +	0.32	0.30
N₂ + O₂	2.20	4.40
CO₂	1.01	0.88
H₂S	-	-
Specific Gravity	0.601	0.606
BTU/ft³ (gross)	1011	1010

CONDENSATE :

FLUID PROPERTIES	GAS Precipice Ss
API Gravity @ 60°F	60°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft³/bbl)	-
Pour Point	-
Specific Gravity	0.738
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Raslie-1) :

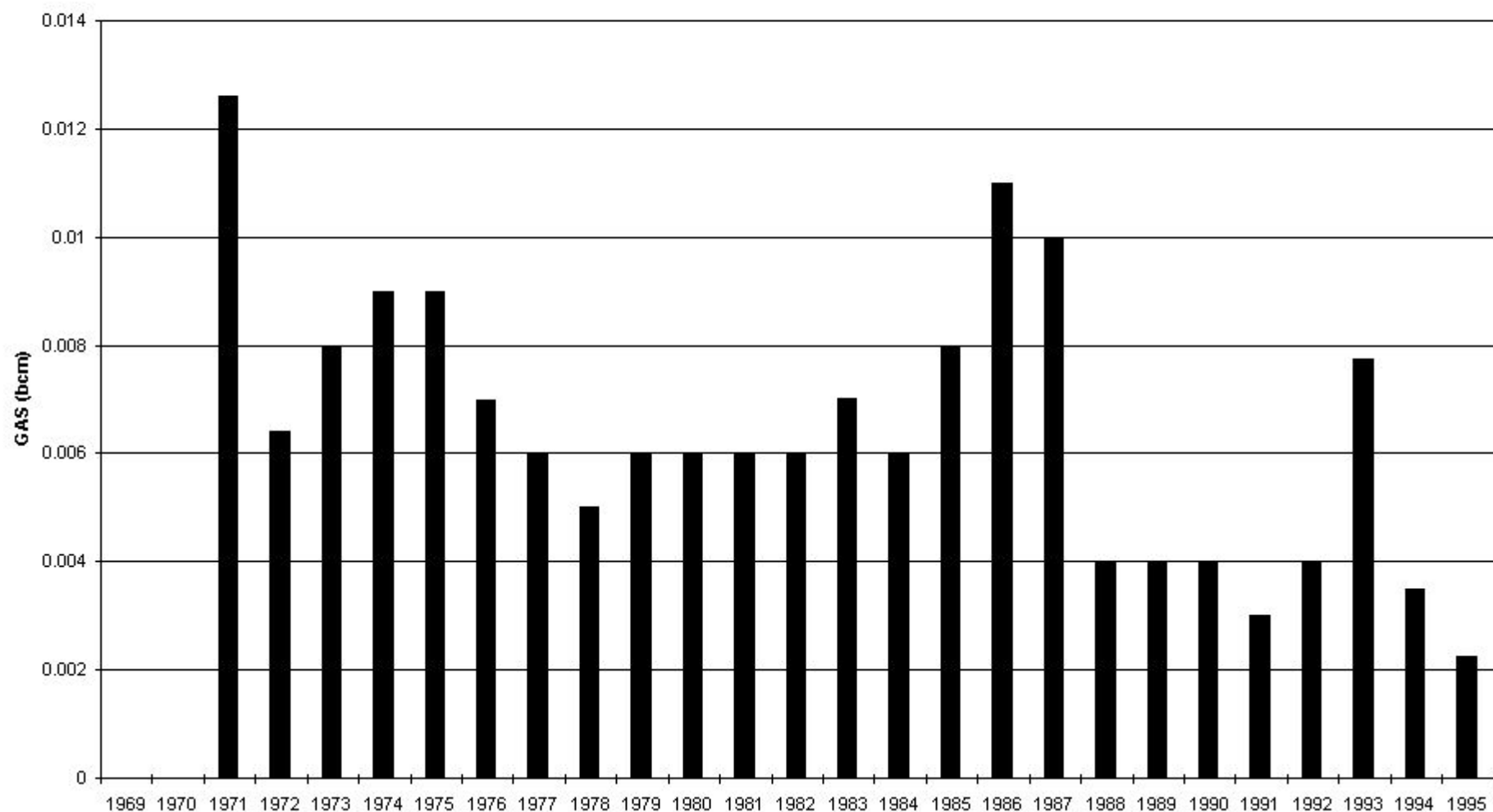
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	3.4
	Mooga Sandstone	70.1
JURASSIC	Orallo Fm	131.1
	Gubberamunda Sandstone	292.6
	Westbourne Fm	344.4
	Springbok Sandstone	462.1
	Walloon Coal Measures	543.2
	Eurombah Fm	771.1
	Hutton Sandstone	827.5
	Evergreen Fm	1039.4
	Precipice Sandstone	1130.8
TRIASSIC	Moolayember Fm	1155.2
	Snake Creek Mudstone Mbr	1191.8
	Showgrounds Sandstone	1203.4
	Rewan Fm	1213.1
PERMIAN	Blackwater Group	1267.1
CARBONIFEROUS	Granite	1322.8

* Picked by Geological Survey of Queensland

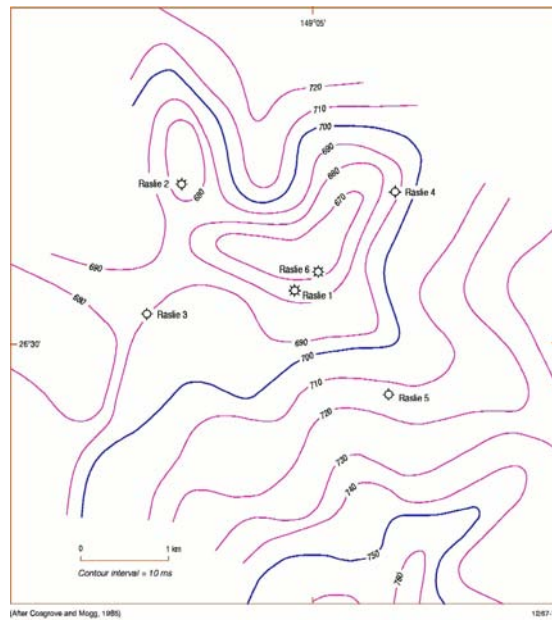
RASLIE, GAS PRODUCTION (Precipice Sandstone & Showgrounds Sandstone)

Discovered 27 September 1964 Production commenced June 1969

Total Wells = 6 (1 Producer; 1 Shut In; 4 Plugged and Abandoned)



RASLIE MAP



REDNOOK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	91 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 71
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Rednook-1
Longitude (E):	149.2625
Latitude (S):	-27.3194
Date total depth reached:	23 NOV 87
Ground level:	388.5 m
Kelly bushing:	394.3 m
Operator:	Crusader Oil NL
Total depth:	2500 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2205.0 m

PETROLEUM BEARING UNIT No.2:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	2226.5 m

TEST DATA FROM THE DISCOVERY WELL (Rednook-1):

DST 1, 2199.8-2224.3 m, Flowed gas at 35 000 m ³ /day and recovered 125 bbl of mud and condensate and 3 bbl of muddy water.	Showgrounds Sandstone

DST 2, 2224.5-2270.0 m, Flowed gas at 9000 m ³ /day and recovered 1.5 bbl of oil cut mud.	Rewan Formation

DST 3, 2273.5-2287.0 m, No recovery.	Rewan Formation

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	very small	very small	very small

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	very small	very small	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	very small	very small	very small

STRATIGRAPHY (Rednook-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	341.5
	Wallumbilla Fm	409.0
	Bungil Fm	606.5
	Mooga Sandstone	812.0
JURASSIC	Orallo Fm	950.5
	Gubberamunda Sandstone	1102.5
	Westbourne Formation	1254.0
	Springbok Sandstone	1365.0
	Walloon Coal Measures	1443.0
	Hutton Sandstone	1665.5
	Evergreen Fm	1867.5
TRIASSIC	Moolayember Fm	1980.5
	Snake Creek Mudstone Mbr	2184.5
	Showgrounds Sandstone	2205.0
	Rewan Fm	2226.5
PERMIAN	Blackwater Group	2293.0
DEVONIAN	Timbury Hills Formation	2467.0

* Picked by Geological Survey of Queensland

REIDS DOME

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 98 km north of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 337-P
 BASIN: Bowen
 SUB-BASIN: Denison Trough
 DISCOVERY WELL: Reids Dome-1A
 Longitude (E): 148.3217
 Latitude (S): -24.7903
 Date total depth reached: 03 AUG 75
 Ground level: 293.0 m
 Kelly bushing: 294.0 m
 Operator: Minex
 Total depth: 139 mKB
 NUMBER OF WELLS DRILLED: 7
 STRUCTURE/TRAP: Anticline.
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Cattle Creek Formation
 CONTENTS: Gas
 FORMATION: Cattle Creek Formation
 AGE: Early Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Shallow marine
 FORMATION TOP (mKB): 20.0 m

TEST DATA FROM THE DISCOVERY WELL (Reids Dome-1A):

Production Test 1, 137.8-138.7 m, Cattle Creek Formation
 Flowed gas at 29 730 m³/day.

Production Test 2, 137.8-138.7 m, Cattle Creek Formation
 Flowed gas at 24 780 m³/day.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Cattle Creek Fm	4	very small	4

STRATIGRAPHY (Reids Dome-1A) :

AGE	UNIT	FORMATION TOP * (mKB)
PERMIAN	Aldebaran Sandstone	00.0
	Cattle Creek Fm	20.0

RICHMOND

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	10 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 7
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Richmond-1
Pool(s):	Precipice Sandstone.
Longitude (E):	148.8833
Latitude (S):	-26.6750
Date total depth reached:	24 AUG 63
Ground level:	295.0 m
Kelly bushing:	298.4 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1258.8 mKB
DISCOVERY WELL:	Richmond-10
Pool(s):	Moolayember Formation.
Longitude (E):	148.8622
Latitude (S):	-26.7014
Date total depth reached:	21 JAN 64
Ground level:	303.0 m
Kelly bushing:	306.3 m
Operator:	Associated Australian Oilfields Ltd
Total depth:	1302 mKB
NUMBER OF WELLS DRILLED:	24
STRUCTURE/TRAP:	Stratigraphic trap within a channel sand system.
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse grained, subangular to subrounded, poorly sorted, slightly lithic and garnetiferous, quartzose with kaolinitic matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial (channel and point bar sands)
FORMATION TOP (mKB):	1220.1 m (Richmond-1)
POROSITY:	16% (average)
PERMEABILITY:	100 to 150 md (average from core analysis)
PETROLEUM BEARING UNIT No.2:	Moolayember Formation
CONTENTS:	Oil and Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine

TEST DATA FROM THE DISCOVERY WELL (Richmond-1):

DST 1, 1222.2-1238.1 m, Precipice Sandstone
 Flowed 43° API oil at 1000 bbl/day and
 gas at 2690 m³/day. Recovered 9 m of
 gas cut, muddy water and 30 m of water.

Production Test, 1220.7-1223.8 m, Precipice Sandstone
 Flowed oil at 855 bbl/day.

TEST DATA FROM THE DISCOVERY WELL (Richmond-10):

DST 1, 1233.5-1254.9 m, Precipice Sandstone
 Flowed gas at 254 800 m³/day and
 recovered 9 m of oil/condensate.

DST 2, 1254.0-1302.1 m, Moolayember Formation
 Flowed 44° API oil at 220 bbl/day,
 gas at 18 400 m³/day and recovered 37 m
 of oil cut mud and 3 m of water cut mud.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	430	414	16

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	3	3	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Precipice Ss	GAS Precipice Ss	GAS Moolayember Fm
Methane	57.60	85.30	87.90
Ethane	12.20	5.30	3.90
Propane	11.60	2.80	1.56
Isobutane	6.00	0.96	0.30
N-butane	3.10	0.63	0.31
Isopentane	2.60	0.49	0.28
N-pentane	0.47	0.24	0.29
Hexanes +	3.70	1.75	2.10
N₂ + O₂	2.50	2.00	3.30
CO₂	0.26	0.50	0.11
H₂S	-	-	-
Specific Gravity	1.067	0.732	-
BTU/ft³ (gross)	1701	1433	-

OIL :

FLUID PROPERTIES	OIL Precipice Ss	OIL Moolayember Fm
API Gravity @ 60°F	42.8° to 44.0°	47.0°
Base	Napthenic	-
Sulphur (% wt)(ppm)	0.10%	-
Initial GOR (ft³/bbl)	250 (Average)	-
Pour Point	3.3°C	-
Specific Gravity	0.812 to 0.806	0.784
Colour	Green	-
Viscosity (cp@100°F)	1.80 to 2.20	-
Bubble Point (psig)	400	na

STRATIGRAPHY (Richmond-1) :

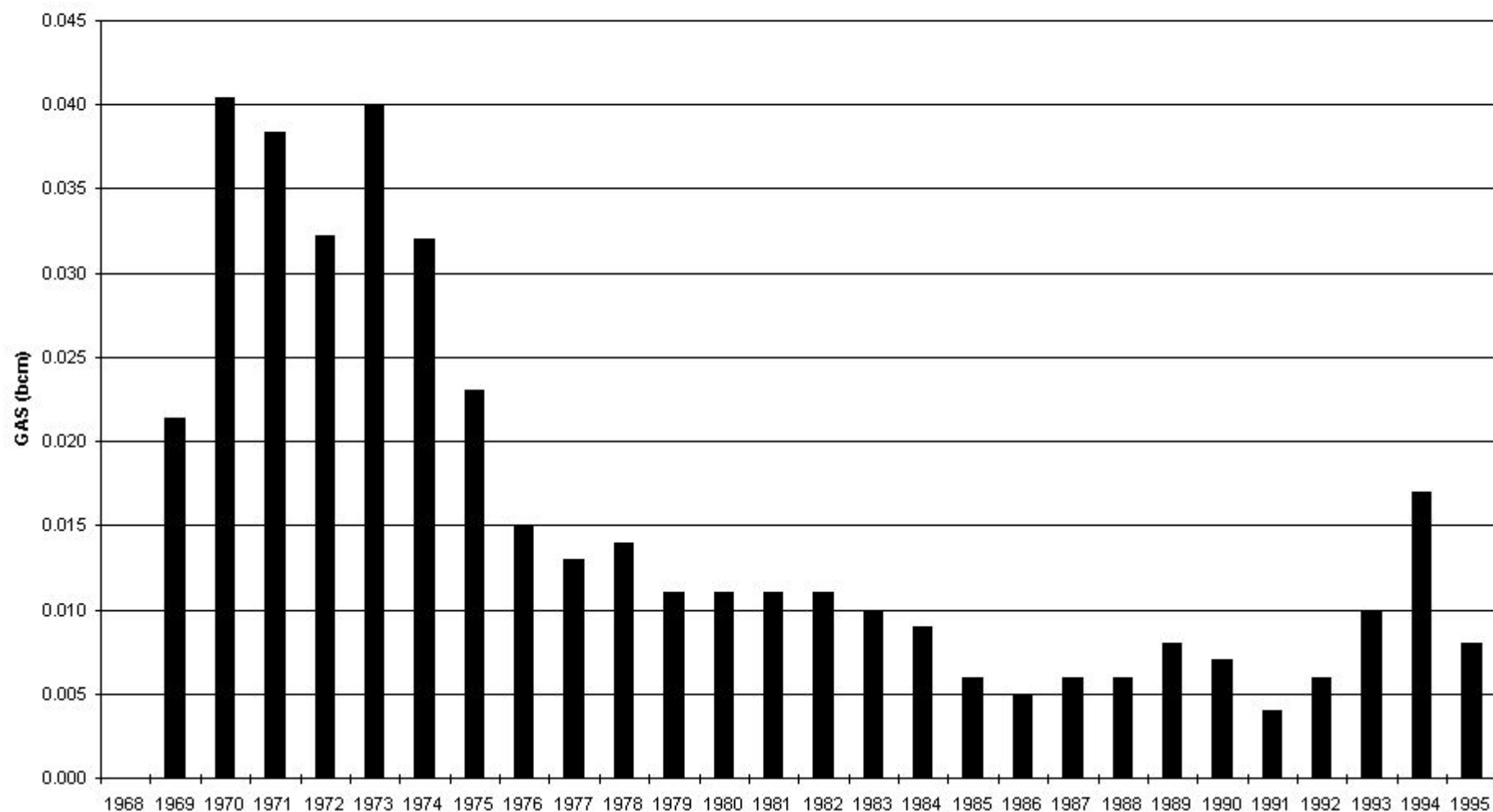
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	114.3
	Mooga Sandstone	225.3
JURASSIC	Orallo Fm	293.2
	Gubberamunda Sandstone	470.9
	Westbourne Fm	533.4
	Springbok Sandstone	667.5
	Walloon Coal Measures	702.3
	Eurombah Fm	927.2
	Hutton Sanstone	977.2
	Evergreen Fm	1110.1
	Precipice Sandstone	1220.1
TRIASSIC	Moolayember Fm	1224.7

* Picked by Geological Survey of Queensland

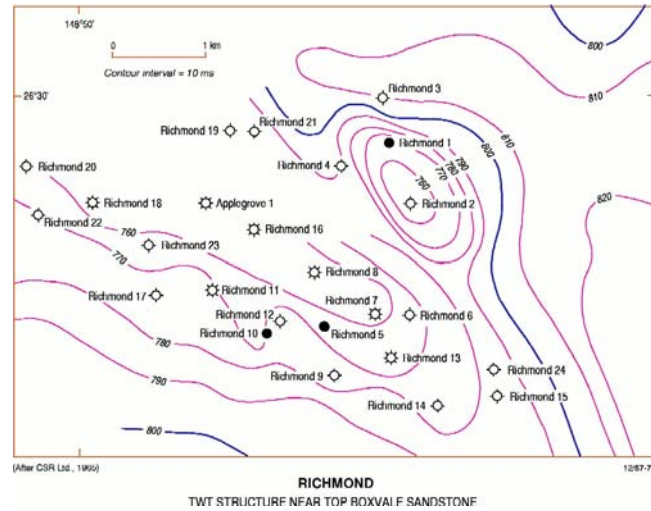
POROSITY AND PERMEABILITY DATA (Richmond-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
40.5	13.0	-	-	Wallumbilla Fm
1223.0	21.0	322.0	378.0	Precipice Sandstone
1223.5	22.5	291.0	237.0	Precipice Sandstone
1224.1	20.0	35.0	10.0	Precipice Sandstone
1224.7	24.5	692.0	494.0	Precipice Sandstone
1225.3	17.5	0.0	0.0	Moolayember Fm
1230.2	20.5	0.0	0.0	Moolayember Fm
1230.8	21.0	0.0	0.0	Moolayember Fm
1231.4	27.0	4.0	0.0	Moolayember Fm
1232.0	26.5	5.0	6.0	Moolayember Fm
1232.7	27.0	10.0	-	Moolayember Fm
1233.3	22.5	0.0	0.0	Moolayember Fm
1235.1	18.5	0.0	0.0	Moolayember Fm
1235.7	18.0	0.0	0.0	Moolayember Fm

RICHMOND, GAS PRODUCTION (Precipice Sandstone)
 Discovered 24 August 1963 Production commenced March 1969
Total Wells = 25 (2 Producers; 5 Shut In; 15 Plugged and Abandoned; 3 Suspended)



RICHMOND MAP



RIVERSLEA

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Producer
 LOCATION: 82 km south of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 30
 BASIN: Surat
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Riverslea-1
 Longitude (E): 148.7445
 Latitude (S): -27.3481
 Date total depth reached: 24 AUG 81
 Ground level: 229.0 m
 Kelly bushing: 233.0 m
 Operator: BHP Petroleum
 Total depth: 1579.6 mKB
 NUMBER OF WELLS DRILLED: 3
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Evergreen Formation
 CONTENTS: Oil
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine
 FORMATION TOP (mKB): 1468.5 m

TEST DATA FROM THE DISCOVERY WELL (Riverslea-1):

DST 1, 1491.5-1577.0 m, Evergreen Formation
 Recovered 3 bbl of oil cut water.

DST 2, 1507.0-1517.1 m, Evergreen Formation
 Flowed oil at 62 bbl/day and water at 11 bbl/day.

DST 3, 1536.5-1538.0 m, Evergreen Formation
 Recovered 13 bbl of diesel.

DST 4, 1512.0-1514.0 m, Evergreen Formation
 Flowed oil at 300 bbl/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	75	72	3

COMPOSITIONAL DATA :

OIL :

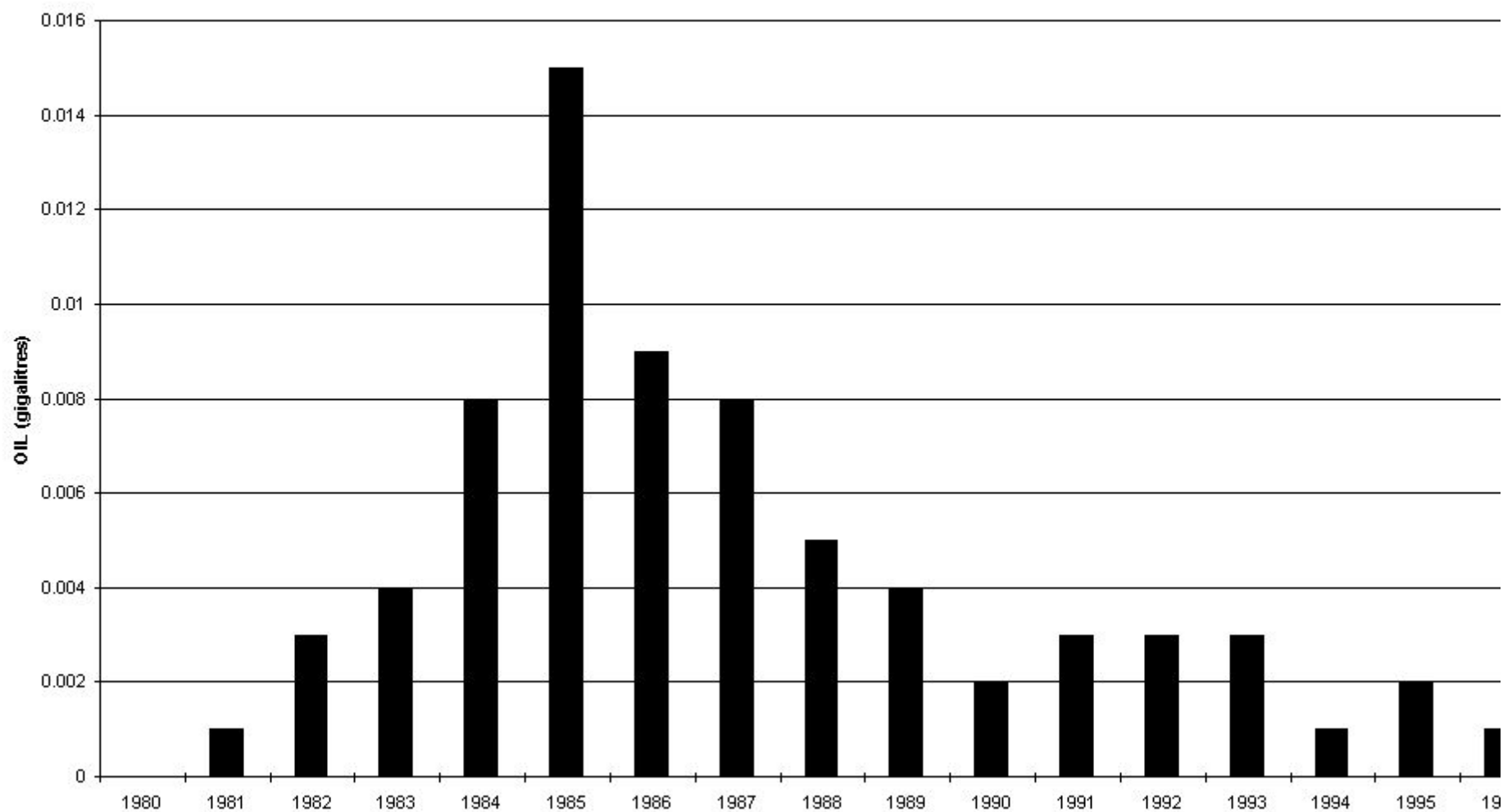
FLUID PROPERTIES	OIL Evergreen Fm
API Gravity @ 60°F	28.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	5°C
Specific Gravity	0.900
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Riverslea-1) :

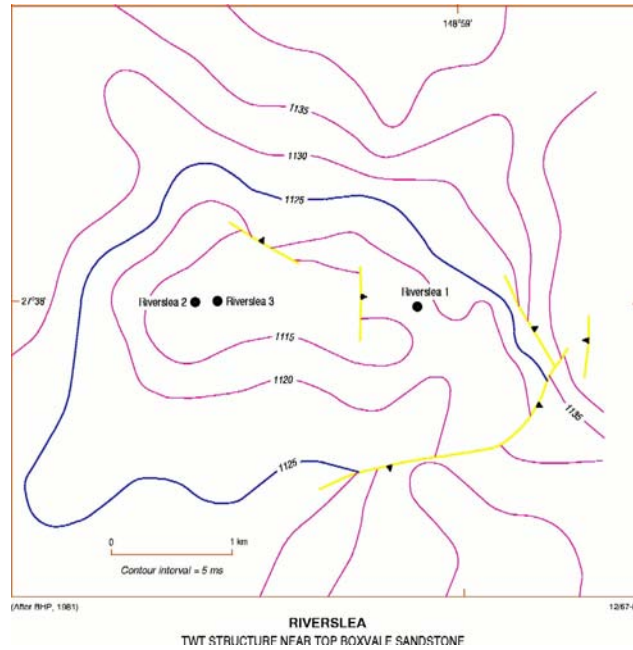
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	260.6
	Bungil Fm	451.7
	Mooga Sandstone	595.9
JURASSIC	Orallo Fm	745.2
	Gubberamunda Sandstone	848.3
	Westbourne Fm	1024.1
	Springbok Sandstone	1107.3
	Walloon Coal Measures	1161.0
	Hutton Sandstone	1304.5
	Evergreen Fm	1468.5
CARBONIFEROUS	Granite	1553.9

* Picked by Geological Survey of Queensland

RIVERSLEA, OIL PRODUCTION (Evergreen Formation)
Discovered 24 August 1984 Production commenced October 1981
Total Wells = 3



RIVERSLEA MAP



ROCKWOOD

PRESENT OPERATOR: XLX NL
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 81 km north of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 260-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Goondiwindi Slope
 DISCOVERY WELL: Rockwood-1
 Longitude (E): 150.3694
 Latitude (S): -26.9803
 Date total depth reached: 29 OCT 72
 Ground level: 303.2 m
 Kelly bushing: 307.5 m
 Operator: LSG Australia Incorporated
 Total depth: 1206.1 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Structural/Stratigraphic.
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1129.9 m

TEST DATA FROM THE DISCOVERY WELL (Rockwood-1):

DST 1, 1143.0-1159.2 m, Precipice Sandstone
 Recovered 300 m of slightly oil cut water.

DST 2, 1185.7-1196.9 m, Precipice Sandstone
 Flowed gas at 19 930 m³/day and
 recovered 3 m of oil cut mud.

STRATIGRAPHY (Rockwood-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo Fm	00.0
	Gubberamunda Sandstone	169.2
	Westbourne Fm	193.5
	Springbok Sandstone	309.4
	Walloon Coal Measures	329.2
	Hutton Sandstone	768.1
	Evergreen Fm	987.6
	Precipice Sandstone	1129.9
CARBONIFEROUS	Basement	1200.9

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Rockwood-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1149.9	6.8	0.1	0.1	Precipice Sandstone
1153.0	13.7	0.3	0.1	Precipice Sandstone
1156.0	9.7	0.1	0.1	Precipice Sandstone
1160.6	5.6	0.1	0.1	Precipice Sandstone
1191.8	13.0	0.6	0.3	Precipice Sandstone

ROCKWOOD NORTH

PRESENT OPERATOR: XLX NL
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 86 km north of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 260-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Gooniwindi Slope
 DISCOVERY WELL: Rockwood North-1
 Longitude (E): 150.3956
 Latitude (S): -26.9456
 Date total depth reached: 25 AUG 73
 Ground level: 296.9 m
 Kelly bushing: 300.2 m
 Operator: LSG Australia Incorporated
 Total depth: 1251.2 mKB
 NUMBER OF WELLS DRILLED: 1
 STRUCTURE/TRAP: Stratigraphic
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Oil
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1172.6 m

TEST DATA FROM THE DISCOVERY WELL (Rockwood North-1):

DST 1, 1234.1-1251.2 m, Precipice Sandstone
 Recovered 4.6 m of oil.

DST 2, 1235.4-1251.2 m, Precipice Sandstone
 Recovered 21 m of oil cut mud.

STRATIGRAPHY (Rockwood North-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Orallo Fm	00.0
	Gubberamunda Sandstone	128.0
	Westbourne Fm	158.5
	Springbok Sandstone	272.2
	Walloon Coal Measures	288.0
	Hutton Sandstone	778.8
	Evergreen Fm	1013.5
	Precipice Sandstone	1172.6
CARBONIFEROUS	Basement	1245.1

* Picked by Geological Survey of Queensland

ROLLESTON

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	228 km north of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 42
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Rolleston-1
Longitude (E):	148.6311
Latitude (S):	-24.5631
Date total depth reached:	25 JAN 64
Ground level:	208.2 m
Kelly bushing:	211.5 m
Operator:	Associated Freney Oil Fields Ltd
Total depth:	2898 mKB
NUMBER OF WELLS DRILLED:	12
STRUCTURE:	Structural/Stratigraphic. Anticline with reservoir distribution limited by permeability barriers.
AREAL CLOSURE:	52 km ²
RESERVOIR UNITS:	3
PETROLEUM BEARING UNIT No.1:	Mantuan Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone : white to light gray, fine to medium grained, micaceous, quartzose with clay and calcite matrix and interbeds of carbonaceous shale.
DEPOSITIONAL ENVIRONMENT:	Deltaic to fluvial
FORMATION TOP (mKB):	563.9 m
POROSITY:	15% (average)
PERMEABILITY:	20 md (average)
PETROLEUM BEARING UNIT No.2:	Freitag Formation
CONTENTS:	Gas
FORMATION:	Freitag Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone : fine grained, pebbly, friable, quartzose.
DEPOSITIONAL ENVIRONMENT:	Shallow marine bar.
FORMATION TOP (mKB):	899.0 m
POROSITY:	19% (average)
PERMEABILITY:	1000 to 4000 md (1800 md average).
PETROLEUM BEARING UNIT No.3:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	956.0 m

TEST DATA FROM THE DISCOVERY WELL (Rolleston-1):

DST 1, 559.6-579.7 m, Flowed gas at 39 080 m ³ /day and recovered 40 m of gas cut mud and 390 m of gas cut, muddy water.	Mantuan Formation
DST 2, 859.8-905.0 m, Flowed gas at 155 180 m ³ /day.	Freitag Formation
DST 14, 905.9-908.3 m, Flowed gas at 83 530 m ³ /day and recovered 35 m of condensate.	Freitag Formation
DST 10, 958.3-967.4 m, Flowed gas at 566 m ³ /day and recovered 100 m of watery mud.	Aldebaran Sandstone
DST 9, 996.7-1017.1 m, Recovered 1.5 m of mud.	Aldebaran Sandstone
DST 13, 1051.6-1054.6 m, No gas to surface. Recovered 1.8 m of mud.	Aldebaran Sandstone
DST 8, 1052.8-1053.1 m, No gas to surface.	Aldebaran Sandstone
DST 7, 1074.4-1084.2 m, Recovered 1.5 m of mud.	Aldebaran Sandstone
DST 12, 1107-1110.1 m, Recovered 18 m of gas cut mud.	Aldebaran Sandstone
DST 6, 1107.6-1108.3 m, Recovered 6 m of mud.	Aldebaran Sandstone
DST 5, 1143.0-1144.2 m, Flowed gas at 53 m ³ /day and recovered 139 m of gas cut mud.	Aldebaran Sandstone
DST 11, 1210.1-1213.1 m, No gas to surface. Recovered 82 m of mud.	Aldebaran Sandstone
DST 4, 1211-1211.6 m, Recovered 173.7 m of gas cut mud.	Aldebaran Sandstone
DST 3, 1324.4-1328.9 m, Flowed gas at 5660 m ³ /day.	Aldebaran Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	28	16	12
Freitag Fm	370	223	147
Mantuan Fm	278	133	145

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss	GAS Mantuan Fm	GAS Freitag Fm
Methane	84.10	94.0	85.90
Ethane	6.30	1.38	4.10
Propane	3.80	0.02	1.34
Isobutane	0.57	trace	0.36
N-butane	1.21	trace	0.46
Isopentane	0.34	-	0.21
N-pentane	0.39	-	0.19
Hexanes +	0.75	-	0.22
N ₂ + O ₂	2.30	4.20	4.50
CO ₂	0.20	0.32	2.70
H ₂ S	-	-	-
Specific Gravity	-	0.582	0.657
BTU/ft ³ (gross)	-	974	1031

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Freitag Fm
API Gravity @ 60°F	50.1°
Base	-
Sulphur (% wt)(ppm)	0.02%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.7792
Colour	Pale straw
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Rolleston-1) :

AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Rewan Fm	00.0
PERMIAN	Bandanna Fm	201.0
	Black Alley Shale	373.0
	Peawaddy Fm	565.0
	Catherine Sandstone	718.0
	Ingelara Fm	732.0
	Aldebaran Sandstone	956.0
	Cattle Creek Fm	1402.0
	Reids Dome Beds	2231.0

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Rolleston-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
576.7	15.0	0.0	0.0	Peawaddy Fm
578.6	17.0	3.0	0.0	Peawaddy Fm
898.9	21.0	886.0	976.0	Ingelara Fm
899.5	24.5	937.0	862.0	Ingelara Fm
900.1	19.0	1347.0	653.0	Ingelara Fm
900.7	21.5	1125.0	972.0	Ingelara Fm
901.3	22.0	1510.0	1354.0	Ingelara Fm
902.0	20.0	2610.0	2190.0	Ingelara Fm
902.6	23.0	2400.0	2330.0	Ingelara Fm
903.2	22.0	1123.0	873.0	Ingelara Fm

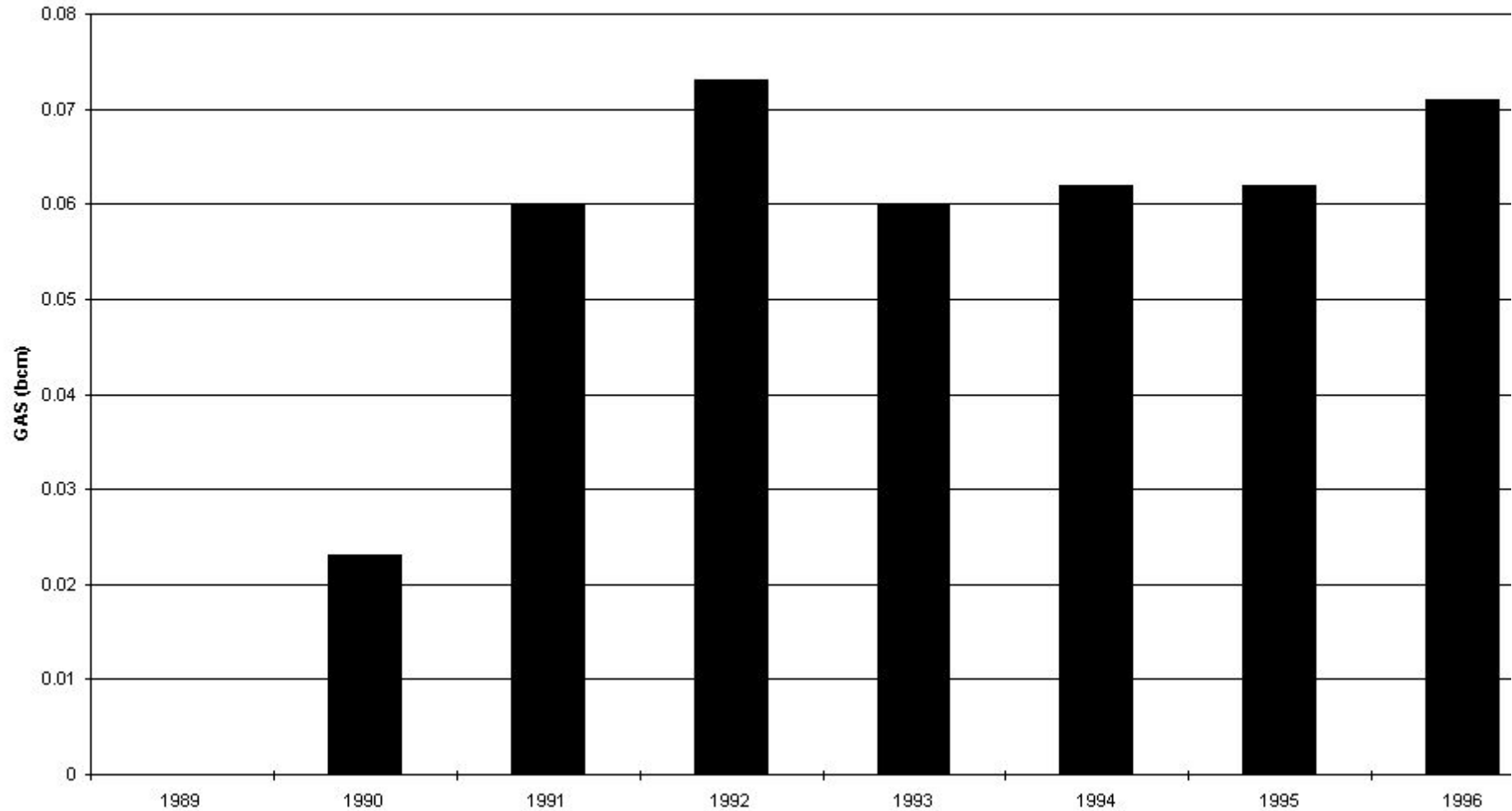
GEOCHEMICAL DATA :

WELLNAME	SAMPLE DEPTH (mKB)	TOC	ROCK-EVAL PYROLYSIS					VR (%)	FORMATION
			S1	S2	S3	HI	OI		
Rolleston-1	274.6	1.40						0.49	Bandanna Fm
	275.0	34.8	0.33	83.17	3.48	239	10	-	Bandanna Fm
	430.4	2.70						0.57	Black Alley Shale
	430.6	3.15						0.51	Black Alley Shale
	431.0	2.75	0.03	1.87	0.68	69	25	-	Black Alley Shale
	720.5	0.30						0.57	Catherine Ss
	721.0	0.55	0.10	1.29	0.01	16	13	-	Catherine Ss
	874.0	2.39	0.30	1.20	0.43	50	18	-	Ingelara Fm
	874.2	2.35						0.89	Ingelara Fm
	1217.0	0.84	0.18	0.27	0.07	32	8	-	Aldebaran Ss
	1217.2	1.65						0.84	Aldebaran Ss
	1400.6	1.25						0.94	Aldebaran Ss
	1401.0	0.84	0.13	0.19	0.05	23	6	-	Aldebaran Ss
	1713.7	2.05						1.20	Cattle Creek Fm
	1714.0	2.45	0.51	0.76	0.22	31	9	-	Cattle Creek Fm
	2166.0	2.92	0.35	0.53	0.06	18	2	-	Cattle Creek Fm
	2166.2	2.70	-	-	-	-	-	1.59	Cattle Creek Fm
	2626.0	1.32	-	-	-	-	-	-	Reids Dome Beds
	2626.1	1.20	-	-	-	-	-	2.06	Reids Dome Beds

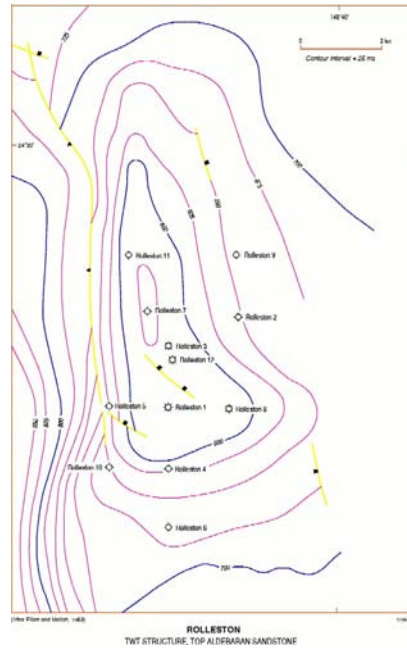
ROLLESTON, GAS PRODUCTION (Aldebaran Sandstone, Freitag Formation & Mantuan Formation)

Discovered 25 January 1964 Production commenced June 1990

Total Wells = 12 (4 Producers; 8 Plugged and Abandoned)



ROLLESTON MAP



ROMA

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Past Producer
 LOCATION: 10 km northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 5
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Roma (AAO 1)
 Longitude (E): 148.8500
 Latitude (S): -26.5747
 Date total depth reached: 30 AUG 52
 Ground level: 342.3 m
 Kelly bushing: 343.8 m
 Operator: Associated Australian Oilfields NL
 Total depth: 1187 mKB
 NUMBER OF WELLS DRILLED: 3
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Moolayember Formation
 CONTENTS: Gas
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 993.3 m

TEST DATA FROM THE DISCOVERY WELL (Roma (AAO 1)):

DST 1, 1137.8-1187.8 m, Moolayember Formation
 Flowed gas at 184 m³/day.

STRATIGRAPHY (Roma (AAO 2)) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Bungil Fm	00.0
	Mooga Sandstone	71.6
JURASSIC	Orallo Fm	118.9
	Gubberamunda Sandstone	280.4
	Westbourne Fm	326.1
	Springbok Sandstone	420.6
	Walloon Coal Measures	490.7
	Eurombah Formation	676.7
	Hutton Sanstone	759.0
	Evergreen Fm	944.9
	Boxvale Sandstone Mbr	979.0
	Precipice Sandstone	1047.0
TRIASSIC	Moolayember Formation	1075.9
CARBONIFEROUS	Basement	1096.7

* Picked by Geological Survey of Queensland

ROSWIN

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	103 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 66
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Roswin-1
Longitude (E):	149.2300
Latitude (S):	-27.4578
Date total depth reached:	07 FEB 84
Ground level:	309.2 m
Kelly bushing:	313.7 m
Operator:	Bridge Oil Ltd
Total depth:	2173.5 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline at Evergreen Formation level. Fault dependent closure at top Permian level.
AREAL CLOSURE:	4.8 km ² (on top Evergreen Formation)
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2059.0 m
TEST DATA FROM THE DISCOVERY WELL (Roswin-1):	
DST 1, 2058.0-2072.9 m, Flowed gas at 181 230 m ³ /day and recovered 1.3 cubic metres of condensate.	Showgrounds Sandstone
DST 2, 2073.0-2082.5 m, Recovered 87 bbl of slightly gas cut water with a trace of an oil scum.	Showgrounds Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	23	7	16

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	8	2	6

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	6	2	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	87.63
Ethane	5.10
Propane	1.85
Isobutane	2.80
N-butane	0.69
Isopentane	0.78 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.72
CO ₂	0.43
H ₂ S	-
Specific Gravity	0.649
BTU/ft ³ (gross)	1037

STRATIGRAPHY (Roswin-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	287.0
	Wallumbilla Fm	367.0
	Bungil Fm	590.0
	Mooga Sandstone	788.0
JURASSIC	Orallo Fm	871.0
	Gubberamunda Sandstone	1076.0
	Westbourne Fm	1228.0
	Springbok Sandstone	1317.0
	Walloon Coal Measures	1402.0
	Hutton Sandstone	1625.0
	Evergreen Fm	1778.0
TRIASSIC	Moolayember Fm	1877.0
	Snake Creek Mudstone Mbr	2040.0
	Showgrounds Sandstone	2059.0
PERMIAN	Blackwater Group	2082.0
DEVONIAN	Timbury Hills Fm	2155.0

* Picked by Geological Survey of Queensland

ROSWIN WEST

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	104 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 66
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Roswin West-1
Longitude (E):	149.2081
Latitude (S):	-27.4653
Date total depth reached:	04 AUG 92
Ground level:	301.0 m
Kelly bushing:	307.0 m
Operator:	Bridge Oil Ltd
Total depth:	2230 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline.
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
 TEST DATA FROM THE DISCOVERY WELL (Roswin West-1):	
DST 1, 2067.0-2088.0 m, Flowed gas at 48 100 m ³ /day (after cleanup and completion).	Showgrounds Sandstone
 DST 2, 2064.0-2080.0 m, Misrun.	 Showgrounds Sandstone

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	4	very small	4

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	1	very small	1

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	1	very small	1

ROSWIN NORTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	102 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 66
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Roswin West-1
Longitude (E):	149.2239
Latitude (S):	-27.4379
Date total depth reached:	20 JUL 92
Ground level:	359.0 m
Kelly bushing:	364.2 m
Operator:	Bridge Oil Ltd
Total depth:	2285 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Anticline.
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
 TEST DATA FROM THE DISCOVERY WELL (Roswin North-1):	
DST 1, 2138.0-2160.0 m,	Showgrounds Sandstone
Flowed gas at 172 700 m ³ /day and	
condensate at 320 bbls/day.	

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	170	7	163

RESERVES (as at 30/6/94) CONTD :

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	59	2	57

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	44	2	42

ROYSTON

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 52 km south-southwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 21
 BASIN: Surat
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Royston-1
 Longitude (E): 148.6500
 Latitude (S): -27.0569
 Date total depth reached: 20 JUL 81
 Ground level: 321.9 m
 Kelly bushing: 326.8 m
 Operator: Hartogen Energy Ltd
 Total depth: 1457.9 mKB
 NUMBER OF WELLS DRILLED: 4
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Evergreen Formation
 CONTENTS: Gas
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine
 FORMATION TOP (mKB): 1336.2 m

TEST DATA FROM THE DISCOVERY WELL (Royston-1):

DST 1, 1414.3-1426.5 m, Evergreen Formation
 Flowed gas at 239 560 m³/day and
 recovered 14 m of condensate cut mud
 and 6 m of condensate.

RESERVES (as at 30/6/96):

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	66	58	8

RESERVES (as at 30/6/94) CONTD :**CONDENSATE :**

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	1	1	very small

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	2	2	very small

COMPOSITIONAL DATA :**GAS :**

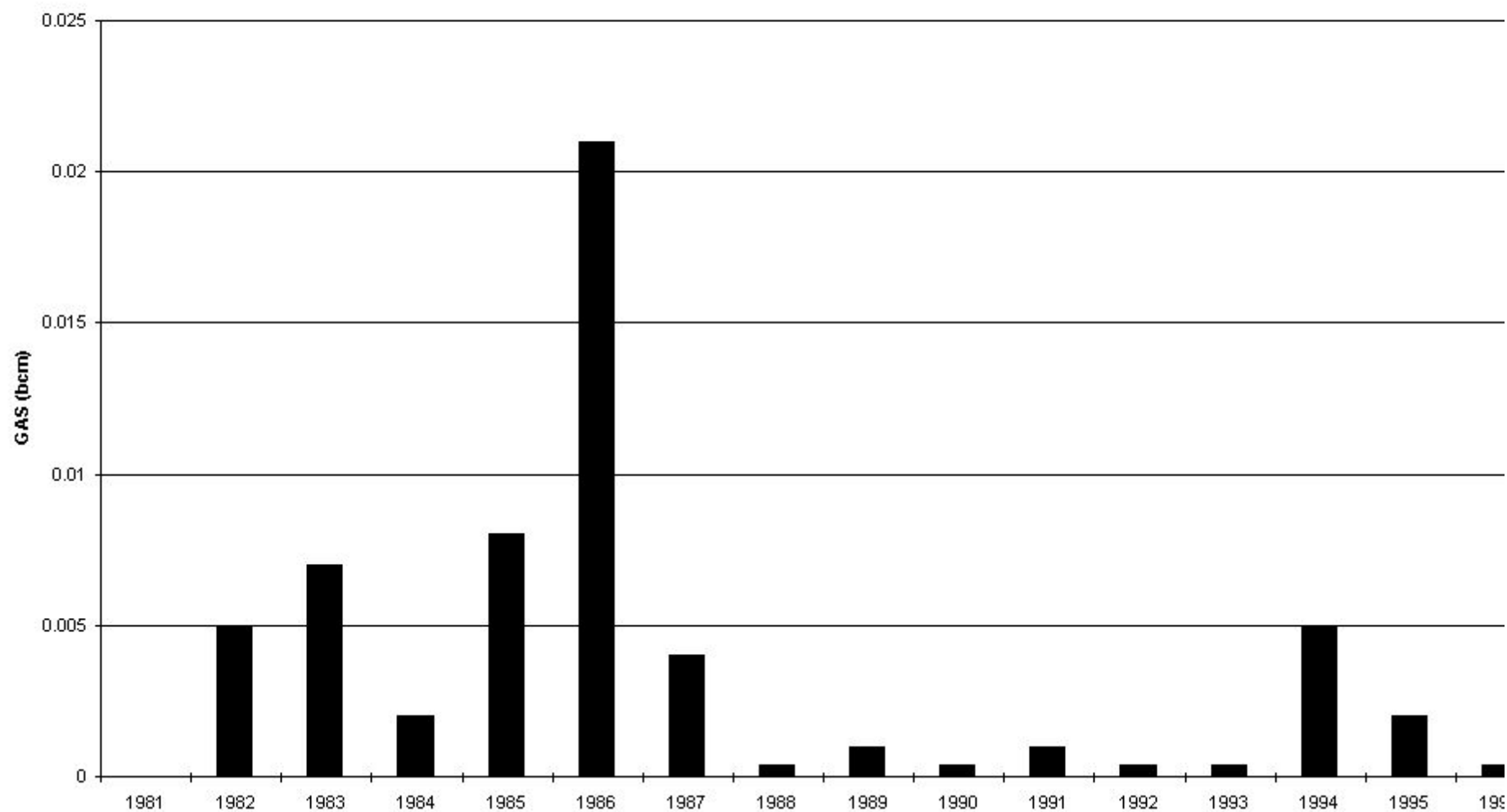
GAS PROPERTIES	GAS Evergreen Fm
Methane	87.40
Ethane	6.20
Propane	0.24
Isobutane	0.74
N-butane	0.07
Isopentane	1.22 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	4.10
CO₂	0.02
H₂S	-
Specific Gravity	0.643
BTU/ft³ (gross)	1085

STRATIGRAPHY (Royston-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	165.8
	Bungil Fm	358.8
	Mooga Sandstone	492.0
JURASSIC	Orallo Fm	611.4
	Gubberamunda Sandstone	738.2
	Westbourne Fm	894.9
	Springbok Sandstone	960.1
	Walloon Coal Measures	1009.5
	Hutton Sandstone	1156.4
	Evergreen Fm	1336.2
CARBONIFEROUS	Granite	1424.3

* Picked by Geological Survey of Queensland

ROYSTON, GAS PRODUCTION (Evergreen Formation)
Discovered 20 July 1981 Production commenced June 1982
Total wells = 4



SAMARI PLAINS

PRESENT OPERATOR:	Victoria Petroleum NL
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	89 km south-southwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	608-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Samari Plains-1
Longitude (E):	148.6342
Latitude (S):	-27.3878
Date total depth reached:	27 DEC 83
Ground level:	230.1 m
Kelly bushing:	234.4 m
Operator:	Hartogen Energy Ltd
Total depth:	1528.6 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Fault dependent closure
AREAL CLOSURE:	12 km ² (near top basement)
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Oil
FORMATION:	Evergreen Formation
AGE:	Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to marginal marine
FORMATION TOP (mKB):	1428.6 m

TEST DATA FROM THE DISCOVERY WELL (Samari Plains-1):

DST 1, 1492.0-1528.6 m,	Evergreen Formation
Recovered 67 m of oil and 61 m of mud.	

DST 2, 1475.2-1484.4 m,	Evergreen Formation
Recovered 37 of mud, 153 m of muddy water and 1140 m of water.	

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Evergreen Fm	very small	very small	very small

STRATIGRAPHY (Samari Plains-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	189.0
	Wallumbilla Fm	306.3
	Bungil Fm	462.7
	Mooga Sandstone	606.9
JURASSIC	Orallo Fm	670.6
	Gubberamunda Sandstone	854.0
	Westbourne Fm	1006.8
	Springbok Sandstone	1069.8
	Walloon Coal Measures	1139.3
	Hutton Sandstone	1319.8
	Evergreen Fm	1428.6
DEVONIAN	Timbury Hills Fm	1503.3

* Picked by Geological Survey of Queensland

SANDY CREEK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	60 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 14
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Sandy Creek-2
Longitude (E):	148.8782
Latitude (S):	-27.1262
Date total depth reached:	27 MAY 82
Ground level:	259.7 m
Kelly bushing:	264.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1522.5 mKB
NUMBER OF WELLS DRILLED:	3
STRUCTURE/TRAP:	Fault dependent closure.
RESERVOIR UNITS:	2
 PETROLEUM BEARING UNIT No.1:	 Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1356.4 m
 PETROLEUM BEARING UNIT No.2:	 Wandoan Sandstone Member
CONTENTS:	Oil
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1456.9 m
 TEST DATA FROM THE DISCOVERY WELL (Sandy Creek-2):	
DST 2, 1456.0-1464.3 m, Flowed gas at 18 120 m ³ /day.	Evergreen Formation
 DST 1, 1470.4-1488.7 m, Flowed oil at 200 bbl/day.	Moolayember Fm (Wandoan Ss Mbr)

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Moolayember Fm (Wandoan Ss Mbr)	2	1	1

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Moolayember Fm (Wandoan Ss Mbr)	56	47	9
Evergreen Fm	20	very small	20

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Moolayember Fm (Wandoan Ss Mbr)	2	2	very small
Evergreen Fm	1	very small	1

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Moolayember Fm (Wandoan Ss Mbr)	5	5	very small
Evergreen Fm	2	very small	2

COMPOSITIONAL DATA :

OIL :

FLUID PROPERTIES	OIL Wandoan Ss Mbr
API Gravity @ 60°F	38.2°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	742
Pour Point	13.1°C
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	0.792(159°F)
Bubble Point (psig)	1725

STRATIGRAPHY (Sandy Creek-2) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	344.4
	Mooga Sandstone	454.2
JURASSIC	Orallo Fm	582.2
	Gubberamunda Sandstone	737.6
	Westbourne Fm	867.2
	Springbok Sandstone	967.7
	Walloon Coal Measures	1064.4
	Eurombah Fm	1179.6
	Hutton Sandstone	1216.2
	Evergreen Fm	1356.4
	Precipice Sandstone	1448.4
TRIASSIC	Moolayember Fm	1456.9
CARBONIFEROUS	Granite	1499.3

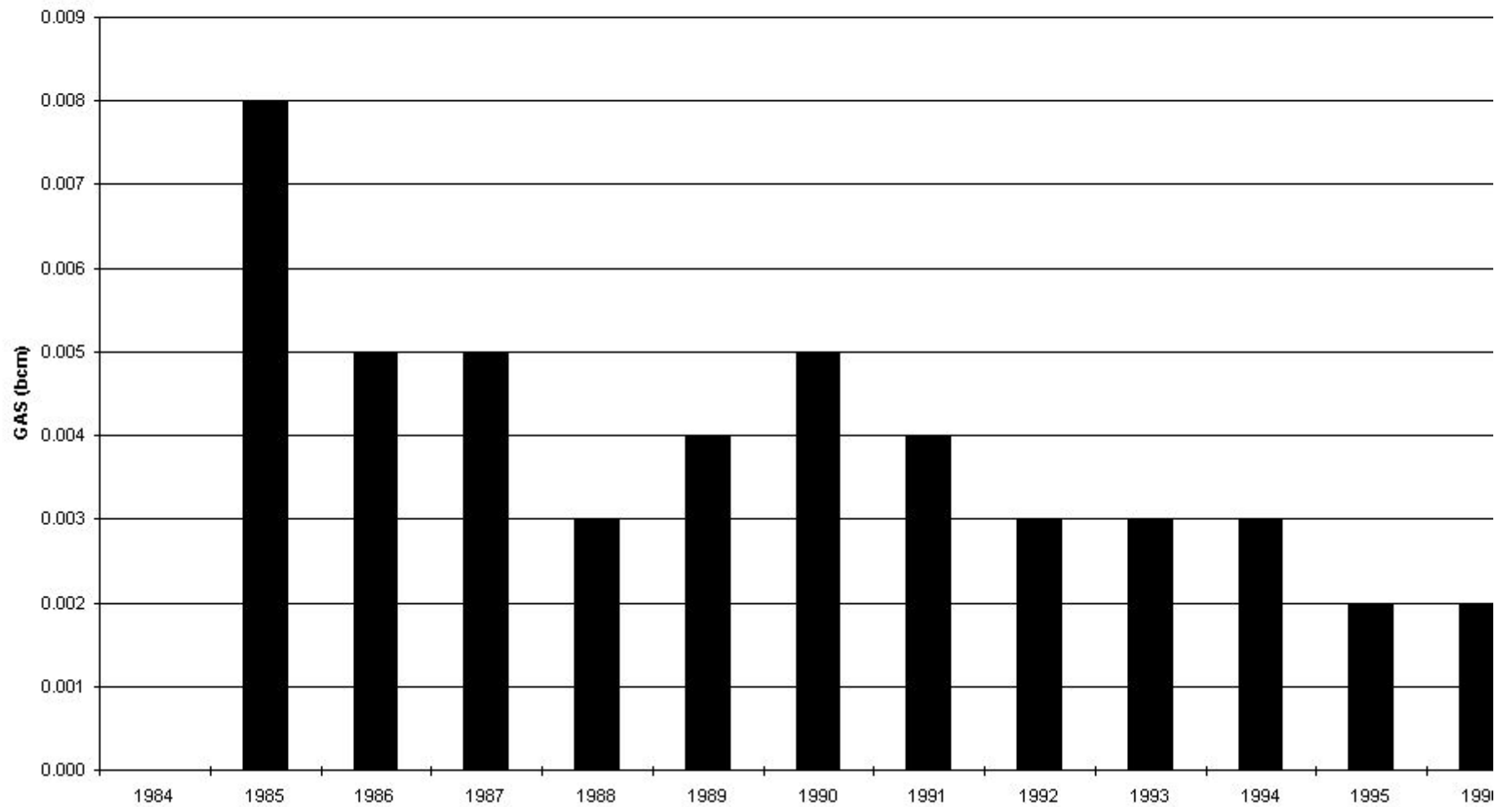
* Picked by Geological Survey of Queensland

SANDY CREEK, GAS PRODUCTION ('Wandoan' Formation & Evergreen Formation)

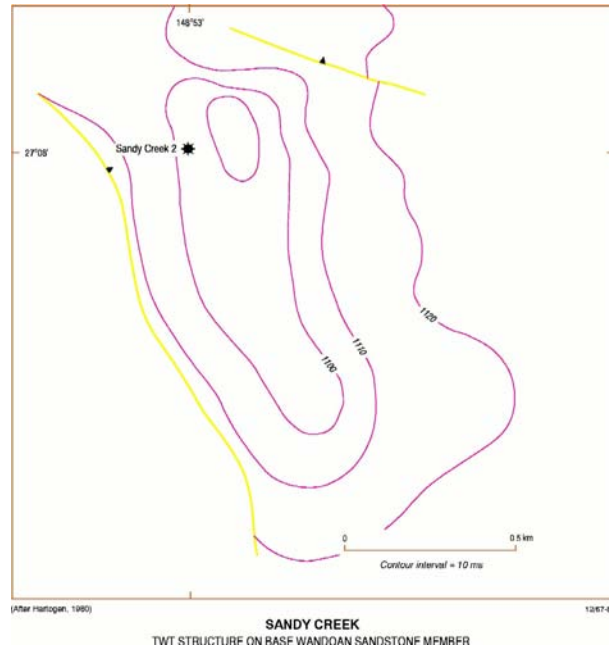
Discovered 27 May 1982

Production commenced August 1982

Total Wells = 3



SANDY CREEK MAP



SCOTIA

PRESENT OPERATOR:	Vacant
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	195 km northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	Vacant
BASIN:	Bowen
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Scotia-1
Longitude (E):	150.0775
Latitude (S):	-25.2681
Date total depth reached:	12 JAN 83
Ground level:	300.5 m
Kelly bushing:	306.3 m
Operator:	Oilmin NL
Total depth:	3122 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	2
 PETROLEUM BEARING UNIT No.1:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	2446.9 m
 PETROLEUM BEARING UNIT No.2:	Camboon Andesite
CONTENTS:	Gas
FORMATION:	Camboon Andesite
AGE:	Carboniferous to Devonian
LITHOLOGY:	Fractured andesite
FORMATION TOP (mKB):	2988.6 m
 TEST DATA FROM THE DISCOVERY WELL (Scotia-1):	
 DST 1, 1246.6-1265.8 m, Recovered 160 m of mud.	Gyranda Formation
 DST 2, 2686.2-2706.0 m, Recovered 274 m of mud.	Aldebaran Sandstone
 DST 3, 2857.5-2876.1 m, Flowed gas at 15 000 m ³ /day.	Aldebaran Sandstone
 DST 4, 3029.1-3074.5 m, Flowed gas at 7080 m ³ /day.	Camboon Andesite

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Camboon Andesite	GAS Aldebaran Ss
Methane	67.73	88.57
Ethane	1.48	3.85
Propane	0.13	0.68
Isobutane	0.01	0.12
N-butane	0.01	0.10
Isopentane	0.05 (C5+)	0.05 (C5+)
N-pentane	na	na
Hexanes +	na	na
N₂ + O₂	30.77	5.55
CO₂	0.05	1.08
H₂S	-	-
Specific Gravity	0.672	-
BTU/ft³ (gross)	-	-

STRATIGRAPHY (Scotia-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Hutton Sandstone	00.0
	Evergreen Fm	284.4
	Precipice Sandstone	428.2
TRIASSIC	Rewan Fm	538.0
PERMIAN	Blackwater Group	703.5
	Back Creek Group	2115.3
CARBONIFEROUS	Camboon Andesite	2988.6

* Picked by Geological Survey of Queensland

SILVER SPRINGS/RENLM

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 115 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 16
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Silver Springs-1
 Longitude (E): 149.1033
 Latitude (S): -27.6000
 Date total depth reached: 29 JUN 74
 Ground level: 260.9 m
 Kelly bushing: 264.9 m
 Operator: Bridge Oil Ltd
 Total depth: 1904.3 mKB
 NUMBER OF WELLS DRILLED: 11
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 9.5 km² (near top Evergreen Fm)
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1871.5 m

TEST DATA FROM THE DISCOVERY WELL (Silver Springs-1):

DST 1, 1866.9-1898.9 m, Showgrounds Sandstone
 Flowed gas at 240 700 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	2828*	2458	370

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	471*	427	64

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	500*	452	68

* includes Renlim

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	77.34
Ethane	8.42
Propane	4.47
Isobutane	1.42
N-butane	1.40
Isopentane	3.15 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	3.50
CO ₂	0.30
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Silver Springs-1) :

AGE	UNIT	FORMATION TOP * (mKB)
TERTIARY	Unnamed	00.0
CRETACEOUS	Roma Fm	141.7
JURASSIC	Blythesdale Fm	615.1
	Walloon Coal Measures	1347.2
	Hutton Sandstone	1549.9
	Evergreen Fm	1677.9
TRIASSIC	Wandoan Fm	1760.2
	Showgrounds Sandstone	1871.5
PERMIAN	Kianga Fm	1882.1
DEVONIAN	Timbury Hills Fm	1887.6

* Picked by Bridge Oil Ltd

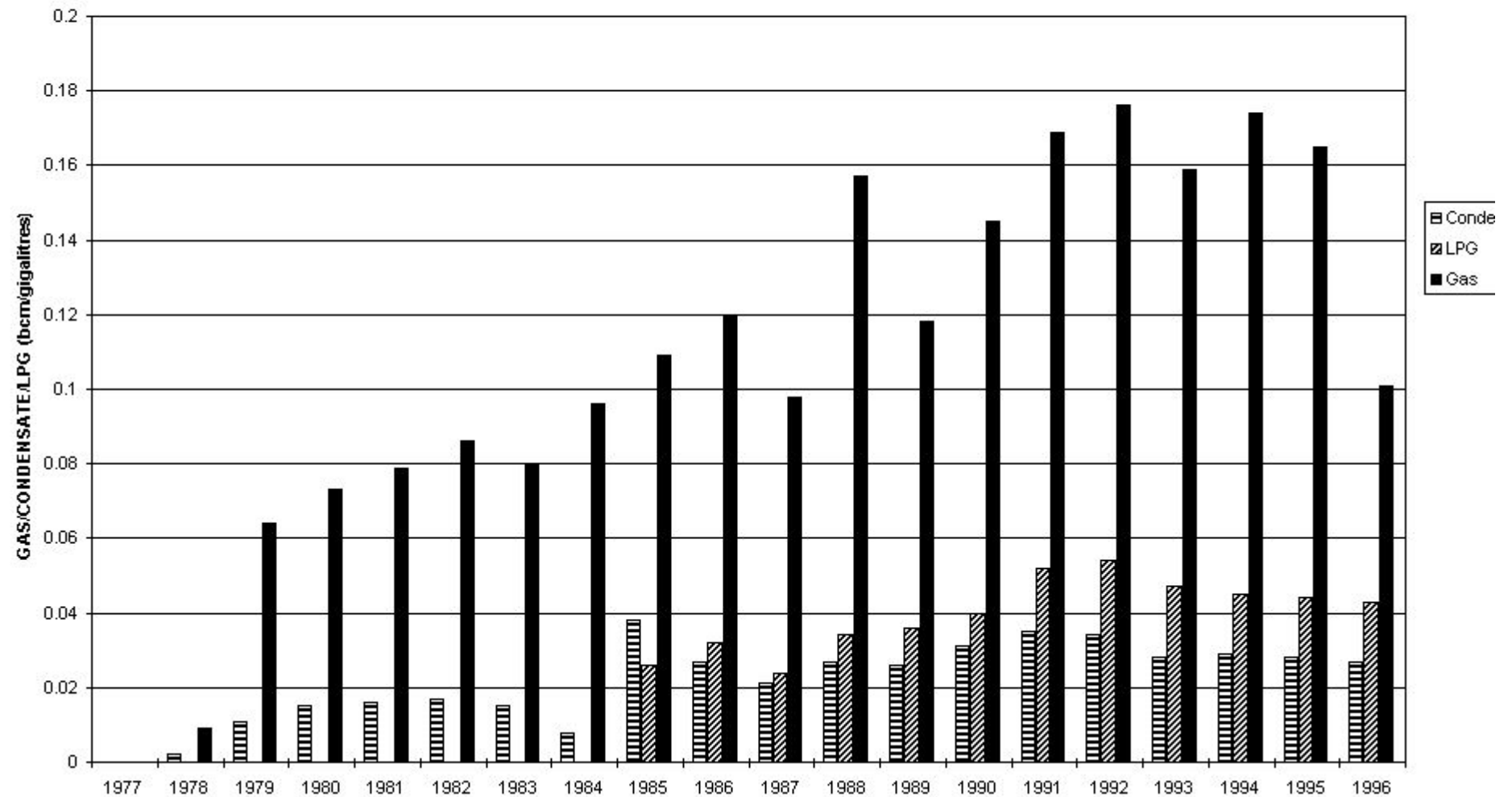
POROSITY AND PERMEABILITY DATA (Silver Springs-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1871.0	20.7	154.0	155.0	Showgrounds Sandstone
1871.8	17.3	263.0	222.0	Showgrounds Sandstone
1872.4	14.1	110.0	61.0	Showgrounds Sandstone
1873.0	10.5	132.0	-	Showgrounds Sandstone
1873.9	12.2	633.0	695.0	Showgrounds Sandstone
1874.5	5.0	57.0	24.0	Showgrounds Sandstone
1875.1	9.4	127.0	91.0	Showgrounds Sandstone
1875.7	5.9	0.1	0.1	Showgrounds Sandstone
1876.7	6.7	47.0	85.0	Showgrounds Sandstone

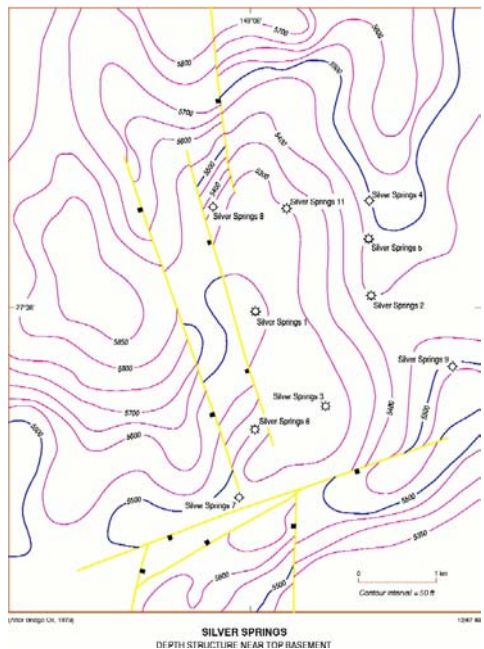
SILVER SPRINGS, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 29 June 1974 Production commenced October 1978

Total Wells = 11



SILVER SPRINGS MAP



SIRRAH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	125 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 16
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Sirrah-2
Longitude (E):	149.1814
Latitude (S):	-27.6467
Date total depth reached:	08 JUN 82
Ground level:	307.0 m
Kelly bushing:	313.9 m
Operator:	Bridge Oil Ltd
Total depth:	2026 mKB
NUMBER OF WELLS DRILLED:	5
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1967.5 m

TEST DATA FROM THE DISCOVERY WELL (Sirrah-2):

DST 1, 1964.0-1975.4 m, Flowed gas at 308 650 m ³ /day and recovered 25 barrels of 64.2 degree API condensate.	Showgrounds Sandstone
DST 2, 1975.0-1980.5 m, Flowed gas at 14 160 m ³ /day and water at 600 barrels/day.	Showgrounds Sandstone
DST 3, 1986-1995 m, Recovered 800 m of gas cut mud.	Showgrounds Sandstone
DST 4, 1988.0-2000.0 m, Flowed gas at 9340 m ³ /day and recovered 68 m of gas cut mud.	Showgrounds Sandstone

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	344	335	9

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	128	116	12

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	125	117	8

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	78.40
Ethane	6.70
Propane	4.60
Isobutane	0.88
N-butane	0.69
Isopentane	2.97 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	5.50
CO ₂	0.18
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Sirrah-2) :

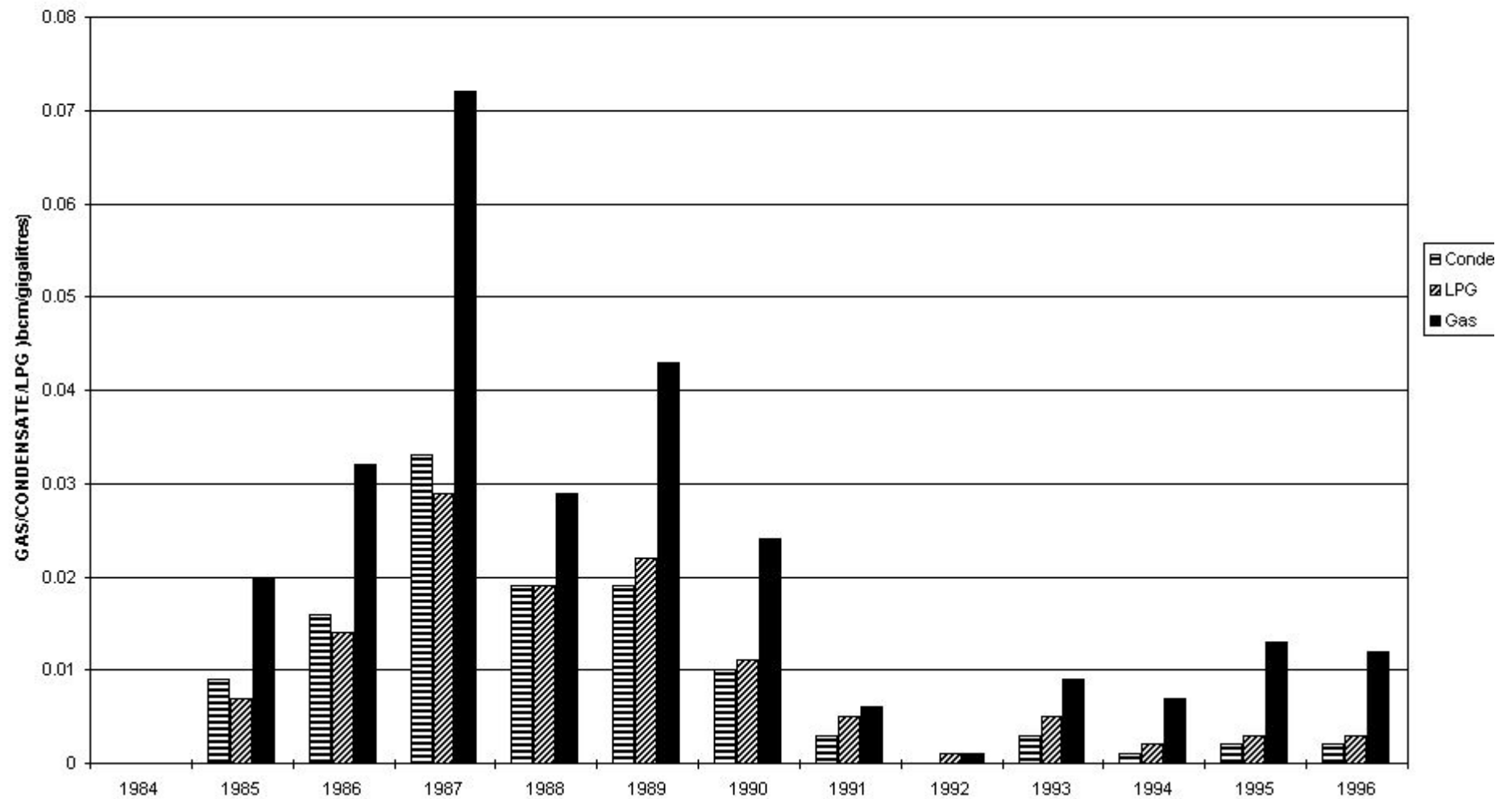
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	262.0
	Wallumbilla Fm	399.5
	Bungil Fm	608.5
	Mooga Sandstone	751.0
JURASSIC	Orallo Fm	892.0
	Gubberamunda Sandstone	1064.0
	Westbourne Fm	1285.5
	Springbok Sandstone	1367.0
	Walloon Coal Measures	1429.5
	Hutton Sandstone	1615.0
	Evergreen Fm	1751.0
	Precipice Sandstone	1827.5
TRIASSIC	Moolayember Fm	1846.0
	Snake Creek Mudstone Mbr	1952.5
	Showgrounds Sandstone	1967.5
PERMIAN	Blackwater Group	1980.0
DEVONIAN	Timbury Hills Fm	2000.0

* Picked by Geological Survey of Queensland

SIRRAH, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 8 June 1982 Production commenced June 1985

Total Wells = 5



SNAKE CREEK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Past Producer
LOCATION:	40 km east-south-east of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 11
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Snake Creek-1
Pool(s):	Showgrounds Sandstone (Gas); Rewan Formation.
Longitude (E):	149.1217
Latitude (S):	-26.8431
Date total depth reached:	15 JUN 64
Ground level:	287.7 m
Kelly bushing:	291.7 m
Operator:	Amalgamated Petroleum NL
Total depth:	1606.3 mKB
DISCOVERY WELL:	Snake Creek-4
Pool(s):	Showgrounds Sandstone (Oil).
Longitude (E):	149.1125
Latitude (S):	-26.8306
Date total depth reached:	22 SEP 64
Ground level:	279.5 m
Kelly bushing:	283.5 m
Operator:	Amalgamated Petroleum NL
Total depth:	1521 mKB
NUMBER OF WELLS DRILLED:	8
STRUCTURE/TRAP:	Structural/Stratigraphic. Located on the axis of a broad, southeast trending nose with permeability barriers to the northeast.
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone : gray, coarse grained, subangular to angular, moderately well sorted, quartzose with minor clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1534.4 m (Snake Creek-1)
POROSITY:	15% (average)
PERMEABILITY:	Variable. 300 to 400 md (average).
PETROLEUM BEARING UNIT No.2:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1539.2 m

TEST DATA FROM THE DISCOVERY WELL (Snake Creek-1):

DST 1, 1514.6-1548.1 m, Showgrounds Sandstone
Flowed gas at 283 170 m³/day and
recovered 46 L of condensate cut mud.

Production Test, 1534.4-1542.3 m, Showgrounds Sandstone
Flowed gas at 126 860 m³/day.

Production Test, 1534.4-1539.2 m, Showgrounds Sandstone
Flowed gas at 73 620 m³/day.

Production Test, 1534.4-1542.3 m, Showgrounds Sandstone
Flowed gas at 54 900 m³/day.

Production Test, 1534.4-1539.2 m, Showgrounds Sandstone
Flowed gas at 84 400 m³/day.

DST 2, 1549.0-1581.9 m, Rewan Formation
Flowed gas at 1410 m³/day.

TEST DATA FROM THE DISCOVERY WELL (Snake Creek-4):

DST 1, 1510.3-1515.2 m, Showgrounds Sandstone
Flowed gas at 87 800 m³/day.

DST 2, 1516.7-1520.7 m, Showgrounds Sandstone
Flowed oil at 80 bbl/day and gas at
6600 m³/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	2	2	very small

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	43	43	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	71.10
Ethane	5.70
Propane	4.00
Isobutane	1.25
N-butane	1.25
Isopentane	0.39
N-pentane	0.16
Hexanes +	0.17
N ₂ + O ₂	2.80
CO ₂	13.20
H ₂ S	-
Specific Gravity	0.630
BTU/ft ³ (gross)	1065

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Rewan Fm
API Gravity @ 60°F	56.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.755
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

OIL :

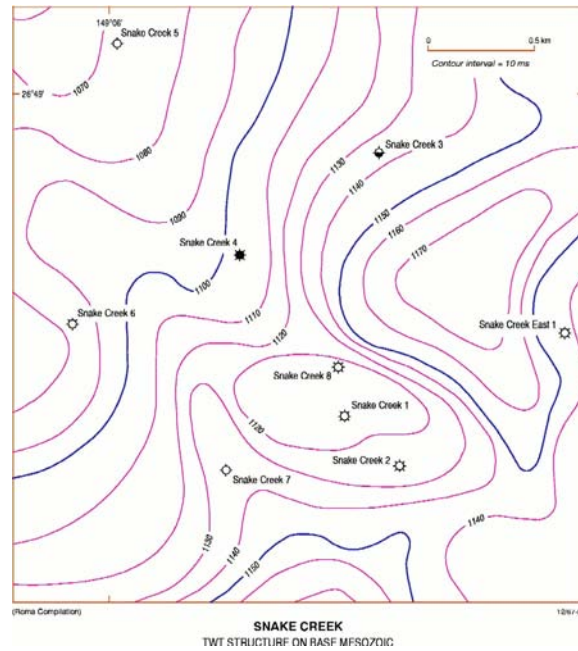
FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	38.0° to 45.0°
Base	Paraffinic
Sulphur (% wt)(ppm)	0.02%
Initial GOR (ft ³ /bbl)	3357 : 1
Pour Point	4.4°C
Specific Gravity	-
Colour	Green
Viscosity (cp@100°F)	2.5
Bubble Point (psig)	-

STRATIGRAPHY (Snake Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	179.8
	Mooga Sandstone	304.5
JURASSIC	Orallo Fm	435.9
	Gubberamunda Sandstone	585.2
	Westbourne Fm	684.3
	Springbok Sandstone	786.4
	Walloon Coal Measures	867.8
	Eurombah Fm	1123.5
	Hutton Sandstone	1185.7
	Evergreen Fm	1315.2
	Precipice Sandstone	1438.7
TRIASSIC	Moolayember Fm	1444.8
	Snake Creek Mudstone Mbr	1521.0
	Showgrounds Sandstone	1534.4
	Rewan Fm	1539.2
PERMIAN	Blackwater Group	1600.8

* Picked by Geological Survey of Queensland

SNAKE CREEK MAP



SNAKE CREEK EAST

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 41 km east-south-east of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 11
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Snake Creek East-1
 Longitude (E): 149.1428
 Latitude (S): -26.8369
 Date total depth reached: 02 OCT 93
 Ground level: 286.7 m
 Kelly bushing: 290.7 m
 Operator: Santos Ltd
 Total depth: 1637 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 2

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

PETROLEUM BEARING UNIT No.2: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (Snake Creek East-1):

DST 5, 1421.0-1432.0 m, Precipice Sandstone
 Flowed gas at 189 700 m³/day.

DST 6, 1439.0-1450.0 m, Precipice Sandstone
 Flowed gas at 19 400 m³/day.

DST 4, 1569.0-1601.0 m, Rewan Formation
 Flowed gas at 20 800 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	11	3	8
Rewan Formation	5	very small	5

SPRINGTON

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 298 km north-northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 41
 BASIN: Bowen
 SUB-BASIN: Denison Trough
 DISCOVERY WELL: Springton-1
 Longitude (E): 148.3869
 Latitude (S): -23.9469
 Date total depth reached: 08 MAY 84
 Ground level: 179.1 m
 Kelly bushing: 183.7 m
 Operator: CSR Ltd
 Total depth: 1332.7 mKB
 NUMBER OF WELLS DRILLED: 4
 STRUCTURE/TRAP: Anticline
 AREAL CLOSURE: 23.0 km²
 RESERVOIR UNITS: 4

PETROLEUM BEARING UNIT No.1: Mantuan Formation
 CONTENTS: Gas
 FORMATION: Peawaddy Formation
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Shallow marine
 FORMATION TOP (mKB): 475.0 m

PETROLEUM BEARING UNIT No.2: Catherine Sandstone
 CONTENTS: Gas
 FORMATION: Catherine Sandstone
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Paralic to shallow marine
 FORMATION TOP (mKB): 649.0 m

PETROLEUM BEARING UNIT No.3: Freitag Formation
 CONTENTS: Gas
 FORMATION: Freitag Formation
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Paralic to shallow marine
 FORMATION TOP (mKB): 917.2 m

PETROLEUM BEARING UNIT No.4: Aldebaran Sandstone
 CONTENTS: Gas
 FORMATION: Aldebaran Sandstone
 AGE: Early Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvio-deltaic
 FORMATION TOP (mKB): 1036.5 m

TEST DATA FROM THE DISCOVERY WELL (Springton-1):

DST 1, 477.0-484.0 m, Mantuan Formation
Flowed gas at 41 340 m³/day and
recovered 21 m of mud.

DST 12, 492.0-515.0 m, Mantuan Formation
Recovered 380 m of muddy water.

DST 11, 516.0-539.0 m, Mantuan Formation
Recovered 380 m of muddy water.

DST 10, 540.0-563.0 m, Mantuan Formation
Recovered 380 m of muddy water.

DST 9, 563.0-585.0 m, Mantuan Formation
Recovered 380 m of muddy water.

DST 2, 653.0-662.5 m, Catherine Sandstone
Flowed gas at 71 070 m³/day and
recovered 3 m of mud.

DST 8, 664.0-694.0 m, Catherine Sandstone
Flowed gas at 10 530 m³/day and
recovered 186 m of gas cut mud.

DST 7, 712.0-742.0 m, Catherine Sandstone
Recovered 180 m of gas cut mud.

DST 6, 745.0-775.0 m, Catherine Sandstone
Recovered 186 m of gas cut mud.

DST 3, 932.0-958.0 m, Freitag Formation
Flowed gas at 19 820 m³/day and
recovered 38 m of mud.

DST 4, 1036.0-1076.0 m, Aldebaran Sandstone
Flowed gas at 5800 m³/day and
recovered 210 m of water.

PRODUCTION & INFRASTRUCTURE :

See Arcturus.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	113	16	97
Catherine Ss	250	207	43
Freitag Fm	220	50	170
Mantuan Fm	54	very small	54

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Catherine Ss	GAS Mantuan Fm
Methane	97.60	94.61
Ethane	0.41	-
Propane	0.05	-
Isobutane	-	-
N-butane	-	-
Isopentane	0.10	-
N-pentane	na	-
Hexanes +	na	-
N ₂ + O ₂	1.44	5.25
CO ₂	0.40	0.14
H ₂ S	-	-
Specific Gravity	0.569	0.578
BTU/ft ³ (gross)	1007	963

STRATIGRAPHY (Springton-1) :

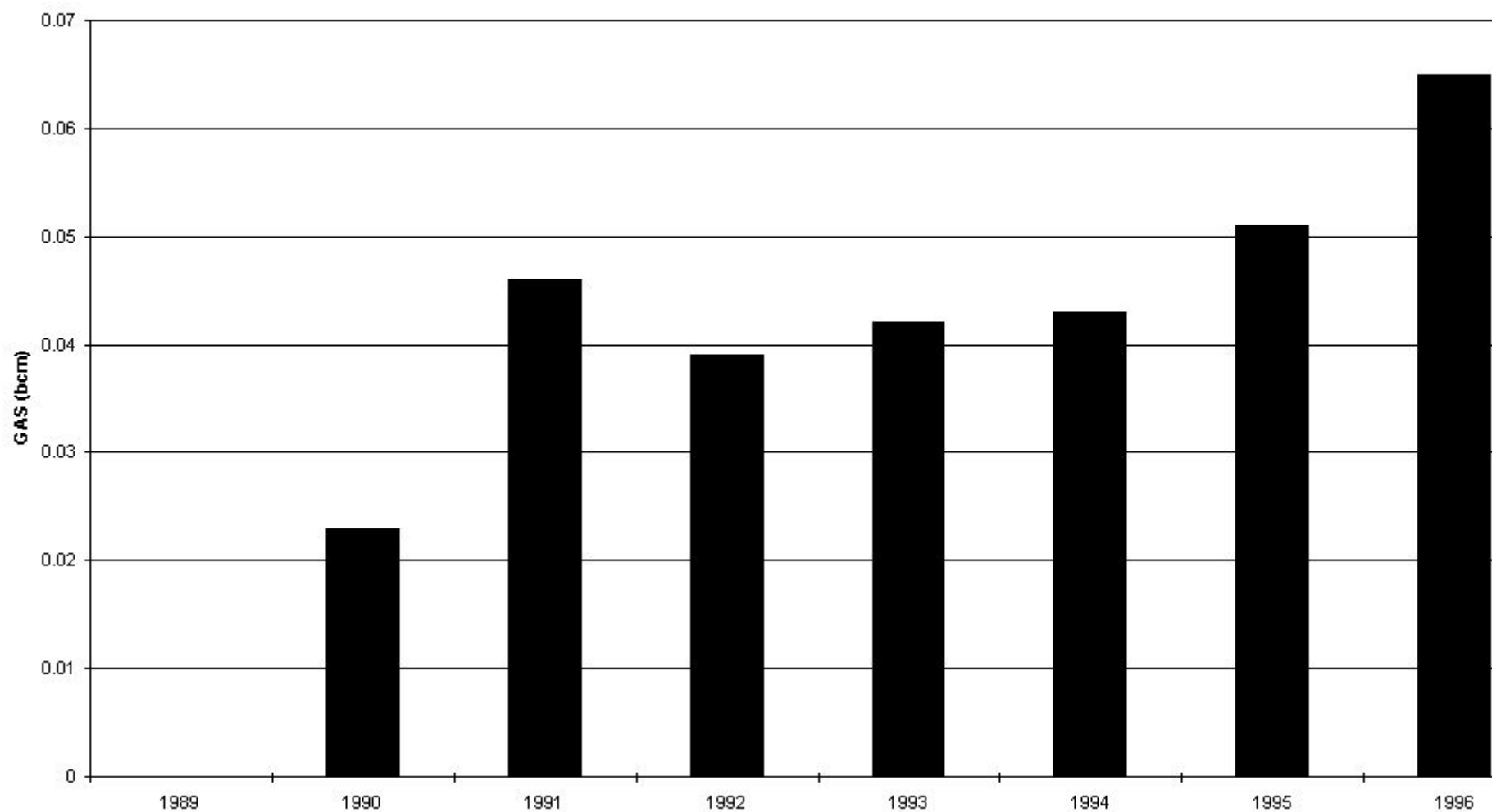
AGE	UNIT	FORMATION TOP * (mKB)
RECENT	Alluvium	00.0
TERTIARY	Basalt	20.0
	Emerald Fm	33.0
PERMIAN	Bandanna Fm	184.0
	Black Alley Shale	391.2
	Mantuan Fm	475.0
	Peawaddy Fm	601.0
	Catherine Sandstone	649.0
	Ingelara Fm	766.0
	Freitag Fm	917.2
	Aldebaran Sandstone	1036.5

* Picked by CSR Ltd

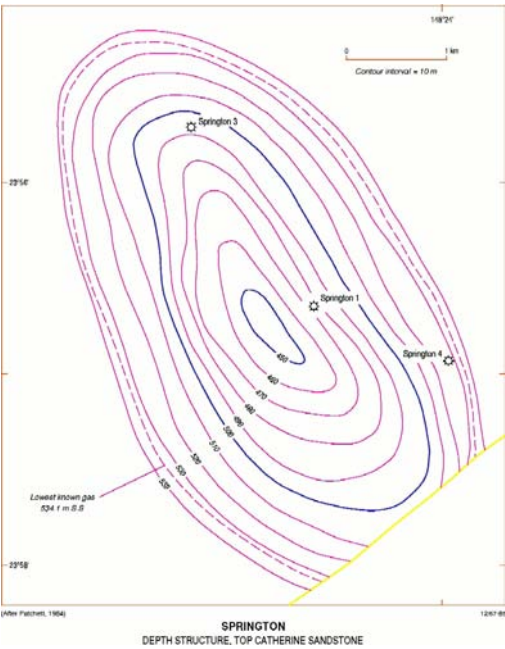
SPRINGTON, GAS PRODUCTION (Aldebaran Sandstone, Catherine Sandstone & Freitag Formation)

Discovered 8 May 1984 Production commenced June 1990

Total Wells = 4 (3 Producers; 1 Plugged & Abandoned)



SPRINGTON MAP



SPRINGVALE

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 152 km north-northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 43
 BASIN: Bowen
 SUB-BASIN: Denison Trough
 DISCOVERY WELL: Springvale-1
 Longitude (E): 148.2964
 Latitude (S): -25.3172
 Date total depth reached: 23 JAN 83
 Ground level: 574.3 m
 Kelly bushing: 578.6 m
 Operator: CSR Ltd
 Total depth: 1100.4 mKB
 NUMBER OF WELLS DRILLED: 2
 STRUCTURE/TRAP: Fault trap.
 AREAL CLOSURE: 3.0 km² (top Reids Dome Beds)
 RESERVOIR UNITS: 2

PETROLEUM BEARING UNIT No.1: Aldebaran Sandstone
 CONTENTS: Gas
 FORMATION: Aldebaran Sandstone
 AGE: Early Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvio-deltaic
 FORMATION TOP (mKB): 625.3 m

PETROLEUM BEARING UNIT No.2: Reids Dome Beds
 CONTENTS: Gas
 FORMATION: Reids Dome Beds
 AGE: Early Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 778.8 m

TEST DATA FROM THE DISCOVERY WELL (Springvale-1):

DST 1, 703.0-731.5 m, Aldebaran Sandstone
 Flowed gas at 84 900 m³/day and
 recovered 23 m of gas cut, muddy water.

DST 2, 845.5-868.7 m, Reids Dome Beds
 Flowed gas at 5 m³/day and recovered
 15 m of mud and 37 m of gas cut, muddy
 water.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	184	142	42
Reids Dome Beds	42	very small	42

COMPOSITIONAL DATA :

GAS :

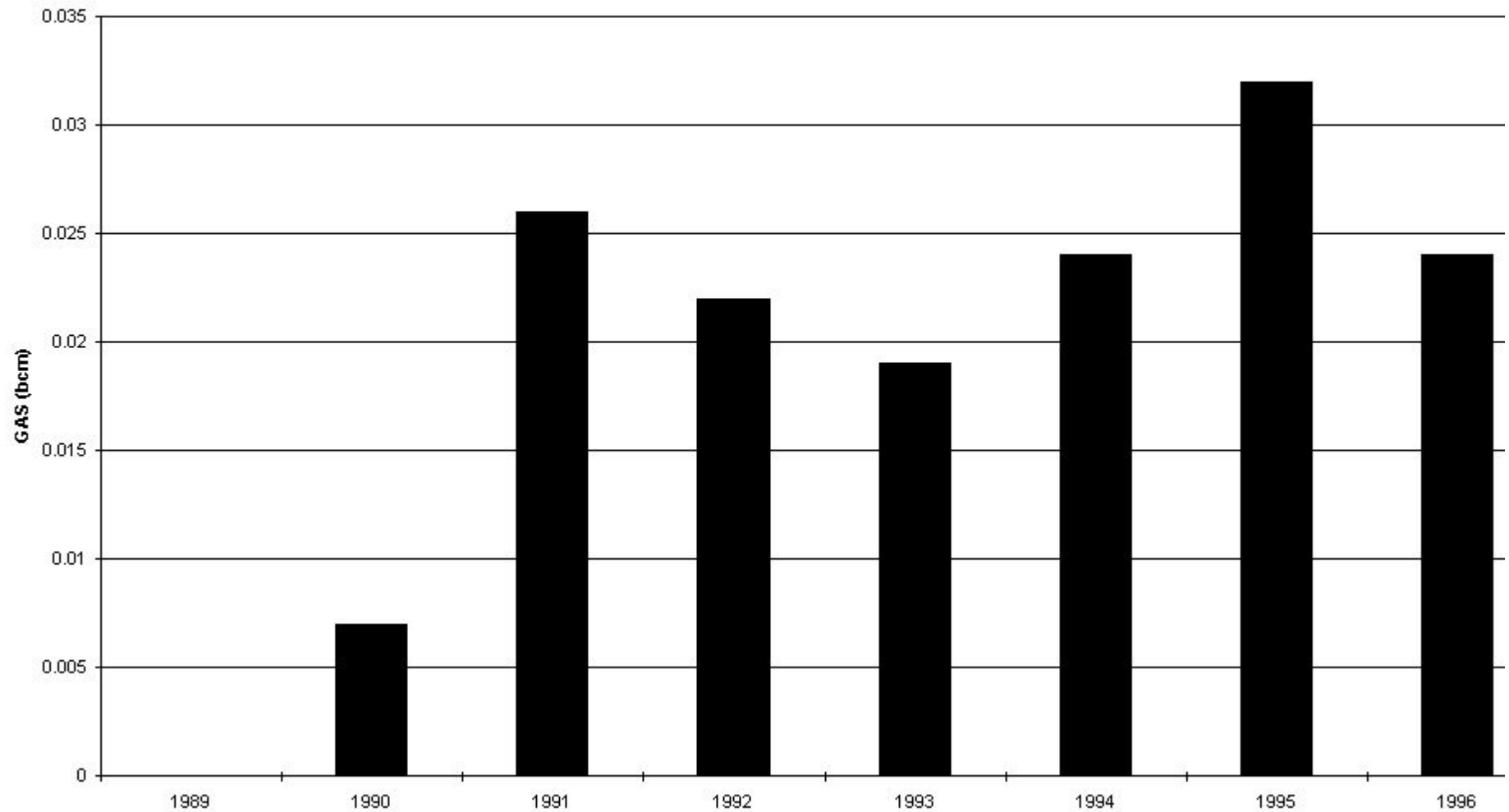
GAS PROPERTIES	GAS Aldebaran Ss
Methane	77.57
Ethane	5.73
Propane	2.10
Isobutane	0.38
N-butane	0.39
Isopentane	0.23 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	4.80
CO ₂	8.80
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Springvale-1) :

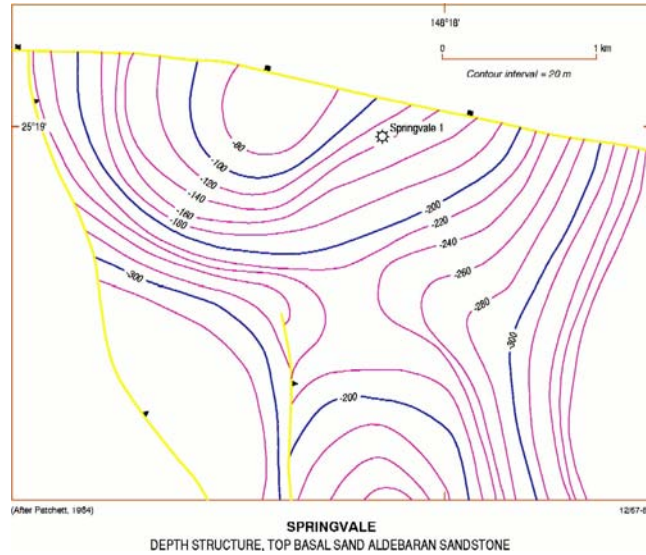
AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Evergreen Fm	00.0
	Precipice Sandstone	35.2
TRIASSIC	Rewan Fm	127.5
PERMIAN	Bandanna Fm	217.0
	Black Alley Shale	310.5
	Peawaddy Fm	466.5
	Ingelara Fm	532.8
	Aldebaran Sandstone	625.3
	Cattle Creek Fm	741.0
	Reids Dome Beds	778.8

* Picked by Geological Survey of Queensland

SPRINGVALE, GAS PRODUCTION (Aldebaran Sandstone)
Discovered 23 January 1983 Production commenced July 1990
Total Wells = 2 (1 Producer; 1 Plugged and Abandoned)



SPRINGVALE MAP



STAKEYARD

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	35 km east northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	336-P
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Stakeyard-2
Longitude (E):	149.1367
Latitude (S):	-26.5583
Date total depth reached:	20 FEB 84
Ground level:	330.1 m
Kelly bushing:	334.3 m
Operator:	CSR Ltd
Total depth:	1585 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1204.6 m

TEST DATA FROM THE DISCOVERY WELL (Stakeyard-2):

DST 2, 1229.0-1248.0 m,	Precipice Sandstone
Flowed gas at 4760 m ³ /day and recovered	
45 m of gas cut mud.	

DST 1, 1548.0-1567.0 m,	Tinowon Formation
Recovered 27 m of gas cut mud.	

STRATIGRAPHY (Stakeyard-2) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	15.2
	Mooga Sandstone	106.7
JURASSIC	Orallo Fm	179.8
	Gubberamunda Sandstone	331.0
	Westbourne Fm	406.3
	Springbok Sandstone	495.3
	Walloon Coal Measures	576.1
	Eurombah Fm	832.7
	Hutton Sandstone	885.4
	Evergreen Fm	1114.3
	Precipice Sandstone	1204.6
TRIASSIC	Moolayember Fm	1220.4
	Snake Creek Mudstone Mbr	1258.8
	Showgrounds Sandstone	1264.6
	Rewan Fm	1269.5

* Picked by Geological Survey of Queensland

SUNNYBANK

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	57 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	336-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Sunnybank-1
Longitude (E):	149.2250
Latitude (S):	-26.9403
Date total depth reached:	01 JAN 63
Ground level:	250.9 m
Kelly bushing:	253.6 m
Operator:	Associated Australian Oilfields NL
Total depth:	2174.4 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Stratigraphic
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Rewan Formation
CONTENTS:	Oil and Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	1752.0 m

PETROLEUM BEARING UNIT No.2:	Blackwater Group
CONTENTS:	Gas
FORMATION:	Blackwater Group
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	1897.4 m

TEST DATA FROM THE DISCOVERY WELL (Sunnybank-1):

DST 12, 1570.9-1571.2 m,	Precipice Sandstone
Recovered 1571 m of gas cut water.	

DST 1, 1744.4-1773.9 m,	Showgrounds Sandstone
Recovered 338 m of gas cut water.	

DST 2, 1786.1-1805.9 m,	Rewan Formation
Flowed gas at 8500 m ³ /day and recovered 1806 m of gas cut oil.	

DST 3, 1783.7-1805.9 m,	Rewan Formation
Flowed oil at 600 bbl/day and gas at 8500 m ³ /day.	

DST 4, 1817.2-1847.7 m,	Rewan Formation
Recovered 79 m of mud.	

DST 10, 1838.6-1888.5 m, Recovered 37 m of oil, 27 m of mud and 37 m of water.	Rewan Formation
DST 11, 1869.6-1888.5 m, Recovered 55 m of gas cut mud and 355m of gas cut, muddy water.	Rewan Formation
DST 5, 1871.2-1882.1 m, Recovered 18 m of oil, 37 m of gas cut, oily mud and 37 m of water.	Rewan Formation
DST 6, 1929.1-1949.2 m, Recovered 40 m of mud.	Blackwater Group
DST 8, 1960.5-1971.5 m, Flowed gas at 7500 m ³ /day and recovered 9 m of mud.	Blackwater Group
DST 9, 2129.6-2139.7 m, Recovered 172 m of gas cut mud.	Back Creek Group

RESERVES (as at 30/6/94) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Rewan Fm	very small	very small	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Blackwater Gp	ASSOCIATED GAS Rewan Fm
Methane	86.90	56.90
Ethane	6.30	12.70
Propane	2.70	12.40
Isobutane	0.45	3.40
N-butane	0.87	5.00
Isopentane	0.22	1.52
N-pentane	0.36	1.79
Hexanes +	0.36	1.45
N ₂ + O ₂	1.29	4.30
CO ₂	0.60	0.58
H ₂ S	-	-
Specific Gravity	-	-
BTU/ft ³ (gross)	-	-

OIL :

FLUID PROPERTIES	OIL Rewan Fm
API Gravity @ 60°F	34.9°
Base	-
Sulphur (% wt)(ppm)	0.10%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Sunnybank-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	249.9
	Mooga Sandstone	368.8
JURASSIC	Orallo Fm	502.9
	Gubberamunda Sandstone	668.4
	Westbourne Fm	791.0
	Springbok Sandstone	870.2
	Walloon Coal Measures	983.0
	Eurombah Fm	1220.7
	Hutton Sanstone	1268.0
	Evergreen Fm	1468.5
	Precipice Sandstone	1567.3
TRIASSIC	Moolayember Fm	1574.3
	Snake Creek Mudstone Mbr	1726.7
	Showgrounds Sandstone	1743.5
	Rewan Fm	1752.0
PERMIAN	Blackwater Group	1897.4
	Back Creek Group	1990.3
CARBONIFEROUS	Granite	2133.6

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Sunnybank-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1790.7	12.5	0.0	0.0	Rewan Fm
1847.7	15.5	0.0	0.0	Rewan Fm
1941.6	2.5	0.0	0.0	Blackwater Group
1971.5	16.0	0.0	0.0	Blackwater Group
2041.6	3.5	0.0	0.0	Back Creek Group

TARRAWONGA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	34 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 10
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Tarrowonga-1
Pool(s):	Precipice Sandstone.
Longitude (E):	149.0544
Latitude (S):	-26.7925
Date total depth reached:	07 DEC 65
Ground level:	318.2 m
Kelly bushing:	321.9 m
Operator:	International Petroleum Services
Total depth:	1440.2 mKB
DISCOVERY WELL:	Tarrowonga-4
Pool(s):	Showgrounds Sandstone.
Longitude (E):	149.0544
Latitude (S):	-26.8069
Date total depth reached:	06 MAR 66
Ground level:	317.3 m
Kelly bushing:	320.7 m
Operator:	International Petroleum Services
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Structural/Stratigraphic. Channel sand overlying a basement ridge.
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone : white, medium to coarse grained, subangular to angular, moderately well sorted.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1348.1 m (Tarrowonga-1)
POROSITY:	16% (average)
PERMEABILITY:	variable (<2 darcies)
PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Tarrowonga-1):	
DST 1, 1341.1-1440.2 m,	Precipice Sandstone
Flowed gas at 96 300 m ³ /day and recovered 37 m of gas and condensate cut mud.	

TEST DATA FROM THE DISCOVERY WELL (Tarrawonga-4):

DST 1, 1362.5-1377.7 m,
Flowed gas at 130 200 m³/day and
recovered 3 m of condensate.

Precipice Sandstone

DST 2, 1411.9-1427.1 m,
Flowed gas at 48 100 m³/day with a small
quantity of associated condensate.

Showgrounds Sandstone

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss*	526	504	22
Showgrounds Ss	72	11	61

* includes Tarrawonga North

COMPOSITIONAL DATA :

GAS :

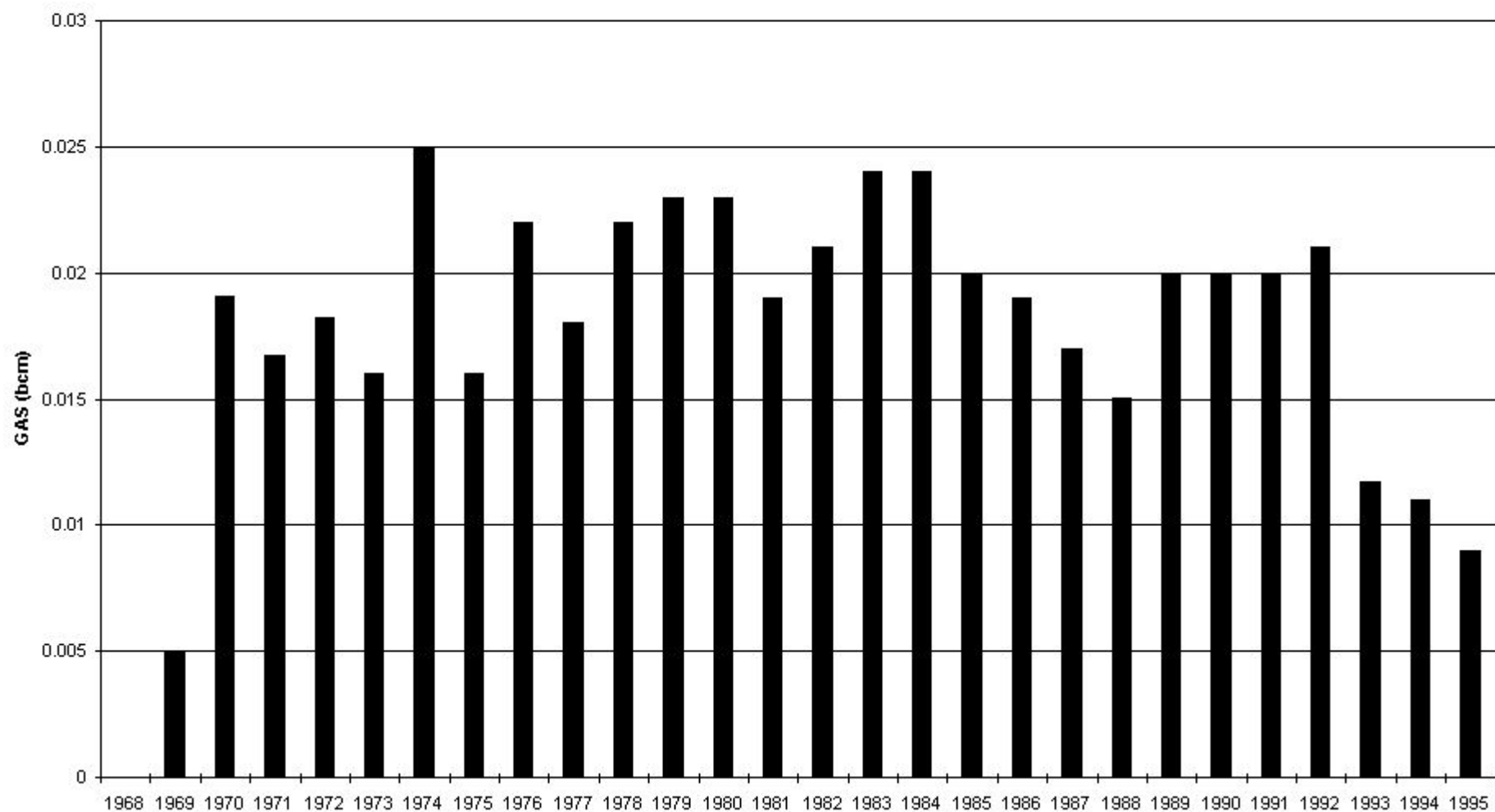
GAS PROPERTIES	GAS Showgrounds Ss	GAS Precipice Ss
Methane	74.40	73.10
Ethane	5.90	6.00
Propane	4.20	4.10
Isobutane	1.10	1.22
N-butane	1.30	1.40
Isopentane	0.41	0.51
N-pentane	0.42	0.51
Hexanes +	1.85	2.70
N ₂ + O ₂	4.00	4.50
CO ₂	6.40	6.00
H ₂ S	-	-
Specific Gravity	-	0.824
BTU/ft ³ (gross)	-	1083

STRATIGRAPHY (Tarrawonga-1) :

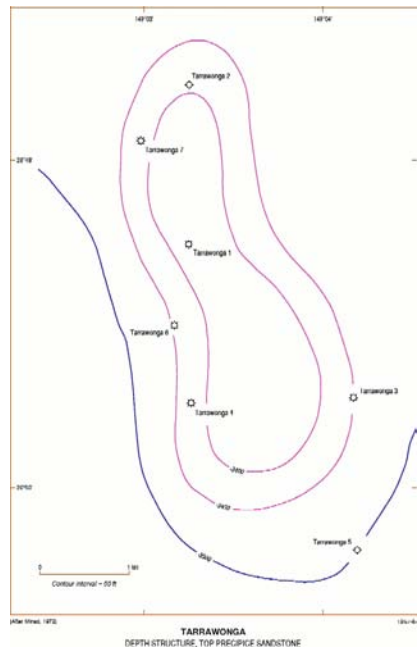
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	174.4
	Mooga Sandstone	290.8
JURASSIC	Orallo Fm	409.4
	Gubberamunda Sandstone	548.0
	Westbourne Fm	626.4
	Springbok Sandstone	768.1
	Walloon Coal Measures	789.4
	Eurombah Fm	1012.6
	Hutton Sandstone	1074.7
	Evergreen Fm	1231.7
	Precipice Sandstone	1348.1
TRIASSIC	Moolayember Fm	1363.1
DEVONIAN	Timbury Hills	1395.1

* Picked by Geological Survey of Queensland

TARRAWONGA, GAS PRODUCTION (Precipice Sandstone)
Discovered 7 December 1965 Production commenced May 1969
Total Wells = 7 (3 Producers; 2 Plugged and Abandoned; 2 Suspended)



TARRAWONGA MAP



TAYLOR

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	115 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 48, PL 49, PL 16
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Taylor-1
Longitude (E):	149.2378
Latitude (S):	-27.5564
Date total depth reached:	23 APR 86
Ground level:	340.0 m
Kelly bushing:	345.7 m
Operator:	Bridge Oil Ltd
Total depth:	2168.4 mKB
NUMBER OF WELLS DRILLED:	20
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2000.5 m

PETROLEUM BEARING UNIT No.2:	Kuttung Formation ?
CONTENTS:	Oil and Gas
FORMATION:	Kuttung Formation ?
AGE:	Pre-Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Continental
FORMATION TOP (mKB):	2007.6 m

TEST DATA FROM THE DISCOVERY WELL (Taylor-1):

DST 3, 1998.0-2011.0 m, Flowed gas at 608 820 m ³ /day.	Showgrounds Sandstone

DST 1, 1998.9-2013.4 m, Flowed gas at 169 900 m ³ /day and recovered 3 m of water and 18 m of condensate.	Showgrounds Sandstone

DST 5, 2016.0-2029.0 m, Recovered 3 m of oil, 8 m of mud and 53 m of gas cut mud.	Kuttung Formation ?

DST 2, 2063.8-2075.0 m, Flowed gas at 2600 m ³ /day.	Kuttung Formation ?

PRODUCTION & INFRASTRUCTURE :

Discovered in 1986, Taylor-1 intersected a gas reservoir in the Showgrounds Sandstone with indications of a possible oil leg (DST-5). Taylor-4, drilled in 1988, intersected the oil leg and production of both oil and gas from Taylor commenced in the same year. Initially, oil was produced at a rate of 350 bbls/day. Production from the adjacent Silver Springs, Renlim, Sirrah and Boxleigh accumulations resulted in a 350 psi drop in reservoir pressure at Taylor. This caused the gas cap at Taylor to expand, causing contact tilting and possible spillage to the west into the Silver Springs structure.

RESERVES (as at 30/6/96) :**GAS :**

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	384	352	32

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	249	226	23

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	26	24	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	79	73	6

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	82.24
Ethane	8.17
Propane	3.53
Isobutane	1.01
N-butane	0.91
Isopentane	2.19 (C5+)
N-pentane	na
Hexanes +	na
N₂ + O₂	1.49
CO₂	0.46
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Taylor-1) :

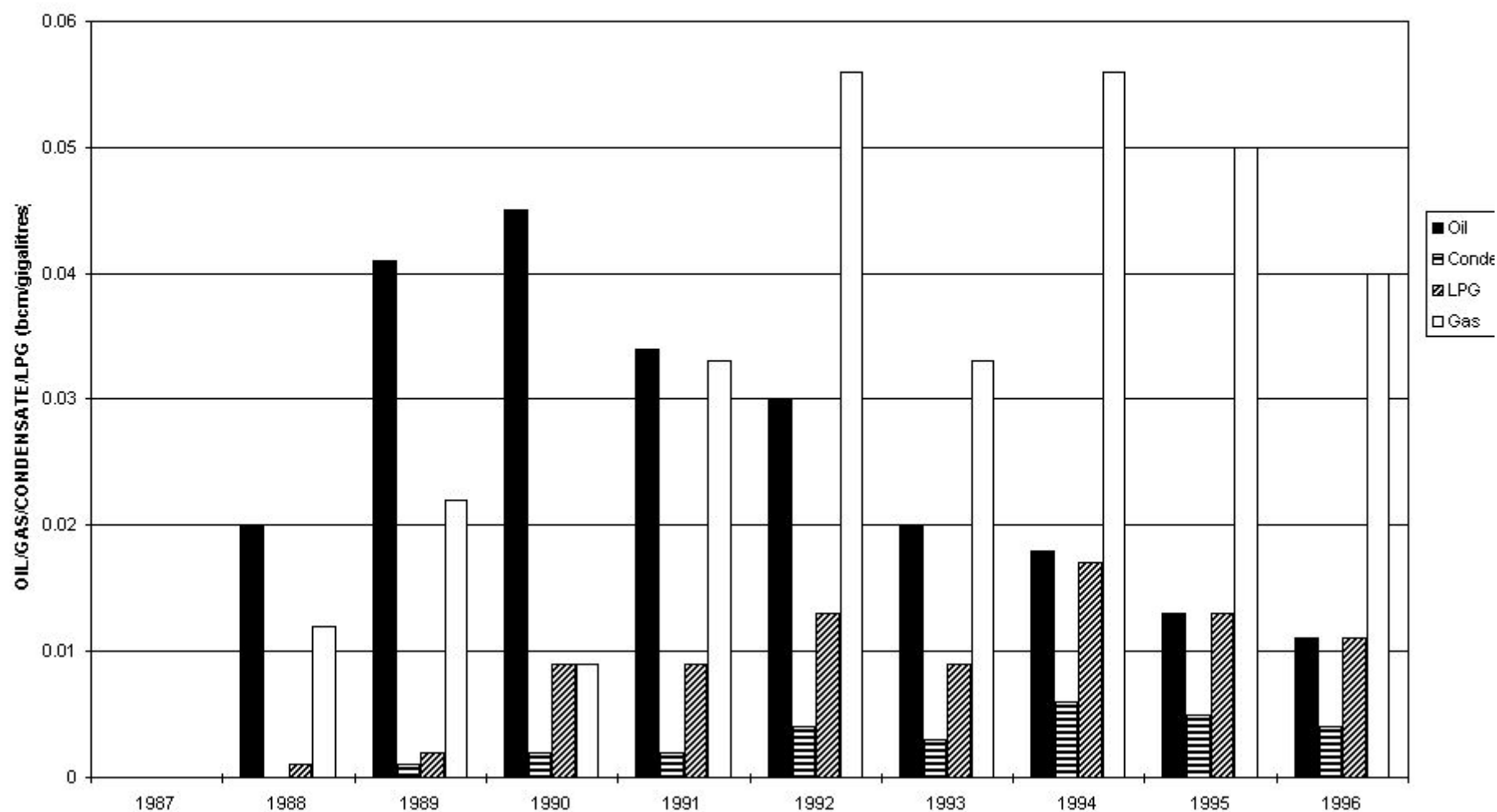
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	238.5
	Wallumbilla Fm	384.1
	Bungil Fm	588.3
	Mooga Sandstone	799.1
JURASSIC	Orallo Fm	967.3
	Gubberamunda Sandstone	1108.5
	Westbourne Fm	1251.7
	Springbok Sandstone	1372.3
	Walloon Coal Measures	1415.4
	Hutton Sandstone	1624.0
	Evergreen Fm	1765.8
TRIASSIC	Wandoan Fm	1870.7
	Sub Unit 9	1981.2
	Showgrounds Sandstone	2000.5
CARBONIFEROUS	Kuttung Fm	2007.6

* Picked by Bridge Oil Ltd

TAYLOR, OIL / GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 23 April 1986 Production commenced June 1988

Total Wells = 20



THOMBY

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	124 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Thomby-1
Longitude (E):	149.1014
Latitude (S):	-27.6736
Date total depth reached:	02 MAY 65
Ground level:	294.4 m
Kelly bushing:	298.1 m
Operator:	Union Oil Development Corporation
Total depth:	1911.4 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1893.7 m

TEST DATA FROM THE DISCOVERY WELL (Thomby-1):

DST 1, 1826.4-1832.2 m, Recovered 184.4 m of gas cut water, 36.6 m of muddy water and 18.3 m of mud.	Moolayember Formation

DST 2, 1895.3-1911.4 m, Flowed gas at 43 m ³ /day and recovered 1859.2 m of gas cut mud and 30.5 m of mud.	Showgrounds Sandstone

STRATIGRAPHY (Thomby-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	265.2
	Wallumbilla Fm	404.2
	Bungil Fm	597.4
	Mooga Sandstone	808.9
JURASSIC	Orallo Fm	920.5
	Gubberamunda Sandstone	1068.6
	Westbourne Fm	1255.8
	Springbok Sandstone	1336.2
	Walloon Coal Measures	1395.4
	Hutton Sandstone	1547.5
	Evergreen Fm	1707.5
	Precipice Sandstone	1776.4
TRIASSIC	Moolayember Fm	1789.8
	Snake Creek Mudstone Mbr	1880.0
	Showgrounds Sandstone	1893.7
PERMIAN	Blackwater Group	1898.6
DEVONIAN	Timbury Hills	1903.5

* Picked by Geological Survey of Queensland

THOMBY CREEK

PRESENT OPERATOR: Santos Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Past Producer
 LOCATION: 119 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 19
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Thomby Creek-1
 Longitude (E): 149.0181
 Latitude (S): -27.6547
 Date total depth reached: 13 NOV 79
 Ground level: 270.1 m
 Kelly bushing: 274.3 m
 Operator: Bridge Oil Ltd
 Total depth: 1912.3 mKB
 NUMBER OF WELLS DRILLED: 6
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1853.2 m

TEST DATA FROM THE DISCOVERY WELL (Thomby Creek-1):

DST 1, 1851.4-1860.8 m, Showgrounds Sandstone
 Recovered an unspecified quantity of oil
 and associated gas.

DST 2, 1862.6-1870.9 m, Blackwater Group
 No recovery.

DST 3, 1870.9-1912.3 m, Blackwater Group
 No recovery.

RESERVES (as at 30/6/94) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	8	8	very small

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Showgrounds Ss
Methane	59.60
Ethane	15.40
Propane	11.80
Isobutane	4.05
N-butane	3.11
Isopentane	3.39 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.40
CO ₂	0.25
H ₂ S	-
Specific Gravity	0.934
BTU/ft ³ (gross)	-

OIL :

FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	49.7°
Base	-
Sulphur (% wt)(ppm)	0.08 ppm
Initial GOR (ft ³ /bbl)	-
Pour Point	30°C
Specific Gravity	0.781
Colour	-
Viscosity (cp@100°F)	1.261
Bubble Point (psig)	-

STRATIGRAPHY (Thomby Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	262.1
	Wallumbilla Fm	391.4
	Bungil Fm	606.3
	Mooga Sandstone	792.5
JURASSIC	Orallo Fm	910.7
	Gubberamunda Sandstone	1044.9
	Westbourne Fm	1226.2
	Springbok Sandstone	1309.1
	Walloon Coal Measures	1389.9
	Hutton Sandstone	1516.1
	Evergreen Fm	1675.8
TRIASSIC	Moolayember Fm	1732.2
	Snake Creek Mudstone Mbr	1829.7
	Showgrounds Sandstone	1853.2
PERMIAN	Blackwater Group	1857.2
DEVONIAN	Timbury Hills	1891.0

* Picked by Geological Survey of Queensland

TIGGRIGIE CREEK

PRESENT OPERATOR:	Vacant
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	109 km north-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	Vacant
BASIN:	Bowen
SUB-BASIN:	Taroom Trough
DISCOVERY WELL:	Tiggrigie Creek-1
Longitude (E):	149.3572
Latitude (S):	-25.7722
Date total depth reached:	16 AUG 83
Ground level:	230.0 m
Kelly bushing:	236.0 m
Operator:	Coho Exploration Pty Ltd
Total depth:	3048 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Partially stratigraphic. Located on an anticlinal nose
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	565.1 m
TEST DATA FROM THE DISCOVERY WELL (Tiggrigie Creek-1):	
DST 2, 868.1-893.6 m, Flowed gas at 3090 m ³ /day.	Moolayember Formation
DST 1, 995.1-1020.7 m, Recovered 38 m of gas cut mud.	Moolayember Formation
DST 4, 1353.7-1379.3 m, Recovered 987.6 m of formation water.	Clematis Sandstone
DST 3, 1543.1-1568.6 m, Recovered 208.5 m of formation water.	Clematis Sandstone
DST 5, 1962.8-1993.3 m, Recovered 70.1 m of gas cut mud.	Rewan Formation

STRATIGRAPHY (Tiggrigie Creek-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Hutton Sandstone	00.0
	Evergreen Fm	338.6
	Precipice Sandstone	498.7
TRIASSIC	Moolayember Fm	565.1
	Clematis Sandstone	1343.6
	Showgrounds Sandstone	1612.1
	Rewan Fm	1664.2
PERMIAN	Kianga Fm	2586.8
	Back Creek Group	2760.0

* Picked by Coho Exploration Pty Ltd

TIMBURY HILLS

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 7 km north-northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 3
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Timbury Hills -2
 Longitude (E): 148.8272
 Latitude (S): -26.5606
 Date total depth reached: 04 APR 60
 Ground level: 335.3 m
 Kelly bushing: 338.3 m
 Operator: CSR Ltd
 Total depth: 1341.1 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1128.4 m

TEST DATA FROM THE DISCOVERY WELL (Timbury Hills -2):

DST 5, 1092.7-1155.8 m, Precipice Sandstone
 Flowed gas at 14 580 m³/day.

DST 4, 1095.8-1155.8 m, Precipice Sandstone
 No recovery.

DST 7, 1123.2-1137.2 m, Precipice Sandstone
 Flowed gas at 16 380 m³/day.

DST 10, 1123.2-1138.9 m, Precipice Sandstone
 Flowed gas at 29 000 m³/day.

DST 1, 1126.8-1137.8 m, Precipice Sandstone
 Flowed gas at 35 400 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	86	81	5

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	85.70
Ethane	11.90
Propane	-
Isobutane	-
N-butane	-
Isopentane	-
N-pentane	-
Hexanes +	-
N ₂ + O ₂	1.80
CO ₂	0.60
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Timbury Hills-2) :

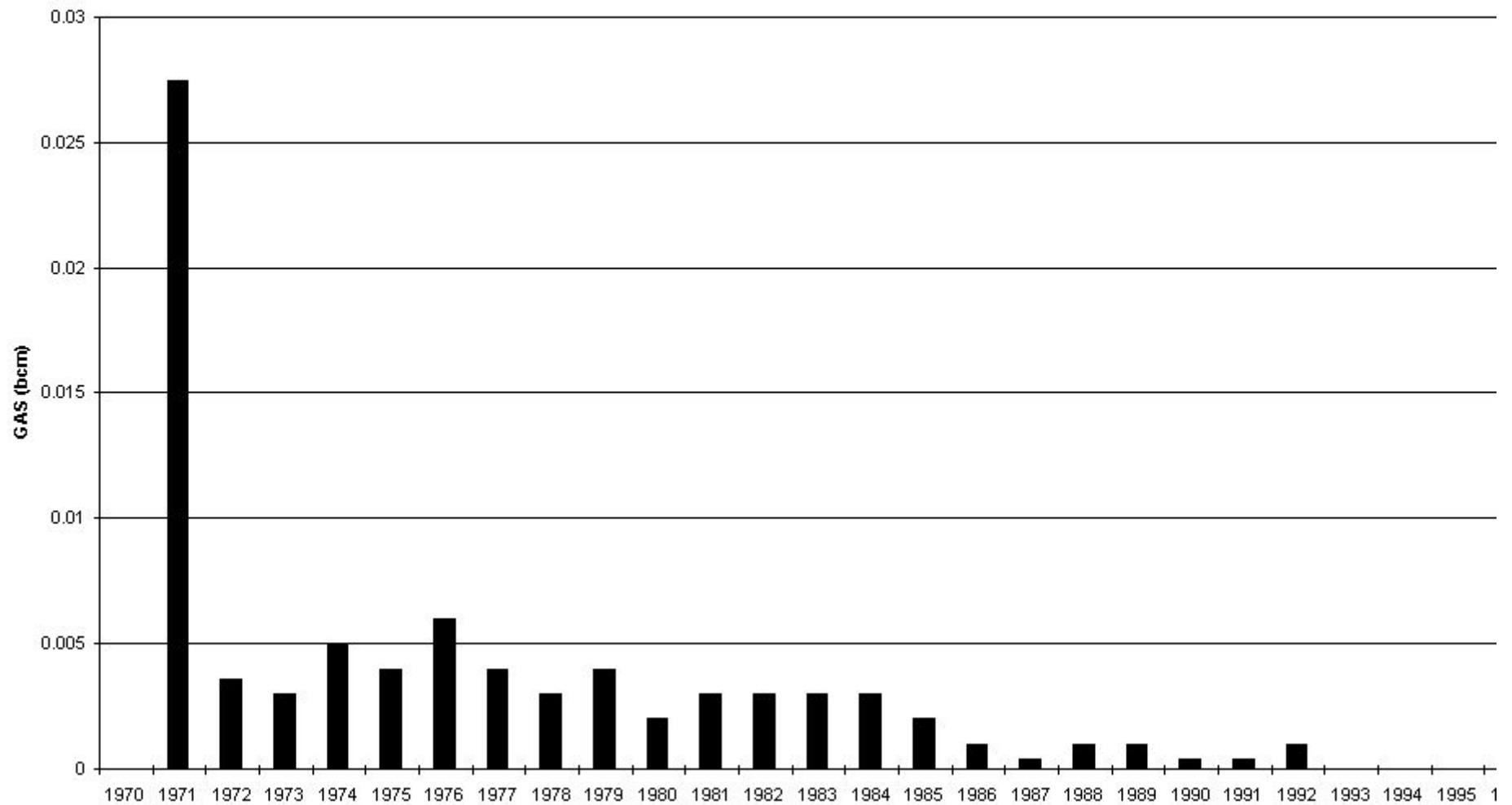
AGE	UNIT	FORMATION TOP * (mKB)
TERTIARY	Unnamed	00.0
CRETACEOUS	Wallumbilla Fm	9.1
	Bungil Fm	54.9
	Mooga Sandstone	156.1
JURASSIC	Orallo Fm	212.5
	Gubberamunda Sandstone	346.9
	Westbourne Fm	417.6
	Springbok Sandstone	543.2
	Walloon Coal Measures	573.6
	Eurombah Fm	787.6
	Hutton Sandstone	847.3
	Evergreen Fm	1007.4
	Precipice Sandstone	1128.4
TRIASSIC	Moolayember Fm	1146.7
DEVONIAN	Timbury Hills Fm	1166.8

* Picked by Geological Survey of Queensland

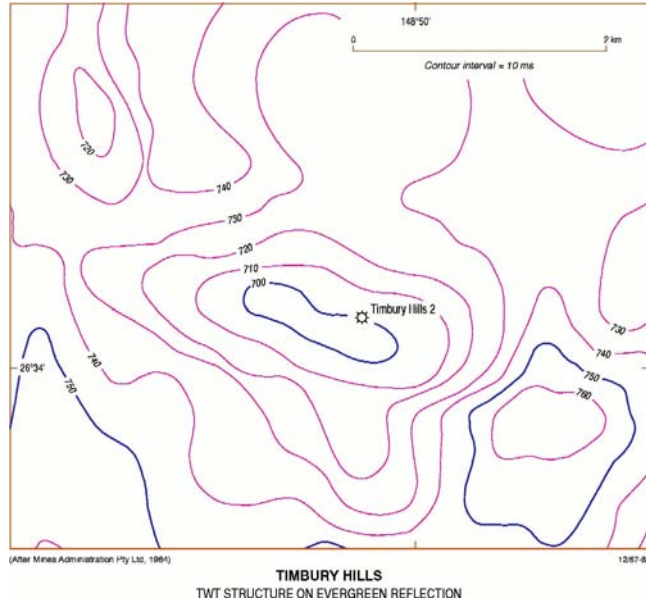
TIMBURY HILLS, GAS PRODUCTION (Precipice Sandstone)

Discovered 4 April 1960 Production commenced April 1971

Total Wells = 2 (1 Shut In; 1 Plugged and Abandoned)



TIMBURY HILLS MAP



TINKER

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 112 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 16
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Tinker-1
 Longitude (E): 149.3064
 Latitude (S): -27.4693
 Date total depth reached: 30 DEC 88
 Ground level: 314.0 m
 Kelly bushing: 318.3 m
 Operator: Bridge Oil Ltd
 Total depth: 2129 mKB
 NUMBER OF WELLS DRILLED: 4
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Rewan Formation
 CONTENTS: Gas
 FORMATION: Rewan Formation
 AGE: Early Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 2030.6 m

TEST DATA FROM THE DISCOVERY WELL (Tinker-1):

DST 1, 2020.0-2041.3 m, Rewan Formation
 Flowed gas at 2580 m³/day and recovered
 46 m of condensate cut mud.

DST 2, 2040.0-2050.0 m, Rewan Formation
 Recovered 20 m of mud.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Rewan Fm	99	49	50

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Rewan Fm	13	6	7

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Rewan Fm	15	7	8

STRATIGRAPHY (Tinker-1) :

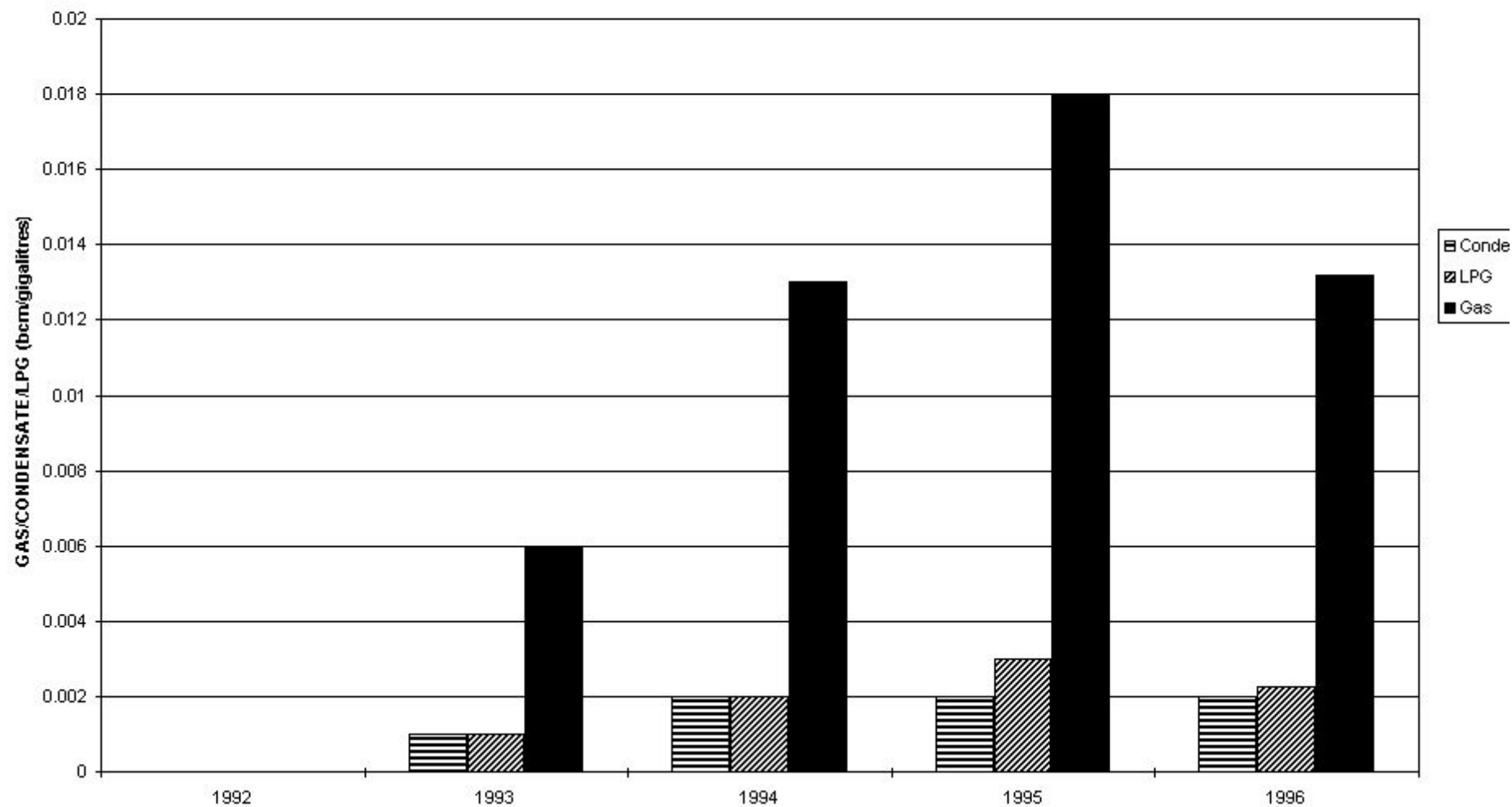
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	327.6
	Bungil Fm	549.0
	Mooga Sandstone	766.5
JURASSIC	Orallo Fm	922.7
	Gubberamunda Sandstone	1046.3
	Westbourne Fm	1210.0
	Springbok Sandstone	1322.8
	Birkhead Formation	1385.0
	Hutton Sandstone	1583.7
	Evergreen Fm	1757.4
	Boxvale Sandstone Mbr	1805.0
	Precipice Sandstone	1851.7
TRIASSIC	Moolayember Fm	1857.8
	Snake Creek Mudstone Mbr	2000.0
	Showgrounds Sandstone	2023.4
	Rewan Formation	2030.6
CARBONIFEROUS	Basement	2067.2

* Picked by Geological Survey of Queensland

TINKER, GAS / CONDENSATE / LPG PRODUCTION ('Rewan' Formation)

Discovered 30 December 1988 Production commenced 1993

Total Wells = 4



TRINIDAD

PRESENT OPERATOR: Santos Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Past Producer
 LOCATION: 31 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 12
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Trinidad-1
 Longitude (E): 148.8917
 Latitude (S): -26.8736
 Date total depth reached: 14 FEB 65
 Ground level: 303.0 m
 Kelly bushing: 306.6 m
 Operator: Amalgamated Petroleum NL
 Total depth: 1471.6 mKB
 NUMBER OF WELLS DRILLED: 9
 STRUCTURE/TRAP: Stratigraphic. Isolated channel sand pods outside structural closure.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone (multiple reservoirs)
 CONTENTS: Oil
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1399.6 m

 TEST DATA FROM THE DISCOVERY WELL (Trinidad-1):

 DST 1, 1399.0-1413.7 m, Precipice Sandstone
 Recovered 125 m of oil and 27 m of mud.

 DST 2, 1400.3-1405.1 m, Precipice Sandstone
 Flowed oil at 162 bbl/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Precipice Ss	7	7	very small

STRATIGRAPHY (Trinidad-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	253.0
	Mooga Sandstone	376.4
JURASSIC	Orallo Fm	447.4
	Gubberamunda Sandstone	636.7
	Westbourne Fm	733.0
	Springbok Sandstone	831.8
	Walloon Coal Measures	900.7
	Eurombah Fm	1083.6
	Hutton Sandstone	1129.9
	Evergreen Fm	1293.0
	Precipice Sandstone	1399.6
TRIASSIC	Moolayember Fm	1403.6
CARBONIFEROUS	Combarngo Volcanics	1465.5

* Picked by Geological Survey of Queensland

TURKEY CREEK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	305 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 67
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Turkey Creek-1
Longitude (E):	148.3329
Latitude (S):	-23.8741
Date total depth reached:	16 NOV 92
Ground level:	190.5 m
Kelly bushing:	194.5 m
Operator:	Australian Gas Light Company
Total depth:	1132.5 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	Fault-bounded asymmetric anticline.
AREAL CLOSURE:	10.0 km ² (top Mantuan Formation)
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Mantuan Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	440 m

PETROLEUM BEARING UNIT No.2:	Catherine Sandstone
CONTENTS:	Gas
FORMATION:	Catherine Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	586 m

TEST DATA FROM THE DISCOVERY WELL (Turkey Creek-1):

DST 1, 438.0-458.7 m, Flowed gas at 39 640 m ³ /day.	Mantuan Formation

DST 2, 593.0-606.0 m, Flowed gas at 21 800 m ³ /day.	Catherine Sandstone

DST 3, 639.0-650.2 m, Flowed gas at 18 830 m ³ /day.	Catherine Sandstone

DST 4, 853-885 m, No gas to surface.	Freitag Formation

DST 5, 890-925 m, Gas to surface at less than 142 m ³ /day.	Freitag Formation

PRODUCTION & INFRASTRUCTURE :

Discovered in 1992, Turkey Creek commenced production in September 1993 at a rate of 150 MCM/day. In 1994 Turkey Creek was connected by a 10 km pipeline to the Springton gas accumulation. Turkey Creek supplies gas to Queensland Alumina Ltd's operation at Gladstone.

See Arcturus.

RESERVES (as at 30/6/96) :**GAS :**

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Catherine Ss	235	68	167
Mantuan Fm	137	52	85

STRATIGRAPHY (Turkey Creek-1) :

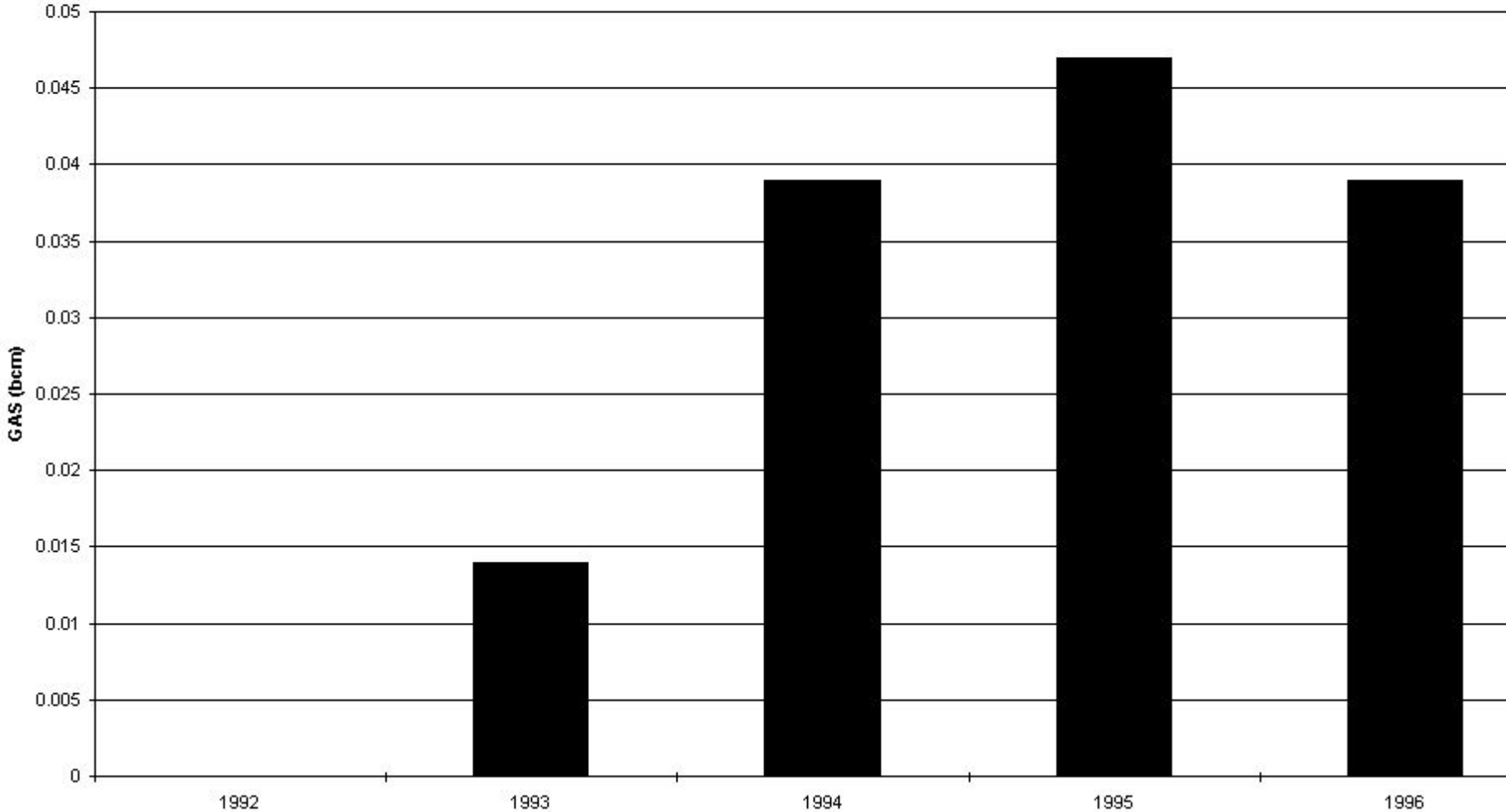
AGE	UNIT	FORMATION TOP * (mKB)
PERMIAN	Bandanna Formation	00.0
	Black Alley Shale	329.0
	Peawaddy Formation	440.0
	Catherine Sandstone	586.0
	Ingelara Formation	692.0
	Freitag Formation	848.0
	Aldebaran Sandstone	998.0

* Picked by Geological Survey of Queensland

TURKEY CREEK, GAS PRODUCTION (Catherine Sandstone & Mantuan Formation)

Discovered 16 November 1992 Production commenced 1993

Total Wells = 4



WAGGAMBA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	135 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Waggamba-1
Longitude (E):	149.4578
Latitude (S):	-27.6631
Date total depth reached:	20 NOV 81
Ground level:	273.0 m
Kelly bushing:	279.5 m
Operator:	Bridge Oil Ltd
Total depth:	2686 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2351.0 m

PETROLEUM BEARING UNIT No.2:	Kianga Formation
CONTENTS:	Gas
FORMATION:	Kianga Formation
AGE:	Late Permian-Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	2467.5 m

TEST DATA FROM THE DISCOVERY WELL (Waggamba-1):

DST 1, 2334.0-2361.0 m, Flowed gas at 960 m ³ /day.	Showgrounds Sandstone

DST 2, 2357.6-2369.1 m, Flowed gas at 1440 m ³ /day and recovered 170 m of gas and condensate cut mud.	Showgrounds Sandstone

DST 3, 2363.4-2369.1 m, Recovered 55 m of condensate cut mud.	Showgrounds Sandstone

DST 4, 2595.2-2621.0 m, Flowed gas at 113 770 m ³ /day and recovered 190 m of condensate.	Kianga Formation

DST 9, 2612.0-2621.0 m, Flowed gas at 67 960 m ³ /day and condensate at 6 bbl/day.	Kianga Formation

DST 8, 2628.5-2631.5 m, Flowed gas at 290 m ³ /day.	Kianga Formation
DST 5, 2648.0-2654.0 m, Flowed gas at 765 m ³ /day and recovered 54 m of condensate.	Kianga Formation
DST 6, 2648.0-2654.0 m, Flowed gas at 650 m ³ /day and recovered 95 m of condensate.	Kianga Formation

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Kianga Fm	9	3	6

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Kianga Fm	8	4	4

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Kianga Fm	very small	very small	very small

COMPOSITIONAL DATA :

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Kianga Fm
API Gravity @ 60°F	56.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.772
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Waggamba-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	323.5
	Bungil Fm	660.0
	Mooga Sandstone	844.8
JURASSIC	Orallo Fm	1041.5
	Gubberamunda Sandstone	1166.5
	Westbourne Fm	1396.5
	Springbok Sandstone	1482.0
	Walloon Coal Measures	1573.0
	Hutton Sandstone	1766.5
	Evergreen Fm	1963.5
	Precipice Sandstone	2055.7
TRIASSIC	Moolayember Fm	2062.0
	Snake Creek Mudstone Mbr	2318.0
	Showgrounds Sandstone	2351.0
	Rewan Fm	2385.0
PERMIAN	Blackwater Group	2467.0
	Back Creek Group	2666.5

* Picked by Geological Survey of Queensland

WALLUMBILLA SOUTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	39 km east-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 8
BASIN:	Bowen
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Wallumbilla South-1
Longitude (E):	149.1833
Latitude (S):	-26.6483
Date total depth reached:	12 JUN 67
Ground level:	292.0 m
Kelly bushing:	297.2 m
Operator:	CSR Ltd
Total depth:	1854.7 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Structural/Stratigraphic. Formed by drape of a permeable sand pod over the axis of faulted basement nose.
AREAL CLOSURE:	10.8 km ²
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Back Creek Group
CONTENTS:	Gas
FORMATION:	Tinowon Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone : medium to very coarse grained, subangular to subrounded, well sorted, quartzose with a white/brown clay matrix.
DEPOSITIONAL ENVIRONMENT:	Shallow marine shoreline deposit.
POROSITY:	21% (average)
PERMEABILITY:	359 md (average from core analysis)
TEST DATA FROM THE DISCOVERY WELL (Wallumbilla South-1):	
DST 1, 1723.0-1756.6 m, Flowed gas at 130 260 m ³ /day and condensate at 12 bbl/day. Recovered 107 m of gas cut mud.	Tinowon Formation
DST 2, 1804.4-1813.6 m, Flowed gas at 57 m ³ /day and recovered 6 m of gas cut mud.	Tinowon Formation

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Tinowon Fm	86	82	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Tinowon Fm
Methane	84.30
Ethane	6.70
Propane	3.50
Isobutane	0.52
N-butane	1.04
Isopentane	0.26
N-pentane	0.41
Hexanes +	1.77
N ₂ + O ₂	1.36
CO ₂	0.19
H ₂ S	-
Specific Gravity	0.707
BTU/ft ³ (gross)	1125

CONDENSATE :

FLUID PROPERTIES	CONDENSATE Tinowon Fm
API Gravity @ 60°F	61.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	0.7351
Colour	Greenish-brown
Viscosity (cp@100°F)	-
Bubble Point (psig)	na

STRATIGRAPHY (Wallumbilla South-1) :

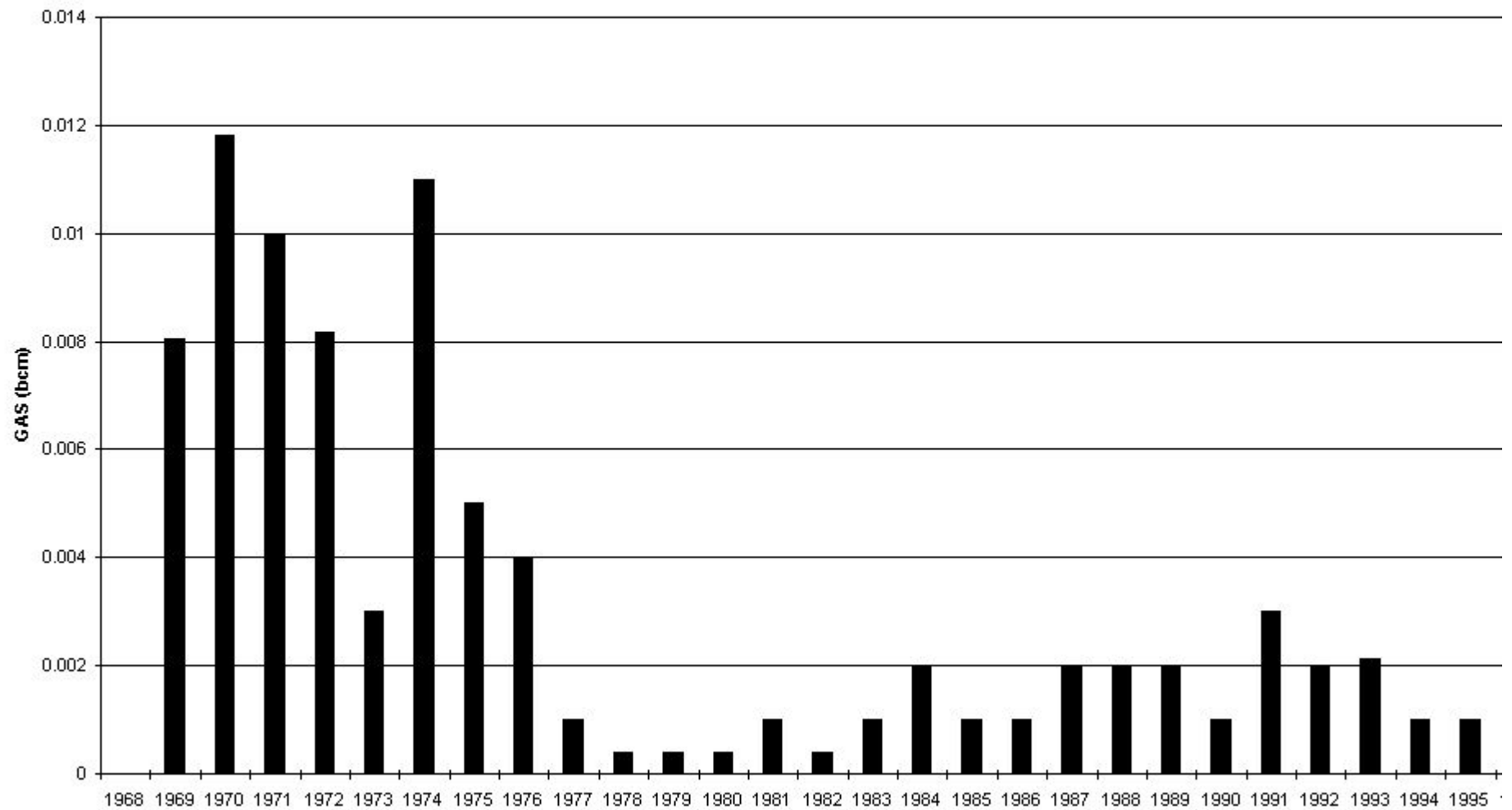
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	70.1
	Mooga Sandstone	208.8
JURASSIC	Orallo Fm	284.4
	Gubberamunda Sandstone	470.0
	Westbourne Fm	537.1
	Springbok Sandstone	655.9
	Walloon Coal Measures	701.0
	Eurombah Fm	1001.0
	Hutton Sandstone	1082.7
	Evergreen Fm	1233.2
	Precipice Sandstone	1352.4
TRIASSIC	Moolayember Fm	1355.5
	Snake Creek Mudstone Mbr	1390.2
	Showgrounds Sandstone	1403.3
	Rewan Fm	1408.8
PERMIAN	Blackwater Group	1609.3
	Back Creek Group	1667.9
CARBONIFEROUS	Combarngo Volcanics	1809.6

* Picked by Geological Survey of Queensland

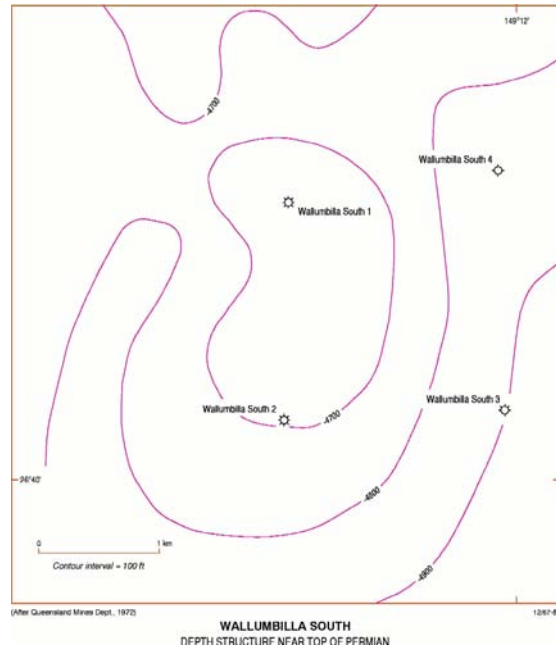
WALLUMBILLA SOUTH, GAS PRODUCTION (Tinowon Formation)

Discovered 12 June 1967 Production commenced September 1969

Total wells = 5 (1 Producer; 2 Shut In; 2 Plugged and Abandoned)



WALLUMBILLA SOUTH MAP



WALPANARA

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 55 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 53
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Walpanara-1
 Longitude (E): 149.0130
 Latitude (S): -27.0644
 Date total depth reached: 01 FEB 88
 Ground level: 261.8 m
 Kelly bushing: 266.4 m
 Operator: Hartogen Energy Ltd
 Total depth: 1817 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Back Creek Group
 CONTENTS: Gas
 FORMATION: Tinowon Formation
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Paralic

TEST DATA FROM THE DISCOVERY WELL (Walpanara-1):

DST 1, 1757.2-1787.9 m, Tinowon Formation
 Flowed gas at 177 600 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Tinowon Fm	59	36	23

RESERVES (as at 30/6/96) CONTD :

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Tinowon Fm	4	2	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Tinowon Fm	8	4	4

STRATIGRAPHY (Walpanara-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	343.8
	Mooga Sandstone	479.9
JURASSIC	Orallo Fm	599.8
	Gubberamunda Sandstone	762.9
	Westbourne Fm	916.5
	Springbok Sandstone	1019.6
	Walloon Coal Measures	1068.3
	Eurombah Fm	1307.0
	Hutton Sandstone	1389.3
	Evergreen Fm	1493.2
TRIASSIC	Moolayember Fm	1586.2
	Showgrounds Sandstone	1710.5
PERMIAN	Blackwater Group	1718.5
DEVONIAN	Timbury Hills Formation	1773.0

* Picked by Geological Survey of Queensland

WALPANARA EAST

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 57 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 53
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Walpanara East-1
 Longitude (E): 149.0290
 Latitude (S): -27.0598
 Date total depth reached: 29 SEP 91
 Ground level: 256.0 m
 Kelly bushing: 261.5 m
 Operator: Oil Company of Australia NL
 Total depth: 1788.6 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Back Creek Group
 CONTENTS: Gas
 FORMATION: Tinowon Formation
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Paralic

TEST DATA FROM THE DISCOVERY WELL (Walpanara East-1):

DST 1, 1752.9-1787.0 m. Tinowon Formation
 Flowed gas at 2830 m³/day and recovered
 10 m of gas cut mud.

STRATIGRAPHY (Walpanara East-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	327.4
	Mooga Sandstone	452.7
JURASSIC	Orallo Fm	596.8
	Gubberamunda Sandstone	769.6
	Westbourne Fm	882.7
	Springbok Sandstone	995.2
	Walloon Coal Measures	1064.4
	Hutton Sandstone	1316.7
	Evergreen Fm	1482.7
	Boxvale Sandstone Mbr	1527.0
TRIASSIC	Moolayember Fm	1586.2
	Snake Creek Mudstone Mbr	1694.7
	Showgrounds Sandstone	1705.1
PERMIAN	Blackwater Group	1714.2
CARBONIFEROUS	Combarngo Volcanics	1759.9

* Picked by Geological Survey of Queensland

WARATAH

PRESENT OPERATOR: Oil Company of Australia Ltd
TYPE: Oil and Gas
COMMERCIAL STATUS: Producer
LOCATION: 49 km south-southeast of Roma.
STATE: Queensland
PETROLEUM TITLES: PL 22
BASIN: Bowen
SUB-BASIN: Saint George-Bollon Slope
DISCOVERY WELL: Waratah-1
 Pool(s): Showgrounds Sandstone (Oil).
 Longitude (E): 148.9676
 Latitude (S): -27.0217
 Date total depth reached: 15 JUN 82
 Ground level: 276.1 m
 Kelly bushing: 280.4 m
 Operator: Hartogen Energy Ltd
 Total depth: 1683.7 mKB
DISCOVERY WELL: Waratah-4
 Pool(s): Showgrounds Sandstone (Gas).
 Longitude (E): 148.9675
 Latitude (S): -27.1499
 Date total depth reached: 30 JAN 83
 Operator: Hartogen Energy Ltd
 Total depth: 1656 mKB
NUMBER OF WELLS DRILLED: 6
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
CONTENTS: Oil and Gas
FORMATION: Showgrounds Sandstone
AGE: Middle Triassic
LITHOLOGY: Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial
FORMATION TOP (mKB): 1631.9 m (Waratah-1)

TEST DATA FROM THE DISCOVERY WELL (Waratah-1):

DST 1, 1631.0-1684.0 m, Showgrounds Sandstone
Flowed oil at 50 bbl/day.

TEST DATA FROM THE DISCOVERY WELL (Waratah-4):

DST 1, 1627.3-1629.9 m, Showgrounds Sandstone
Flowed oil at 1100 bbl/day and gas at
2800 m³/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	67	56	11

COMPOSITIONAL DATA :

OIL :

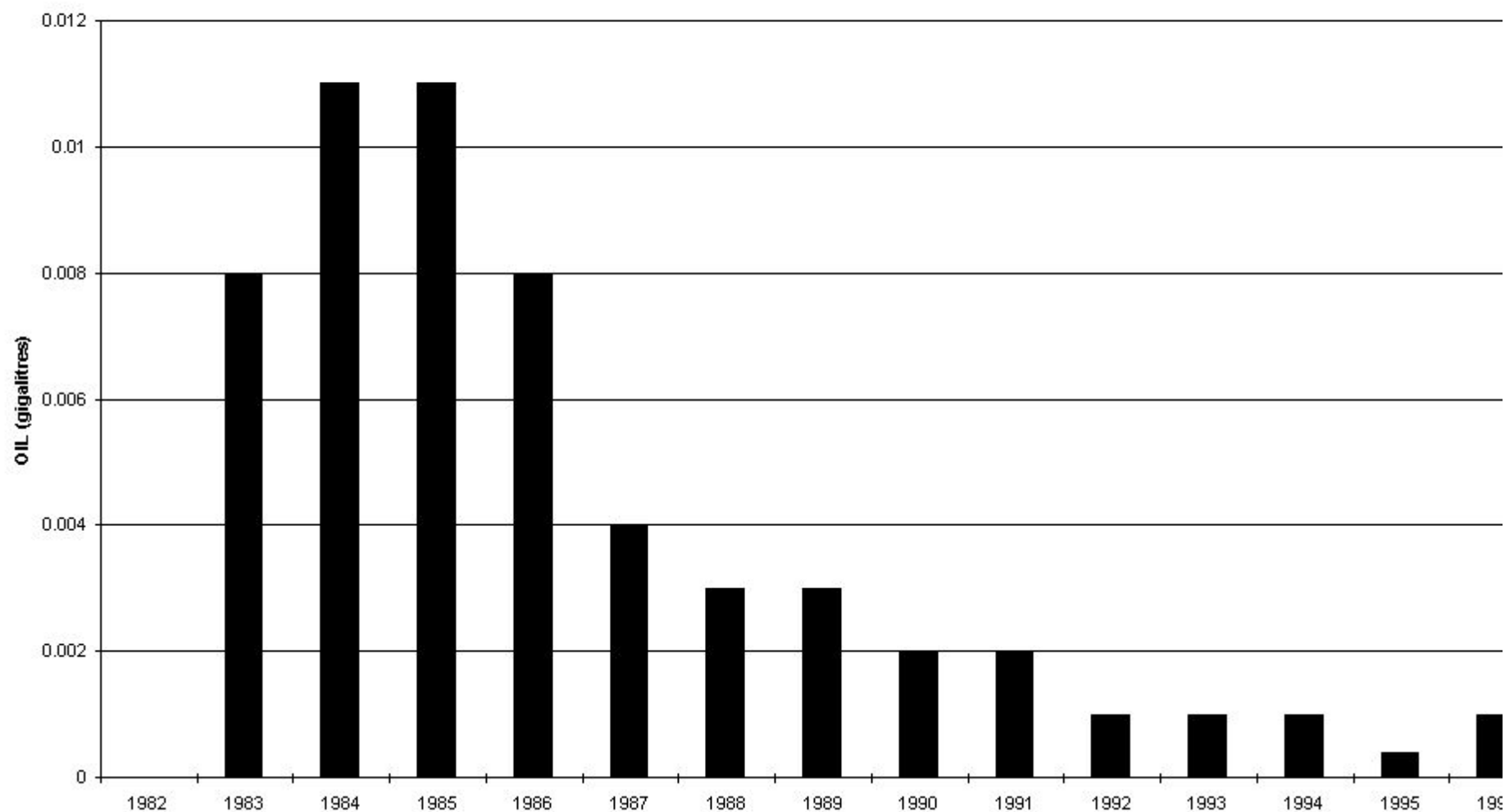
FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	30.0°
Base	-
Sulphur (% wt)(ppm)	-
Initial GOR (ft ³ /bbl)	-
Pour Point	23.9°C
Specific Gravity	0.876
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Waratah-1) :

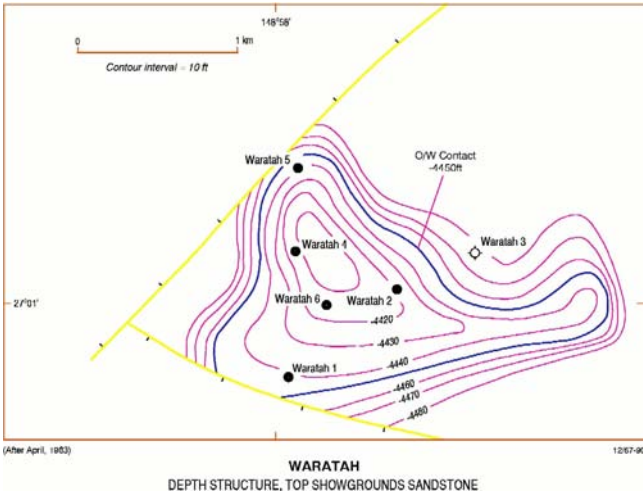
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	327.7
	Mooga Sandstone	461.8
JURASSIC	Orallo Fm	538.0
	Gubberamunda Sandstone	755.9
	Westbourne Fm	862.0
	Springbok Sandstone	976.0
	Walloon Coal Measures	1045.5
	Eurombah Fm	1228.3
	Hutton Sandstone	1249.7
	Evergreen Fm	1437.1
TRIASSIC	Moolayember Fm	1548.4
	Snake Creek Mudstone Mbr	1624.6
	Showgrounds Sandstone	1631.9
PERMIAN	Blackwater Group	1641.0
CARBONIFEROUS	Granite	1649.3

* Picked by Geological Survey of Queensland

WARATAH, OIL PRODUCTION (Showgrounds Sandstone)
Discovered 15 June 1982 Production commenced November 1983
Total Wells = 6



WARATAH MAP



WAROOPY

PRESENT OPERATOR: Santos Ltd
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: 11 km east of Roma.
STATE: Queensland
PETROLEUM TITLES: PL 3
BASIN: Surat
SUB-BASIN: Roma Shelf
DISCOVERY WELL: Warooby-1
 Longitude (E): 148.8972
 Latitude (S): -26.5339
 Date total depth reached: 04 AUG 34
 Operator: Oil Search Ltd
NUMBER OF WELLS DRILLED: 1
STRUCTURE/TRAP: Anticline
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Precipice Sandstone
CONTENTS: Gas
FORMATION: Precipice Sandstone
AGE: Early Jurassic
LITHOLOGY: Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (Warooby-1):

DST, 1103.7-1147.6 m, Precipice Sandstone
Flowed gas at 17 700 m³/day and water
at 1900 bbl/day.

WAROoby SOUTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	12 km east of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 3
BASIN:	Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Warooby South-1
Longitude (E):	148.9295
Latitude (S):	-26.5961
Date total depth reached:	27 FEB 64
Ground level:	300.2 m
Kelly bushing:	303.6 m
Operator:	Associated Australian Oilfields
Total depth:	1185.7 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	15.0 km ² (on mid Evergreen reflector)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1121.4 m
 TEST DATA FROM THE DISCOVERY WELL (Warooby South-1):	
DST 1, 1116.5-1132.9 m, Flowed gas at 2260 m ³ /day and recovered 23 m of mud.	Precipice Sandstone
 DST 2, 1119.5-1185.7 m, Flowed gas at 760 m ³ /day and recovered 54 m of gas cut mud and 122 m of water.	Precipice Sandstone

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	88.10
Ethane	4.70
Propane	2.10
Isobutane	0.41
N-butane	0.59
Isopentane	0.20
N-pentane	0.19
Hexanes +	0.57
N ₂ + O ₂	2.80
CO ₂	0.38
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Warooby South-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Unnamed	00.0
CRETACEOUS	Bungil Fm	13.7
	Mooga Sandstone	109.7
JURASSIC	Orallo Fm	176.2
	Gubberamunda Sandstone	330.7
	Westbourne Fm	396.6
	Springbok Sandstone	520.3
	Walloon Coal Measures	546.5
	Eurombah Fm	762.0
	Hutton Sandstone	810.8
	Evergreen Fm	999.4
	Precipice Sandstone	1121.4
TRIASSIC	Moolayember Fm	1135.1
DEVONIAN	Timbury Hills Fm	1145.4

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Warooby South-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1123.4	20.0	0.0	0.0	Precipice Sandstone
1124.0	22.0	0.0	0.0	Precipice Sandstone
1124.6	23.0	4.0	0.0	Precipice Sandstone
1125.5	19.5	0.0	0.0	Precipice Sandstone

1126.3	18.5	0.0	0.0	Precipice Sandstone

WARRINILLA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	168 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	337-P
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Warranilla-1
Pool(s):	Freitag Formation; Cattle Creek Formation.
Longitude (E):	148.5539
Latitude (S):	-25.1136
Date total depth reached:	18 JUL 63
Ground level:	306.3 m
Kelly bushing:	311.2 m
Operator:	Planet Exploration Company Pty Ltd
Total depth:	2042.5 mKB
DISCOVERY WELL:	Warranilla-2
Pool(s):	Peawaddy Formation.
Longitude (E):	148.5528
Latitude (S):	-25.0592
Date total depth reached:	28 NOV 64
Ground level:	293.2 m
Kelly bushing:	298.4 m
Operator:	Planet Exploration Company Pty Ltd
Total depth:	1769.4 mKB
DISCOVERY WELL:	Warranilla-5
Pool(s):	Bandanna Formation.
Longitude (E):	148.5736
Latitude (S):	-25.0006
Date total depth reached:	26 APR 68
Ground level:	284.1 m
Kelly bushing:	288.6 m
Operator:	Planet Exploration Company Pty Ltd
Total depth:	2051 mKB
NUMBER OF WELLS DRILLED:	6
STRUCTURE/TRAP:	Structural/Stratigraphic
RESERVOIR UNITS:	4
 PETROLEUM BEARING UNIT No.1:	 Bandanna Formation
CONTENTS:	Gas
FORMATION:	Bandanna Formation
AGE:	Late Permian to Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	489.5 m (Warrinilla-5)
 PETROLEUM BEARING UNIT No.2:	 Peawaddy Formation
CONTENTS:	Gas
FORMATION:	Peawaddy Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	766.6 m (Warrinilla-2)

PETROLEUM BEARING UNIT No.3:	Freitag Formation
CONTENTS:	Gas
FORMATION:	Freitag Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	987.6 m (Warrinilla-1)
PETROLEUM BEARING UNIT No.4:	Cattle Creek Formation
CONTENTS:	Gas
FORMATION:	Cattle Creek Formation
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Shallow marine
FORMATION TOP (mKB):	1082.1 m (Warrinilla-1)
TEST DATA FROM THE DISCOVERY WELL (Warrinilla-1):	
DST 4, 986.9-999.4 m, Recovered 12 m of gas cut mud.	Ingelara/Freitag Formation
DST 5, 986.9-1008.9 m, No recovery.	Freitag Formation
DST 6, 1024.4-1032.8 m, Flowed gas at 3060 m ³ /day.	Freitag Formation
DST 7, 1024.4-1035.1 m, Flowed gas at 280 m ³ /day.	Freitag Formation
DST 8, 1034.8-1044.5 m, Recovered 61 m of gas cut mud.	Freitag Formation
DST 9, 1042.7-1055.2 m, Recovered 12 m of gas cut mud.	Freitag Formation/Aldebaran Sandstone
DST 10, 1053.4-1066.2 m, Recovered 12 m of gas cut mud.	Aldebaran Sandstone
DST 11, 1065.0-1092.1 m, Recovered 37 m of gas cut mud.	Aldebaran Ss/Cattle Creek Formation
DST 12, 1245.1-1257.6 m, Recovered 15 m of gas cut mud.	Cattle Creek Formation
DST 13, 1270.1-1282.9 m, Flowed gas at 4960 m ³ /day.	Cattle Creek Formation
DST 14, 1289.3-1311.6 m, Recovered 6 m of gas cut mud.	Cattle Creek Formation
DST 15, 1429.5-1451.5 m, Recovered 9 m of gas cut mud.	Cattle Creek Fm/Reids Dome Beds
DST 16, 1453.6-1484.4 m, Recovered 12 m of gas cut water.	Reids Dome Beds

TEST DATA FROM THE DISCOVERY WELL (Warrinilla-2):

DST 1, 769.0-781.8 m, Peawaddy Formation
Flowed gas at 21 000 m³/day.

DST 8, 1103.4-1114.0 m, Aldebaran Sandstone
Recovered 64 m of gas cut mud.

DST 10, 1196.3-1213.1 m, Aldebaran Sandstone
Recovered 27 m of gas cut mud.

DST 11, 1229.3-1236.9 m, Aldebaran Sandstone
Recovered 192 m of gas cut water.

DST 13, 1269.5-1289.3 m, Aldebaran Sandstone
Recovered 183 m of heavily gas cut water.

DST 15, 1482.9-1502.7 m, Cattle Creek Formation
Recovered 9 m of slightly gas cut mud.

DST 16, 1752.6-1770.9 m, Reids Dome Beds
Recovered 335 m of heavily gas cut mud.

TEST DATA FROM THE DISCOVERY WELL (Warrinilla-5):

DST 1, 367.6-384.4 m, Bandanna Formation
Flowed gas at 1420 m³/day and recovered 30 m of mud. Tool partially plugged.

DST 2, 790.1-810.5 m, Peawaddy Formation
Flowed gas at 14 160 m³/day and recovered 113 m of gas cut mud.

DST 3, 810.2-830.6 m, Peawaddy Formation
Flowed gas at 8500 m³/day and recovered 30 m of gas cut mud.

DST 7, 1357.9-1360.9 m, Aldebaran Sandstone
Recovered 457 m of gas cut water.

RESERVES (as at 30/6/94) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Mantuan Fm	12	very small	12

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Freitag Fm
Methane	68.60
Ethane	8.40
Propane	4.70
Isobutane	0.75
N-butane	1.51
Isopentane	0.40
N-pentane	0.59
Hexanes +	0.46
N ₂ + O ₂	3.30
CO ₂	11.30
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Warrinilla-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Unnamed	00.0
TRIASSIC	Rewan Fm	27.4
PERMIAN	Bandanna Fm	461.8
	Black Alley Shale	559.3
	Peawaddy Fm	755.9
	Ingelara Fm	841.3
	Freitag Fm	987.6
	Aldebaran Sandstone	1053.4
	Cattle Creek Fm	1082.1
	Reids Dome Beds	1436.5

* Picked by Geological Survey of Queensland

STRATIGRAPHY (Warrinilla-2) :

AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Rewan Fm	00.0
PERMIAN	Bandanna Fm	496.8
	Black Alley Shale	606.6
	Peawaddy Fm	766.6
	Ingelara Fm	954.6
	Freitag Fm	1082.0
	Aldebaran Sandstone	1104.0
	Cattle Creek Fm	1321.9
	Reids Dome Beds	1690.1

* Picked by Geological Survey of Queensland

STRATIGRAPHY (Warrinilla-5) :

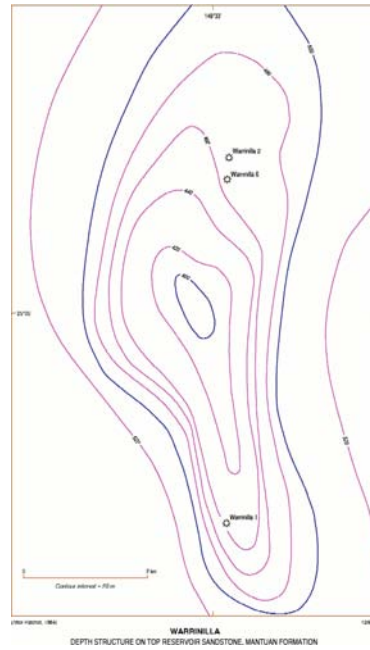
AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Rewan Fm	00.0
PERMIAN	Bandanna Fm	489.5
	Black Alley Shale	619.1
	Peawaddy Fm	779.1
	Catherine Sandstone	926.0
	Ingelara Fm	931.5
	Freitag Fm	1090.1
	Aldebaran Sandstone	1114.0
	Cattle Creek Fm	1414.0
	Reids Dome Beds	1815.1

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Warrinilla-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
153.9	21.0	3.0	6.0	Rewan Fm
253.3	17.0	7.0	-	Rewan Fm
405.1	15.0	-	0.0	Rewan Fm
493.8	15.0	0.0	0.0	Bandanna Fm
592.0	15.0	-	0.0	Black Alley Shale
670.3	15.0	0.0	0.0	Black Alley Shale
763.2	17.5	0.0	0.0	Peawaddy Fm
779.7	19.0	0.0	0.0	Peawaddy Fm
877.3	9.5	0.0	0.0	Ingelara Fm
995.5	11.0	0.0	0.0	Freitag Fm
1032.4	12.5	0.0	0.0	Freitag Fm
1042.2	14.5	0.0	0.0	Freitag Fm
1054.0	15.0	0.0	0.0	Aldebaran Sandstone
1058.6	12.0	0.0	0.0	Aldebaran Sandstone
1124.7	8.0	0.0	0.0	Cattle Creek Fm
1180.2	11.5	0.0	0.0	Cattle Creek Fm
1256.7	10.5	0.0	0.0	Cattle Creek Fm
1283.2	11.0	0.0	0.0	Cattle Creek Fm
1411.5	6.0	-	0.0	Cattle Creek Fm
1439.3	8.5	0.0	0.0	Reids Dome Beds
1451.5	7.5	0.0	0.0	Reids Dome Beds
1481.6	10.0	0.0	0.0	Reids Dome Beds
1571.5	12.5	0.0	0.0	Reids Dome Beds
1909.0	7.0	0.0	0.0	Reids Dome Beds
2020.8	8.0	0.0	0.0	Reids Dome Beds

WARRINILLA MAP



WARRINILLA NORTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	192 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	337-P
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Warrinilla North-1
Longitude (E):	148.5306
Latitude (S):	-24.8803
Date total depth reached:	08 OCT 63
Ground level:	310.9 m
Kelly bushing:	315.8 m
Operator:	Planet Exploration Company Pty Ltd
Total depth:	2094.5
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Structural/Stratigraphic
RESERVOIR UNITS:	3

PETROLEUM BEARING UNIT No.1:	Ingelara Formation
CONTENTS:	Gas
FORMATION:	Ingelara Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	1052.0 m

PETROLEUM BEARING UNIT No.2:	Freitag Formation
CONTENTS:	Gas
FORMATION:	Freitag Formation
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Paralic to shallow marine
FORMATION TOP (mKB):	1223.8 m

PETROLEUM BEARING UNIT No.3:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	1253.0 m

TEST DATA FROM THE DISCOVERY WELL (Warrinilla North-1):

DST 1, 609.6-631.6 m, Recovered 2 m of mud.	Bandanna Formation

DST 3, 679.1-690.1 m, Recovered 31 m of mud.	Bandanna Formation

DST 4, 900.7-911.7 m, Recovered 3 m of mud.	Peawaddy Formation

DST 5, 1134.2-1137.2 m, Recovered 2m of mud.	Ingelara Formation
DST 6, 1134.2-1162.2 m, Flowed gas at 1980 m ³ /day.	Ingelara Formation
DST 7, 1220.7-1228.3 m, Recovered 15 m of slightly gas cut mud.	Ingelara/Freitag Formation
DST 8, 1227.4-1238.1 m, Flowed gas at 3100 m ³ /day and recovered 40 m of gas cut mud.	Freitag Formation
DST 9, 1237.8-1255.8 m, Recovered 27 m of gas cut mud.	Freitag Formation
DST 11, 1323.4-1344.2 m, Recovered 23 m of mud.	Aldebaran Sandstone
DST 14, 1382.3-1387.8 Flowed gas at 1130 m ³ /day and recovered 38 m of gas cut mud.	Aldebaran Sandstone
DST 15, 1374.7-1393.9 m, Recovered 37 m of gas cut mud.	Aldebaran Sandstone
DST 16, 1428.3-1437.4 m, Recovered 64 m of slightly gas cut mud.	Aldebaran Sandstone
DST 17, 1561.5-1595.0 m, Recovered 61 m of mud.	Aldebaran Sandstone
DST 18, 1634.6-1640.1 m, Recovered 5 m of mud.	Aldebaran Sandstone
DST 19, 1638.0-1650.2 m, Recovered 107 m of mud.	Aldebaran Sandstone
DST 20, 1649.0-1666.3 m, Recovered 21 m of slightly gas cut mud.	Aldebaran Sandstone
DST 21, 1679.5-1699.3 m, Flowed gas at 2830 m ³ /day and recovered 91 m of gas cut mud.	Aldebaran Sandstone
DST 22, 1699.0-1720.3 m, Flowed gas at 7080 m ³ /day and recovered 206 m of gas cut water.	Aldebaran Sandstone
DST 23, 1935.5-1962.3 m, Recovered 3 m of mud.	Cattle Creek Formation

STRATIGRAPHY (Warrinilla North-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Alluvium	00.0
TRIASSIC	Rewan Fm	16.8
PERMIAN	Bandanna Fm	607.8
	Black Alley Shale	742.0
	Peawaddy Fm	897.6
	Ingelara Fm	1052.0
	Freitag Fm	1223.8
	Aldebaran Sandstone	1253.0
	Cattle Creek Fm	1721.0
	Reids Dome Beds	2025.0

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Warrinilla North-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
169.5	27.5	0.0	0.0	Rewan Fm
171.0	28.0	0.0	0.0	Rewan Fm
325.8	22.5	0.0	0.0	Rewan Fm
482.5	19.5	0.0	0.0	Rewan Fm
613.0	18.0	0.0	-	Bandanna Fm

WARROON

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Producer
LOCATION:	92 km southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 71
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Warroon-1
Pool(s):	Showgrounds Sandstone (Gas); Rewan Formation.
Longitude (E):	149.2092
Latitude (S):	-27.3603
Date total depth reached:	31 AUG 79
Ground level:	315.0 m
Kelly bushing:	319.0 m
Operator:	BHP Petroleum
Total depth:	2103 mKB
DISCOVERY WELL:	Warroon-3
Pool(s):	Showgrounds Sandstone (Oil)
Longitude (E):	149.1254
Latitude (S):	-27.2037
Date total depth reached:	31 AUG 88
Ground level:	339.1 m
Kelly bushing:	344.8 m
Operator:	Crusader Oil NL
Total depth:	2298 mKB
NUMBER OF WELLS DRILLED:	3
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	2050.7 m (Warroon-1)
PETROLEUM BEARING UNIT No.2:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	2060.5 m (Warroon-1)
TEST DATA FROM THE DISCOVERY WELL (Warroon-1):	
DST 1, 2043.0-2062.0 m, Flowed gas at 228 660 m ³ /day and recovered 35 m of condensate.	Showgrounds Sandstone
DST 2, 2061.0-2078.0 m, Flowed gas at 5830 m ³ /day and recovered 58 m of gas cut mud.	Rewan Formation

TEST DATA FROM THE DISCOVERY WELL (Warroon-3):

DST 1, 2056-2076 m, Moolayember Formation
No gas to surface.

DST 2, 2092-2108.5 m, Showgrounds Sandstone
Flowed gas at 42 000 m³/day decreasing to a rate too small to measure. Recovered 1 bbl of oil and 0.6 bbls of oil cut mud.

DST 3, 2111-2139 m, Rewan Formation
Flowed gas at a rate too small to measure and recovered 0.3 bbls of oil cut mud.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Showgrounds Ss	25	20	5

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Showgrounds Ss	5	4	1

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Showgrounds Ss	12	8	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Rewan Fm	GAS Showgrounds Ss
Methane	37.86	59.73
Ethane	9.14	10.08
Propane	11.39	11.74
Isobutane	5.81	4.88
N-butane	8.29	4.80
Isopentane	24.24 (C5+)	2.84 (C5+)
N-pentane	na	na
Hexanes +	na	na
N₂ + O₂	3.07	4.78
CO₂	0.15	1.15
H₂S	-	-
Specific Gravity	0.9713	0.7327
BTU/ft³ (gross)	1604	1214

STRATIGRAPHY (Warroon-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Alluvium	00.0
CRETACEOUS	Wallumbilla Fm	329.2
	Bungil Fm	563.9
	Mooga Sandstone	697.7
JURASSIC	Orallo Fm	851.0
	Gubberamunda Sandstone	1024.7
	Westbourne Fm	1227.1
	Springbok Sandstone	1332.3
	Walloon Coal Measures	1371.6
	Hutton Sandstone	1603.9
	Evergreen Fm	1761.4
	Precipice Sandstone	1845.3
TRIASSIC	Moolayember Fm	1850.8
	Snake Creek Mudstone Mbr	2029.1
	Showgrounds Sandstone	2050.7
	Rewan Fm	2060.0
PERMIAN	Blackwater Group	2077.0

* Picked by Geological Survey of Queensland

STRATIGRAPHY (Warroon-3) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Formation	00.0
	Surat Siltstone	327.5
	Wallumbilla Fm	401.8
	Bungil Fm	578.0
	Mooga Sandstone	731.0
JURASSIC	Orallo Fm	879.3
	Gubberamunda Sandstone	1052.9
	Westbourne Fm	1256.5
	Springbok Sandstone	1383.0
	Birkhead Formation	1399.0
	Hutton Sandstone	1630.4
	Evergreen Fm	1792.5
	Precipice Sandstone	1868.0
TRIASSIC	Moolayember Fm	1877.0
	Snake Creek Mudstone Mbr	2075.2
	Showgrounds Sandstone	2098.0
	Rewan Fm	2108.0
PERMIAN	Blackwater Group	2141.3
	Back Creek Group	2162.0
DEVONIAN	Timbury Hills Formation	2235.0

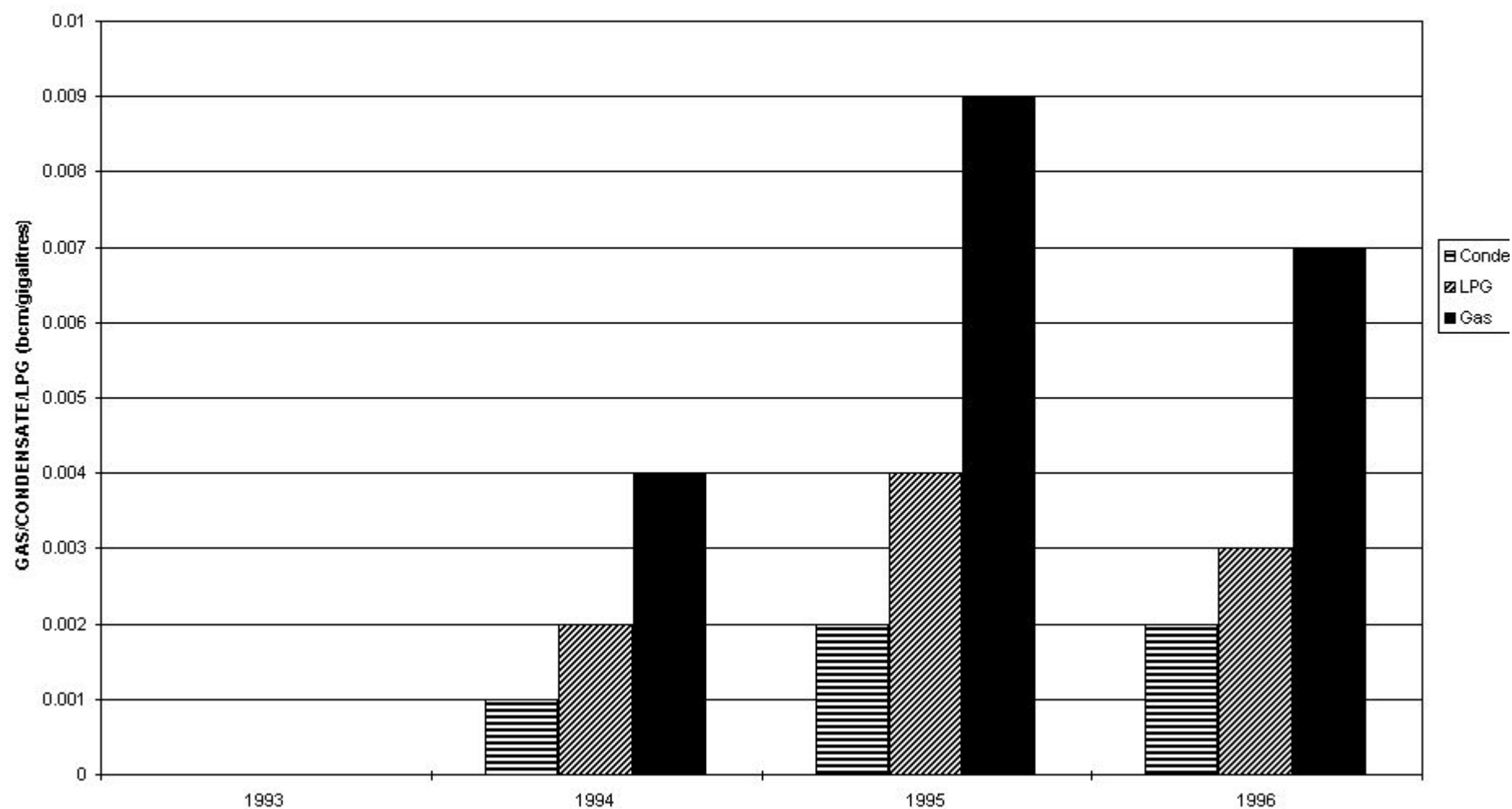
* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Warroon-1) :

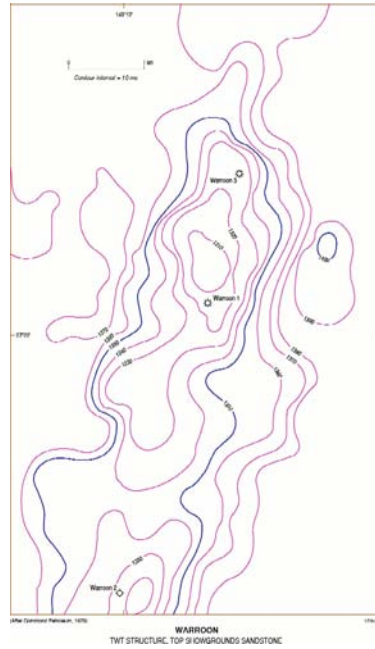
DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
2050.8	10.9	1.9	1.4	Showgrounds Sandstone
2051.6	5.9	0.8	0.1	Showgrounds Sandstone
2052.3	13.7	1.7	1.0	Showgrounds Sandstone
2052.7	10.9	13.5	11.8	Showgrounds Sandstone
2053.4	2.1	37.0	18.0	Showgrounds Sandstone
2053.9	16.5	0.1	0.1	Showgrounds Sandstone
2054.5	15.7	94.0	-	Showgrounds Sandstone
2054.8	2.4	0.1	0.1	Showgrounds Sandstone
2055.8	12.4	1.0	0.4	Showgrounds Sandstone
2056.2	16.4	7.4	9.9	Showgrounds Sandstone
2056.7	15.7	229.0	-	Showgrounds Sandstone
2057.1	28.8	143.0	-	Showgrounds Sandstone
2057.6	14.5	3.1	-	Showgrounds Sandstone
2058.0	6.5	0.6	-	Showgrounds Sandstone
2058.4	11.0	0.1	0.1	Showgrounds Sandstone
2059.0	6.5	0.1	0.2	Showgrounds Sandstone

WARROON, GAS / CONDENSATE / LPG PRODUCTION (Showgrounds Sandstone)

Discovered 31 August 1979 Production commenced 1994

Total Wells = 3 (2 Producers; 1 Plugged and Abandoned)

WARROON MAP



WASHPOOL

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Past Producer
 LOCATION: 63 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 22
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Washpool-1
 Longitude (E): 148.9769
 Latitude (S): -27.1622
 Date total depth reached: 07 SEP 85
 Ground level: 234.1 m
 Kelly bushing: 238.4 m
 Operator: Hartogen Energy Ltd
 Total depth: 1660.6 mKB
 NUMBER OF WELLS DRILLED: 2
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1599.6 m

TEST DATA FROM THE DISCOVERY WELL (Washpool-1):

DST 1, 1597.2-1603.2 m, Showgrounds Sandstone
 Recovered 285 m of oil and 18 m of mud.

DST 2, 1604.2-1613.3 m, Showgrounds Sandstone
 Recovered 335 m of mud.

RESERVES (as at 30/6/96) :

OIL :

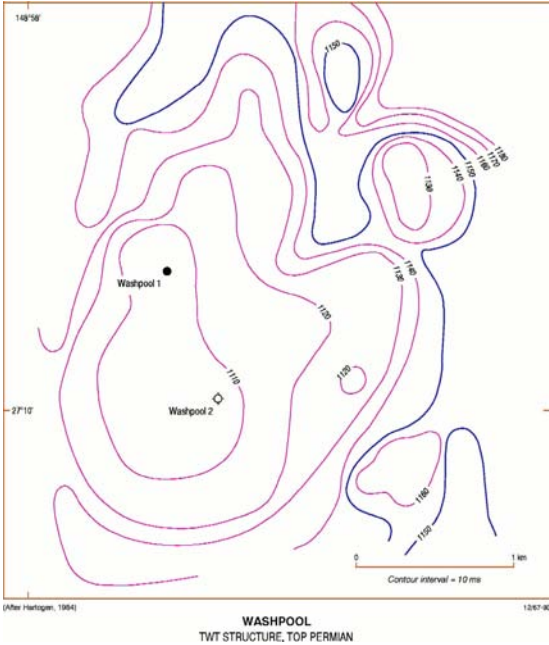
RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	4	4	very small

STRATIGRAPHY (Washpool-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Alluvium	00.0
CRETACEOUS	Roma Fm	4.3
	Blythesdale Group	342.0
JURASSIC	Injune Creek Group	882.4
	Hutton Sandstone	1238.1
	Evergreen Fm	1419.8
TRIASSIC	Wandoan Fm	1517.9
	Showgrounds Sandstone	1599.6
PERMIAN	Blackwater Group	1601.4
DEVONIAN	Timbury Hills Fm	1611.8

* Picked by Hartogen Energy Ltd

WASHPOOL MAP



WERIBONE

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 96 km southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: 470-P
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Weribone-1
 Longitude (E): 149.3506
 Latitude (S): -27.3272
 Date total depth reached: 22 MAY 63
 Ground level: 334.7 m
 Kelly bushing: 339.9 m
 Operator: Union Oil Development Corporation
 Total depth: 2436.9 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Gas
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 2152.5 m

TEST DATA FROM THE DISCOVERY WELL (Weribone-1):

DST 1, 2153.7-2160.7 m, Showgrounds Sandstone
 Flowed gas at 4250 m³/day and recovered
 18 m of gas cut mud.

COMPOSITIONAL DATA :

GAS :

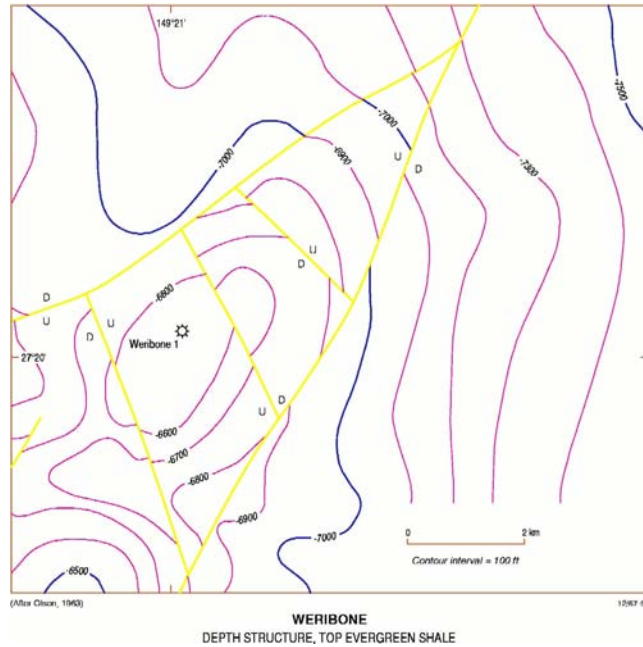
GAS PROPERTIES	GAS Showgrounds Ss
Methane	84.30
Ethane	7.70
Propane	3.70
Isobutane	0.75
N-butane	1.26
Isopentane	0.34
N-pentane	0.42
Hexanes +	0.34
N ₂ + O ₂	1.20
CO ₂	-
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Weribone-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Alluvium	00.0
CRETACEOUS	Wallumbilla Fm	331.9
	Bungil Fm	557.5
	Mooga Sandstone	696.5
JURASSIC	Orallo Fm	864.1
	Gubberamunda Sandstone	1039.4
	Westbourne Fm	1210.4
	Springbok Sandstone	1318.3
	Walloon Coal Measures	1386.2
	Hutton Sandstone	1633.7
	Evergreen Fm	1809.9
	Precipice Sandstone	1914.1
TRIASSIC	Moolayember Fm	1919.0
	Snake Creek Mudstone Mbr	2122.9
	Showgrounds Sandstone	2152.5
	Rewan Fm	2169.6
PERMIAN	Blackwater Group	2271.1
DEVONIAN	Timbury Hills Fm	2365.2

* Picked by Geological Survey of Queensland

WERIBONE MAP



WESTGROVE

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	125 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 44
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Westgrove-2
Longitude (E):	148.4230
Latitude (S):	-25.5444
Date total depth reached:	04 JAN 62
Ground level:	531.6 m
Kelly bushing:	534.3 m
Operator:	CSR Ltd
Total depth:	1691.5 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	67.0 km ²
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Permian
LITHOLOGY:	Sandstone : dark gray, fine to coarse grained, poorly sorted, subangular, conglomeratic, carbonaceous, slightly calcareous with a white clay matrix.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic.
POROSITY:	14% (average)
PERMEABILITY:	12 md (average)
PETROLEUM BEARING UNIT No.2:	Reids Dome Beds
CONTENTS:	Gas
FORMATION:	Reids Dome Beds
AGE:	Early Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
TEST DATA FROM THE DISCOVERY WELL (Westgrove-2):	
DST 13, 850.4-870.0 m, Flowed gas at 11 040 m ³ /day and recovered 91 m of gas cut mud.	Aldebaran Sandstone
DST 3, 871.1-911.4 m, Flowed gas at 36 810 m ³ /day and recovered 18 m of gas cut mud.	Aldebaran Sandstone
DST 2, 874.2-947.6 m, Recovered 601 m of water.	Aldebaran Sandstone
DST 11, 879.4-879.7 m, Recovered 183 m of gas cut mud.	Aldebaran Sandstone

DST 10, 905.3-905.6 m, Flowed gas at 5780 m ³ /day and recovered 260 m of water.	Aldebaran Sandstone
DST 1, 934.8-947.8 m, Recovered 783 m of water.	Aldebaran Sandstone
DST 4, 977.5-995.8 m, Recovered 95 m of muddy water.	Aldebaran Sandstone
DST 5, 1230.2-1260.7 m, Recovered 55 m of gas cut mud.	Reids Dome Beds
DST 8, 1449.9-1469.1 m, Flowed gas at 7080 m ³ /day.	Reids Dome Beds
DST 6, 1450.9-1469.1 m, Recovered 20 m of mud.	Reids Dome Beds
DST 7, 1450.9-1469.1 m, Recovered 11 m of mud.	Reids Dome Beds
DST 9, 1670.3-1691.6 m, Recovered 91 m of gas cut mud.	Reids Dome Beds

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Sandstone	362	very small	362

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss	GAS Reids Dome Beds
Methane	67.40	75.60
Ethane	5.40	0.26
Propane	1.50	0.01
Isobutane	0.26	trace
N-butane	0.33	trace
Isopentane	0.09	trace
N-pentane	0.09	trace
Hexanes +	0.05	-
N ₂ + O ₂	1.30	20.90
CO ₂	23.60	1.51
H ₂ S	-	-
Specific Gravity	0.878	0.647
BTU/ft ³ (gross)	842	769

STRATIGRAPHY (Westgrove-3) :

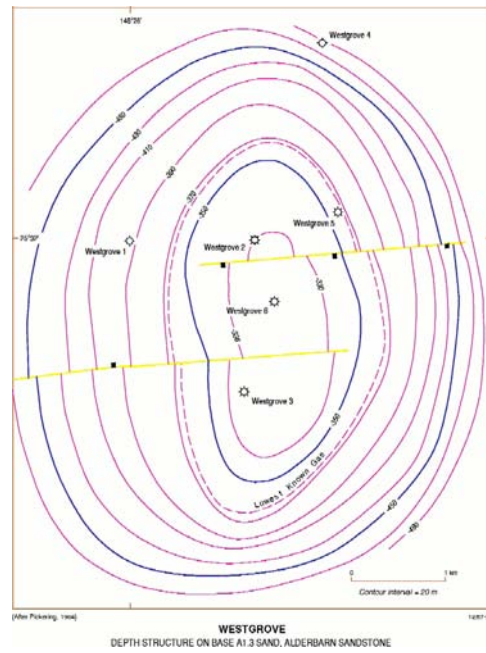
AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Hutton Sandstone	00.0
	Evergreen Fm	73.2
	Precipice Sandstone	128.9
TRIASSIC	Rewan Fm	232.3
PERMIAN	Blackwater Group	424.6
	Black Alley Shale	506.0
	Ingelara Formation	734.6
	Aldebaran Sandstone	778.8
	Reids Dome Beds	1091.2
	Basement	3859.6

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Westgrove-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
499.8	6.5	0.0	0.0	Bandanna Fm
647.3	5.0	0.0	0.0	Mantuan Fm
1083.9	14.0	0.0	0.0	Aldebaran Sandstone
1322.6	5.5	0.0	0.0	Cattle Creek Fm
1402.7	4.0	0.0	0.0	Cattle Creek Fm
1404.0	8.0	6.0	5.0	Cattle Creek Fm
1601.5	3.5	0.0	0.0	Reids Dome Beds
1722.2	3.0	0.0	0.0	Reids Dome Beds
1811.8	8.0	0.0	0.0	Reids Dome Beds
1897.7	3.0	0.0	0.0	Reids Dome Beds

WESTGROVE MAP



WESTLANDS

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 22 km north-northwest of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 13
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Westlands-1
 Longitude (E): 148.7250
 Latitude (S): -26.4183
 Date total depth reached: 02 AUG 70
 Ground level: 361.2 m
 Kelly bushing: 364.5 m
 Operator: CSR Ltd
 Total depth: 994.9 mKB
 NUMBER OF WELLS DRILLED: 4
 STRUCTURE/TRAP: Stratigraphic. Small, permeable sand pod on a minor structural closure.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Evergreen Formation
 CONTENTS: Gas
 FORMATION: Evergreen Formation
 AGE: Early Jurassic
 LITHOLOGY: Sandstone : light gray, fine to medium grained, subangular to subrounded, quartzose, very calcareous in part with some clay matrix.
 DEPOSITIONAL ENVIRONMENT: Fluvial to shallow marine
 FORMATION TOP (mKB): 853.1 m

 TEST DATA FROM THE DISCOVERY WELL (Westlands-1):

 DST 1, 949.5-994.9 m, Evergreen Formation
 Flowed gas at 123 180 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	12	9	3

STRATIGRAPHY (Westlands-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Mooga Sandstone	00.0
JURASSIC	Orallo Fm	50.0
	Gubberamunda Sandstone	195.1
	Westbourne Fm	266.4
	Springbok Sandstone	366.4
	Walloon Coal Measures	432.8
	Hutton Sandstone	634.0
	Evergreen Fm	853.1
	Precipice Sandstone	954.0
TRIASSIC	Moolayember Fm	969.9
CARBONIFEROUS	Granite	992.7

* Picked by Geological Survey of Queensland

WILGA

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Oil and Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 67 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 14
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Wilga-2
 Longitude (E): 148.9377
 Latitude (S): -27.1931
 Date total depth reached: 15 SEP 91
 Operator: Oil Company of Australia NL
 Total depth: 1512 mKB
 NUMBER OF WELLS DRILLED: 2
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Moolayember Formation
 CONTENTS: Oil and Gas
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to lacustrine
 FORMATION TOP (mKB): 1448.7 m

TEST DATA FROM THE DISCOVERY WELL (Wilga-2):

DST 1, 1484.4-1512.4 m, Moolayember Formation
 Flowed oil at 100 bbl/day and gas at
 7390 m³/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Moolayember Fm	5	3	2

STRATIGRAPHY (Wilga-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Roma Fm	00.0
JURASSIC	Blythesdale Fm	312.1
	Injune Creek Group	908.3
	Walloon Coal Measures	1026.6
	Hutton Sandstone	1214.3
	Evergreen Fm	1355.8
TRIASSIC	Wandoan Fm	1448.7
CARBONIFEROUS	Granite	1467.3

* Picked by Oil Company of Australia Ltd

WINGNUT

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Past Producer
LOCATION:	27 km east-northeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 5
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Wingnut-1
Longitude (E):	149.0561
Latitude (S):	-26.5361
Date total depth reached:	18 APR 87
Ground level:	363.9 m
Kelly bushing:	367.9 m
Operator:	CSR Ltd
Total depth:	1233 mKB
NUMBER OF WELLS DRILLED:	2
RESERVOIR UNITS:	3

PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1138.5 m

PETROLEUM BEARING UNIT No.2:	Showgrounds Sandstone
CONTENTS:	Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1185.0 m

PETROLEUM BEARING UNIT No.3:	Moolayember Formation
CONTENTS:	Gas
FORMATION:	Moolayember Formation
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1160.0 m

TEST DATA FROM THE DISCOVERY WELL (Wingnut-1):

DST 1, 1111.9-1159 m, Flowed gas at 60 830 m ³ /day.	Precipice Sandstone

DST 3, 1165.2-1178.1 m, Flowed gas at 1076 m ³ /day and recovered 15 m of gas cut mud.	Moolayember Formation

DST 2, 1180.0-1207.0 m, Flowed gas at 183 130 m ³ /day.	Showgrounds Sandstone

RESERVES (as at 30/6/96) :

GAS :

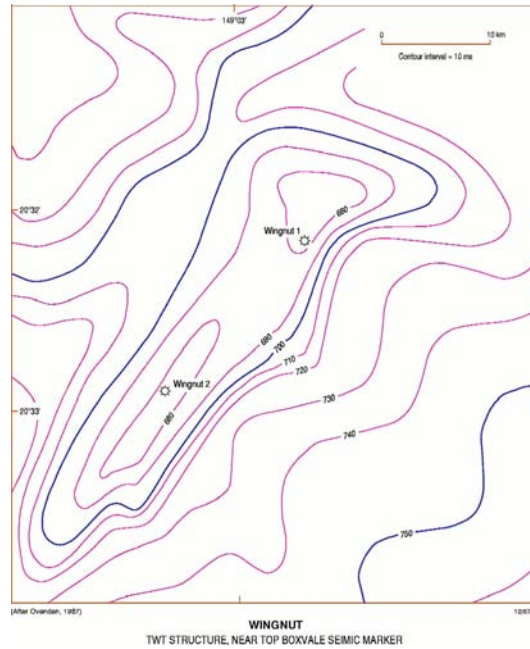
RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	2	2	very small
Showgrounds Ss	19	19	very small

STRATIGRAPHY (Wingnut-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Mooga Sandstone	00.0
JURASSIC	Orallo Fm	157.0
	Gubberamunda Sandstone	342.0
	Westbourne Fm	400.0
	Springbok Sandstone	500.0
	Birkhead Formation	554.0
	Eurombah Formation	774.0
	Hutton Sandstone	830.0
	Evergreen Fm	1034.0
	Boxvale Sandstone Mbr	1086.0
	Precipice Sandstone	1138.5
TRIASSIC	Moolayember Fm	1160.0
	Snake Creek Mudstone Mbr	1172.5
	Showgrounds Sandstone	1185.0
PERMIAN	Blackwater Group	1196.0
DEVONIAN	Timbury Hills Fm	1224.0

* Picked by Geological Survey of Queensland

WINGNUT MAP



WINNATHOOLA

PRESENT OPERATOR:	Santos Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	34 km east-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 11
BASIN:	Bowen/Surat
SUB-BASIN:	Roma Shelf
DISCOVERY WELL:	Winnathoola-1
Pool(s):	Precipice Sandstone.
Longitude (E):	149.0906
Latitude (S):	-26.7556
Date total depth reached:	22 SEP 61
Ground level:	307.9 m
Kelly bushing:	310.9 m
Operator:	Associated Australian Oilfields
Total depth:	1628.2 mKB
DISCOVERY WELL:	Winnathoola-2
Pool(s):	Rewan Formation.
Longitude (E):	149.0939
Latitude (S):	-26.7567
Date total depth reached:	04 APR 87
Ground level:	306.6 m
Kelly bushing:	310.6 m
Operator:	CSR Ltd
Total depth:	1589 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	1.6km ² (intra Moolayember Fm)
RESERVOIR UNITS:	2
PETROLEUM BEARING UNIT No.1:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1358.5 m (Winnathoola-1)
PETROLEUM BEARING UNIT No.2:	Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
TEST DATA FROM THE DISCOVERY WELL (Winnathoola-1):	
DST 1, 1360.9-1378.0 m,	Precipice Sandstone
Flowed gas at 16 990 m ³ /day and recovered 1.3 barrels of mud.	
DST 2, 1534.7-1628.2 m,	Blackwater Group
Recovered 4.62 barrels of mud.	

TEST DATA FROM THE DISCOVERY WELL (Winnathoola-2):

DST 1, 1354.0-1383.0 m, Precipice Sandstone
Recovered 90 m of gas cut mud and water.

DST 2, 1450.0-1493.0 m, Rewan Formation
Flowed gas at 2300 m³/day and recovered
2 m of gas cut mud.

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	80.00
Ethane	5.20
Propane	3.00
Isobutane	0.80
N-butane	0.80
Isopentane	0.30
N-pentane	0.20
Hexanes +	-
N₂ + O₂	7.70
CO₂	2.00
H₂S	-
Specific Gravity	-
BTU/ft³ (gross)	-

STRATIGRAPHY (Winnathoola-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	152.4
	Mooga Sandstone	276.2
JURASSIC	Orallo Fm	393.2
	Gubberamunda Sandstone	526.1
	Westbourne Fm	610.2
	Springbok Sandstone	743.1
	Walloon Coal Measures	783.3
	Eurombah Fm	1028.1
	Hutton Sandstone	1091.2
	Evergreen Fm	1251.2
	Precipice Sandstone	1358.5
TRIASSIC	Moolayember Fm	1373.4
	Snake Creek Mudstone Mbr	1424.6
	Showgrounds Sandstone	1438.7
	Rewan Fm	1445.4
PERMIAN	Blackwater Group	1499.0
DEVONIAN	Timbury Hills Fm	1562.1

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Winnathoola-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1325.0	10.5	0.0	0.0	Evergreen Fm
1469.2	9.5	0.0	0.0	Rewan Fm

WUNGER

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	125 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	471-P
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Wunger-1
Longitude (E):	149.1261
Latitude (S):	-27.6792
Date total depth reached:	28 OCT 63
Ground level:	302.1 m
Kelly bushing:	306.3 m
Operator:	Union Oil Development Corporation
Total depth:	1932.1 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Showgrounds Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1913.8 m

TEST DATA FROM THE DISCOVERY WELL (Wunger-1):

DST 2, 1914.4-1917.2 m, Recovered a small quantity of gas cut, muddy water,	Showgrounds Sandstone

DST 1, 1915.1-1920.5 m, Flowed 60 degree API oil at 740 bbl/day and gas at 5100 m ³ /day.	Showgrounds Sandstone

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Showgrounds Ss
Methane	64.70
Ethane	8.10
Propane	3.60
Isobutane	5.60
N-butane	5.20
Isopentane	3.90
N-pentane	4.20
Hexanes +	0.32
N ₂ + O ₂	3.20
CO ₂	1.20
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

OIL :

FLUID PROPERTIES	OIL Showgrounds Ss
API Gravity @ 60°F	45.9°
Base	
Sulphur (% wt)(ppm)	0.10%
Initial GOR (ft ³ /bbl)	-
Pour Point	-
Specific Gravity	-
Colour	-
Viscosity (cp@100°F)	-
Bubble Point (psig)	-

STRATIGRAPHY (Wunger-1) :

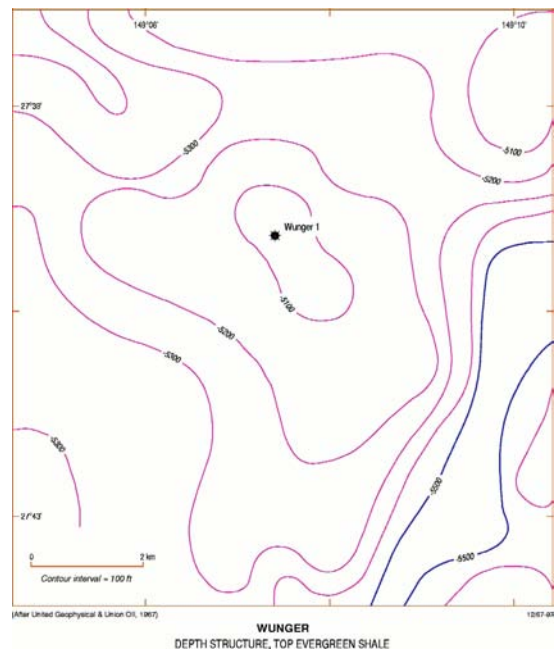
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	271.0
	Wallumbilla Fm	404.8
	Bungil Fm	622.4
	Mooga Sandstone	817.5
JURASSIC	Orallo Fm	914.1
	Gubberamunda Sandstone	1090.6
	Westbourne Fm	1264.9
	Springbok Sandstone	1350.9
	Walloon Coal Measures	1405.1
	Hutton Sandstone	1593.5
	Evergreen Fm	1721.8
	Precipice Sandstone	1784.6
TRIASSIC	Moolayember Fm	1804.1
	Snake Creek Mudstone Mbr	1899.8
	Showgrounds Sandstone	1913.8
DEVONIAN	Timbury Hills Fm	1922.7

* Picked by Geological Survey of Queensland

POROSITY AND PERMEABILITY DATA (Wunger-1) :

DEPTH (mKB)	POROSITY (%)	HORIZONTAL PERMEABILITY (millidarcies)	VERTICAL PERMEABILITY (millidarcies)	FORMATION
1854.8	19.5	0.0	0.0	Moolayember Fm
1856.0	21.0	0.0	0.0	Moolayember Fm
1857.2	15.5	0.0	0.0	Moolayember Fm
1916.6	22.5	252.0	307.0	Showgrounds Sandstone
1917.9	19.5	51.0	445.0	Showgrounds Sandstone

WUNGER MAP



XYLEX

PRESENT OPERATOR:	XLX NL
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	80 km north of Moonie
STATE:	Queensland
PETROLEUM TITLES:	260-P
BASIN:	Surat
SUB-BASIN:	Chinchilla-Gooniwindi Slope
DISCOVERY WELL:	Xylex-1
Longitude (E):	150.3556
Latitude (S):	-26.9833
Date total depth reached:	10 SEP 85
Ground level:	313.8 m
Kelly bushing:	318.1 m
Operator:	XL Petroleum Pty Ltd
Total depth:	1252.1 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Hutton Sandstone
CONTENTS:	Oil
FORMATION:	Hutton Sandstone
AGE:	Middle Jurassic
LITHOLOGY:	Sandstone.

DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	855.3 m

TEST DATA FROM THE DISCOVERY WELL (Xylex-1):

DST 1, 851.9-864.1 m, Recovered 131 m of light green, very slightly gassy oil and 220 m of gassy water.	Hutton Sandstone

DST 2, 1001.3-1008.9 m, Recovered 171 m of muddy water.	Hutton Sandstone

DST 3, 1226.6-1237.8 m, Recovered 26 m of oil cut muddy water.	Precipice Sandstone/Kuttung Formation

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Hutton Ss	very small	very small	very small

STRATIGRAPHY (Xylex-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Undifferentiated	00.0
	Westbourne Fm	277.4
	Springbok Sandstone	388.0
	Walloon Coal Measures	417.6
	Hutton Sandstone	855.3
	Evergreen Fm	1054.3
	Precipice Sandstone	1212.5
CARBONIFEROUS	Kuttung Fm	1235.4

* Picked by XL Petroleum Pty Ltd

XYLOIL SOUTH

PRESENT OPERATOR: XLX NL
 TYPE: Oil
 COMMERCIAL STATUS: Other discovery
 LOCATION: 84 km north of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 260-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Goondiwindi Slope
 DISCOVERY WELL: Xyloil South-1
 Longitude (E): 150.3961
 Latitude (S): -26.9667
 Date total depth reached: 22 JUN 85
 Ground level: 307.9 m
 Kelly bushing: 312.1 m
 Operator: XLX NL
 Total depth: 1293.9 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone ?
 CONTENTS: Oil
 FORMATION: Precipice Sandstone ?
 AGE: Early Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1225.9 m

 TEST DATA FROM THE DISCOVERY WELL (Xyloil South-1):

 DST 1, 1261.9-1293.9 m, Precipice Sandstone ?
 Recovered 610 m of oil.

STRATIGRAPHY (Xyloil South-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Undifferentiated	00.0
	Westbourne Fm	193.2
	Walloon Coal Measures	339.9
	Hutton Sandstone	830.9
	Evergreen Fm	1079.0
	Precipice Sandstone	1225.9
PERMIAN	Unnamed	1268.9
CARBONIFEROUS	Kuttung Fm	1283.8

* Picked by XLX NL

XYLOLEUM

PRESENT OPERATOR: XLX NL
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 97 km north of Moonie.
 STATE: Queensland
 PETROLEUM TITLES: 260-P
 BASIN: Surat
 SUB-BASIN: Chinchilla-Goondiwindi Slope
 DISCOVERY WELL: Xyloleum-1
 Longitude (E): 150.3984
 Latitude (S): -26.8453
 Date total depth reached: 30 SEP 83
 Ground level: 293.8 m
 Kelly bushing: 298.1 m
 Operator: XLX NL
 Total depth: 995.8 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Walloon Coal Measures
 CONTENTS: Gas
 FORMATION: Walloon Coal Measures
 AGE: Middle-Late Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial to paludal
 FORMATION TOP (mKB): 171.9 m

TEST DATA FROM THE DISCOVERY WELL (Xyloleum-1):

DST 2, 208.8-243.8 m, Walloon Coal Measures
 Flowed gas at 1420 m³/day and recovered
 18 m of mud.

DST 3, 410.0-489.2 m, Walloon Coal Measures
 Recovered 91 m of mud and 291 m of
 muddy water.

DST 1, 575.2-613.6 m, Eurombah Beds/Hutton Sandstone
 Recovered 61 m of mud and 496 m of
 muddy water.

STRATIGRAPHY (Xyloleum-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Westbourne Fm	00.0
	Springbok Sandstone	165.8
	Walloon Coal Measures	171.9
	Hutton Sandstone	602.9
	Evergreen Fm	843.1
CARBONIFEROUS	Kuttung Fm	986.9

* Picked by Geological Survey of Queensland

YAMBUGLE

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	54 km southeast of Roma
STATE:	Queensland
PETROLEUM TITLES:	PL 53
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Yambugle-2
Longitude (E):	149.0097
Latitude (S):	-27.0428
Date total depth reached:	11 OCT 83
Ground level:	274.0 m
Kelly bushing:	278.3 m
Operator:	Hartogen Energy Ltd
Total depth:	1810.8 mKB
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	4.0 km ² (on top Permian)
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Blackwater Group
CONTENTS:	Gas
FORMATION:	Blackwater Group
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to paludal
FORMATION TOP (mKB):	1694.7 m

TEST DATA FROM THE DISCOVERY WELL (Yambugle-2):

DST 3, 1683.7-1699.0 m, Flowed water at 790 bbl/day.	Showgrounds Sandstone

DST 4, 1718.5-1724.6 m, Recovered 18 m of mud.	Blackwater Group

DST 1, 1725.2-1763.0 m, Flowed gas at 79 290 m ³ /day and recovered 18 m of mud and 1.5 m of condensate.	Blackwater Group

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Blackwater Group	20	13	7

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Blackwater Group	2	1	1

LPG :

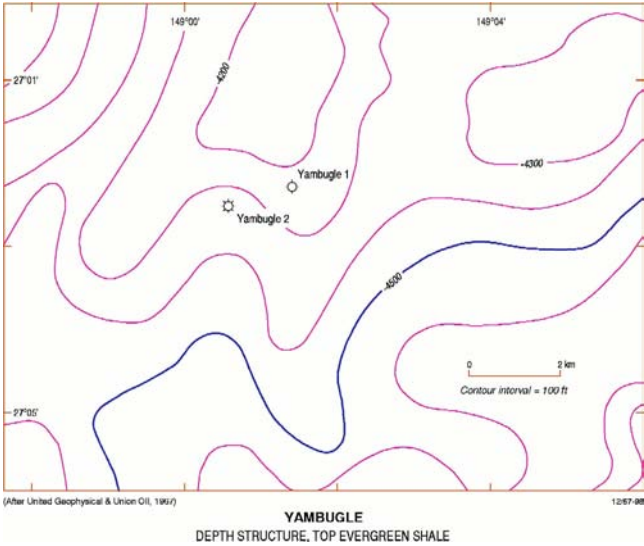
RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Blackwater Group	4	1	3

STRATIGRAPHY (Yambugle-2) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	00.0
	Bungil Fm	338.3
	Mooga Sandstone	469.4
JURASSIC	Orallo Fm	603.2
	Gubberamunda Sandstone	760.5
	Westbourne Fm	883.9
	Springbok Sandstone	1015.0
	Walloon Coal Measures	1045.0
	Hutton Sandstone	1286.3
	Evergreen Fm	1442.0
TRIASSIC	Moolayember Fm	1581.0
	Snake Creek Mudstone Mbr	1676.4
	Showgrounds Sandstone	1685.5
PERMIAN	Blackwater Group	1694.7
CARBONIFEROUS	Basement	1733.1

* Picked by Geological Survey of Queensland

YAMBUGLE MAP



YANALAH

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Producer
 LOCATION: 11 km northeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 5
 BASIN: Surat
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Yanalah-1
 Longitude (E): 148.8547
 Latitude (S): -26.5283
 Date total depth reached: 20 JUL 64
 Ground level: 357.2 m
 Kelly bushing: 360.6 m
 Operator: Associated Australian Oilfields
 Total depth: 1260.7 mKB
 NUMBER OF WELLS DRILLED: 5
 STRUCTURE/TRAP: Structural/Stratigraphic. Formed by drape of permeable sandstone over an anticlinal axis.
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Precipice Sandstone
 CONTENTS: Gas
 FORMATION: Precipice Sandstone
 AGE: Early Jurassic
 LITHOLOGY: Sandstone : medium to coarse grained, subangular to subrounded, slightly garnetiferous, quartzose with patchy white clay matrix.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1136.9 m

 TEST DATA FROM THE DISCOVERY WELL (Yanalah-1):

 DST 1, 1137.2-1214.0 m, Precipice Sandstone
 Flowed gas at 90 610 m³/day.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Precipice Ss	28	24	4

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Precipice Ss
Methane	89.40
Ethane	3.60
Propane	0.92
Isobutane	0.45
N-butane	0.17
Isopentane	0.19
N-pentane	0.03
Hexanes +	0.30
N ₂ + O ₂	4.00
CO ₂	0.92
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Yanalահ-1) :

AGE	UNIT	FORMATION TOP * (mKB)
QUATERNARY	Unnamed	00.0
CRETACEOUS	Wallumbilla Fm	15.2
	Bungil Fm	21.3
	Mooga Sandstone	125.3
JURASSIC	Orallo Fm	186.2
	Gubberamunda Sandstone	346.6
	Westbourne Fm	409.0
	Springbok Sandstone	520.9
	Walloon Coal Measures	547.4
	Eurombah Fm	811.4
	Hutton Sandstone	870.2
	Evergreen Fm	1026.3
	Precipice Sandstone	1136.9
TRIASSIC	Moolayember Fm	1160.7
	Showgrounds Sandstone	1181.1
PERMIAN	Blackwater Group	1190.2
DEVONIAN	Timbury Hills Fm	1231.4

* Picked by Geological Survey of Queensland

YARRABEND

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	72 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 27
BASIN:	Bowen/Surat
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Yarrabend-1
Pool(s):	Evergreen Formation
Longitude (E):	148.9070
Latitude (S):	-27.2475
Date total depth reached:	15 NOV 83
Ground level:	230.7 m
Kelly bushing:	235.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1481.3 mKB
NUMBER OF WELLS DRILLED:	5
STRUCTURE/TRAP:	Fault dependent closure.
AREAL CLOSURE:	6.0 km ² (on basement)
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Evergreen Formation
CONTENTS:	Gas
FORMATION:	Evergreen Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to shallow marine
FORMATION TOP (mKB):	1360.9 m

PETROLEUM BEARING UNIT No.2:	Precipice Sandstone
CONTENTS:	Gas
FORMATION:	Precipice Sandstone
AGE:	Early Jurassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
FORMATION TOP (mKB):	1449.9 m

TEST DATA FROM THE DISCOVERY WELL (Yarrabend-1):

DST 1, 1407.6-1420.7 m, Flowed gas at 373 780 m ³ /day.	Evergreen Formation

DST 2, 1450.2-1463.0 m, Flowed gas at 22 650 m ³ /day.	Precipice Sandstone

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Evergreen Fm	160	144	16

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Evergreen Fm	17	14	3

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Evergreen Fm	39	29	10

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Evergreen Fm (Boxvale Ss)	GAS Precipice Ss
Methane	82.60	86.25
Ethane	8.35	6.90
Propane	4.10	2.95
Isobutane	0.81	0.54
N-butane	1.00	0.73
Isopentane	0.92 (C5+)	0.59 (C5+)
N-pentane	na	na
Hexanes +	na	na
N ₂ + O ₂	2.10	1.90
CO ₂	0.15	0.11
H ₂ S	-	-
Specific Gravity	0.691	0.656
BTU/ft ³ (gross)	-	-

STRATIGRAPHY (Yarrabend-1) :

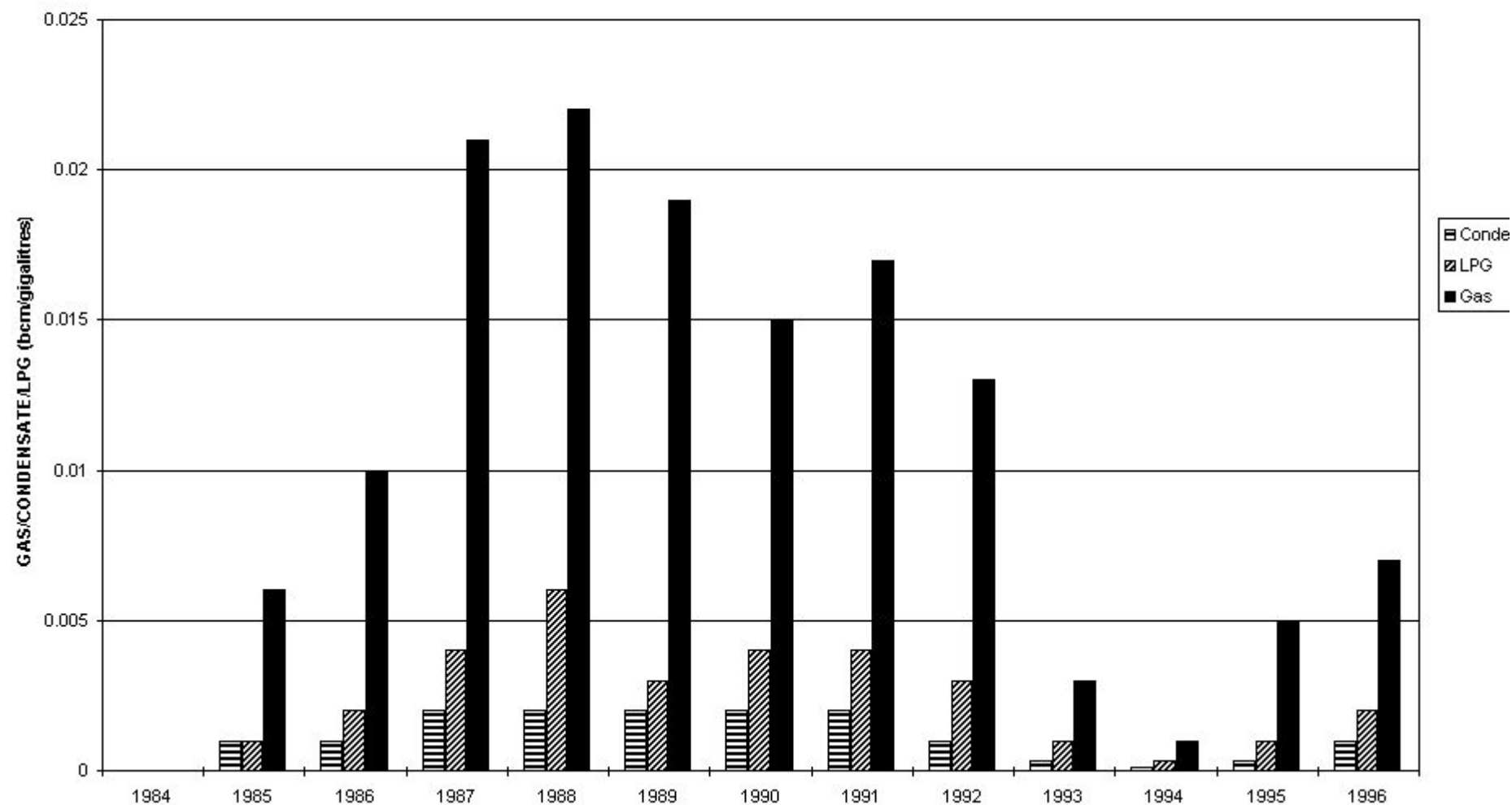
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Formation	160.9
	Bungil Formation	354.8
	Mooga Sandstone	452.9
JURASSIC	Orallo Formation	627.9
	Gubberamunda Sandstone	748.0
	Westbourne Formation	953.4
	Springbok Sandstone	986.0
	Birkhead Formation	1046.4
	Hutton Sandstone	1199.7
	Evergreen Fm	1360.9
	Boxvale Sandstone Mbr	1407.6
	Precipice Sandstone	1449.9
TRIASSIC	Moolayember Formation	1453.9
CARBONIFEROUS	Basement	1460.0

* Picked by Geological Survey of Queensland

YARRABEND, GAS / CONDENSATE / LPG PRODUCTION (Evergreen Formation)

Discovered 15 November 1983 Production commenced May 1985

Total Wells = 5



YARRAWONGA

PRESENT OPERATOR: Santos Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 41 km east-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 8
 BASIN: Bowen
 SUB-BASIN: Roma Shelf
 DISCOVERY WELL: Yarrowonga-1
 Longitude (E): 149.2022
 Latitude (S): -26.6306
 Date total depth reached: 16 NOV 67
 Ground level: 300.8 m
 Kelly bushing: 305.4 m
 Operator: CSR Ltd
 Total depth: 1873 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Back Creek Group
 CONTENTS: Gas
 FORMATION: Back Creek Group
 AGE: Late Permian
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Shallow marine
 FORMATION TOP (mKB): 1703.2 m

TEST DATA FROM THE DISCOVERY WELL (Yarrowonga-1):

DST 1, 1856.2-1873.0 m, Back Creek Group
 Flowed gas at 4250 m³/day and recovered
 55 m of slightly condensate cut mud.

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Back Creek Gp
Methane	89.90
Ethane	4.70
Propane	1.58
Isobutane	0.17
N-butane	0.36
Isopentane	0.11
N-pentane	0.12
Hexanes +	1.09
N ₂ + O ₂	1.21
CO ₂	0.76
H ₂ S	-
Specific Gravity	-
BTU/ft ³ (gross)	-

STRATIGRAPHY (Yarrowonga-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Wallumbilla Fm	4.6
	Bungil Fm	76.2
	Mooga Sandstone	185.9
JURASSIC	Orallo Fm	253.9
	Gubberamunda Sandstone	456.3
	Westbourne Fm	508.7
	Springbok Sandstone	659.6
	Walloon Coal Measures	697.4
	Eurombah Fm	983.0
	Hutton Sandstone	1077.8
	Evergreen Fm	1211.3
TRIASSIC	Moolayember Fm	1328.9
	Snake Creek Mudstone Mbr	1401.5
	Showgrounds Sandstone	1414.6
	Rewan Fm	1420.7
PERMIAN	Blackwater Group	1621.8
	Back Creek Group	1703.2
CARBONIFEROUS	Combarngo Volcanics	1868.4

* Picked by Geological Survey of Queensland

YAPUNYAH

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Oil
 COMMERCIAL STATUS: Past Producer
 LOCATION: 85 km south of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 30
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Yapunyah-1
 Longitude (E): 148.7453
 Latitude (S): -27.3308
 Date total depth reached: 06 JUL 82
 Ground level: 232.9 m
 Kelly bushing: 237.4 m
 Operator: Hematite Petroleum
 Total depth: 1609 mKB
 NUMBER OF WELLS DRILLED: 1
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Wandoan Sandstone
 CONTENTS: Oil
 FORMATION: Moolayember Formation
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial
 FORMATION TOP (mKB): 1557.8 m (Moolayember Fm)

 TEST DATA FROM THE DISCOVERY WELL (Yapunyah-1):

 DST 1, 1550.8-1557.5 m, Wandoan Sandstone
 Flowed 37.9° API oil at 20 bbl/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Wandoan Ss	3	3	very small

COMPOSITIONAL DATA :

OIL :

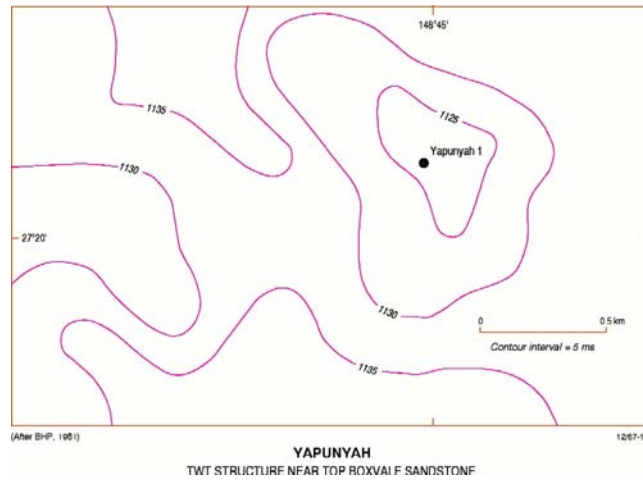
FLUID PROPERTIES	OIL Wandoan Ss
API Gravity @ 60°F	41.3°
Base	-
Sulphur (% wt)(ppm)	0.04 ppm
Initial GOR (ft ³ /bbl)	-
Pour Point	11°C
Specific Gravity	0.8187
Colour	-
Viscosity (cp@100°F)	4.1
Bubble Point (psig)	-

STRATIGRAPHY (Yapunya-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Surat Siltstone	00.0
	Wallumbilla Fm	238.0
	Bungil Fm	439.5
	Mooga Sandstone	603.5
JURASSIC	Orallo Fm	672.1
	Gubberamunda Sandstone	876.3
	Westbourne Fm	1024.7
	Springbok Sandstone	1109.5
	Walloon Coal Measures	1170.4
	Hutton Sandstone	1324.7
	Evergreen Fm	1490.0
TRIASSIC	Moolayember Fm	1557.8
CARBONIFEROUS	Granite	1595.3

* Picked by Geological Survey of Queensland

YAPUNYAH MAP



YELLOWBANK

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	137 km north-northwest of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 43
BASIN:	Bowen
SUB-BASIN:	Denison Trough
DISCOVERY WELL:	Yellowbank-1
Pool(s):	Rewan Formation; Aldebaran Sandstone.
Longitude (E):	148.3922
Latitude (S):	-25.4358
Date total depth reached:	12 FEB 82
Ground level:	577.9 m
Kelly bushing:	582.0 m
Operator:	Associated Australian Resources
Total depth:	1463 mKB
DISCOVERY WELL:	Yellowbank-6
Pool(s):	Reids Dome Beds.
Longitude (E):	148.3891
Latitude (S):	-25.4431
Date total depth reached:	15 JAN 91
Ground level:	560.0 m
Kelly bushing:	564.4 m
Operator:	Central Queensland Natural Gas
Total depth:	1789 mKB
NUMBER OF WELLS DRILLED:	7
STRUCTURE/TRAP:	Anticline (top Aldebaran Sandstone)
AREAL CLOSURE:	12.0 km ²
RESERVOIR UNITS:	3
 PETROLEUM BEARING UNIT No.1:	 Rewan Formation
CONTENTS:	Gas
FORMATION:	Rewan Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial to lacustrine
FORMATION TOP (mKB):	405.5 m
 PETROLEUM BEARING UNIT No.2:	 Aldebaran Sandstone
CONTENTS:	Gas
FORMATION:	Aldebaran Sandstone
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvio-deltaic
FORMATION TOP (mKB):	1097.1 m
 PETROLEUM BEARING UNIT No.3:	 Reids Dome Beds
CONTENTS:	Gas
FORMATION:	Reids Dome Beds
AGE:	Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial

TEST DATA FROM THE DISCOVERY WELL (Yellowbank-1):

DST 5, 578.0-587.0 m, Rewan Formation
Flowed gas at 67 960 m³/day. Recovered
52 m of gas cut mud.

DST 1, 1090.0-1122.0 m, Ingelara Fm/Aldebaran Sandstone
Recovered 12 m of slightly gas and
condensate cut mud.

DST 2, 1287.0-1329.0 m, Aldebaran Sandstone
Flowed gas at 62 300 m³/day and
recovered 27 m of gas cut mud.

DST 4, 1287.0-1296.0 m, Aldebaran Sandstone
Flowed gas at 39 640 m³/day.

DST 3, 1303.0-1328.5 m, Aldebaran Sandstone
Recovered 67 m of gas cut mud.

TEST DATA FROM THE DISCOVERY WELL (Yellowbank-6):

DST 1, 559.7-575.4 m, Rewan Formation
Flowed gas at 58 300 to 60 570 m³/day and
recovered 37 m of gas cut mud.

DST 2, 577.6-597.7 m, Rewan Formation
Flowed gas at 32 850 to 43 350 m³/day and
recovered 43 m of gas cut mud.

DST 3, 1421-1438.5 m, Reids Dome Beds
Flowed gas at 4950 m³/day and recovered
56 m of gas cut mud.

DST 4, 1605.5-1612 m, Reids Dome Beds
Recovered 53 m of gas cut muddy water.

DST 5, 1623.2-1636.7 m, Reids Dome Beds
Recovered 59 m of gas cut muddy water
and 60 m of gas cut watery mud.

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Aldebaran Ss	1133	700	433
Rewan Fm	31	21	10

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Aldebaran Ss
Methane	59.00
Ethane	5.80
Propane	1.99
Isobutane	0.42
N-butane	0.51
Isopentane	0.46 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	0.96
CO ₂	30.70
H ₂ S	-
Specific Gravity	0.911
BTU/ft ³ (gross)	-

STRATIGRAPHY (Yellowbank-1) :

AGE	UNIT	FORMATION TOP * (mKB)
JURASSIC	Evergreen Fm	00.0
	Precipice Sandstone	136.6
TRIASSIC	Moolayember Fm	241.3
	Clematis Sandstone	273.0
	Rewan Fm	405.5
PERMIAN	Bandanna Fm	665.0
	Black Alley Shale	806.5
	Mantuan Fm	884.3
	Peawaddy Fm	955.0
	Ingelara Fm	995.7
	Aldebaran Sandstone	1097.1
	Cattle Creek Fm	1328.0
	Reids Dome Beds	1435.9

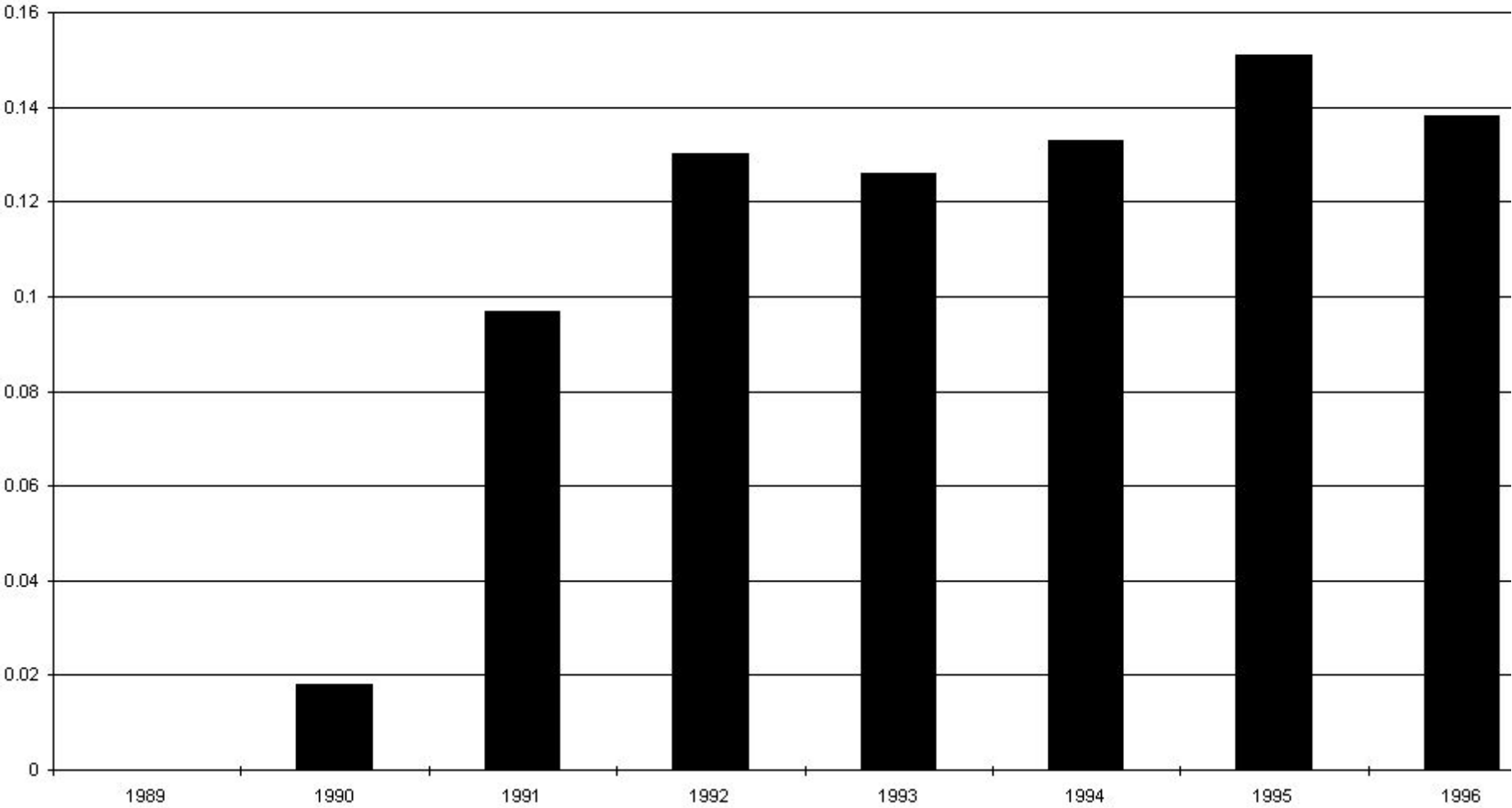
* Picked by Central Queensland Natural Gas

STRATIGRAPHY (Yellowbank-6) :

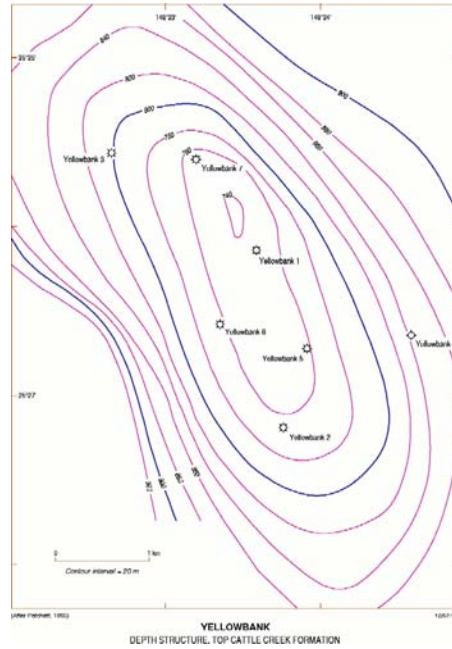
AGE	UNIT	FORMATION TOP * (mKB)
TRIASSIC	Clematis Sandstone	00.0
	Rewan Fm	386.0
PERMIAN	Blackwater Group	642.0
	Back Creek Group	752.5
	Reids Dome Beds	1374.0

* Picked by Queensland Geological Survey

YELLOWBANK, GAS PRODUCTION (Aldebaran Sandstone & 'Rewan' Formation)
Discovered 12 February 1982 Production commenced June 1990
Total Wells = 7 (5 Producers; 1 Shut in; 1 Plugged and Abandoned)



YELLOWBANK MAP



YELLOWBANK CREEK

PRESENT OPERATOR: Bribane Petroleum NL
 TYPE: Oil
 COMMERCIAL STATUS: Producer
 LOCATION: 128 km south-southeast of Roma.
 STATE: Queensland
 PETROLEUM TITLES: PL 18
 BASIN: Bowen
 SUB-BASIN: Saint George-Bollon Slope
 DISCOVERY WELL: Yellowbank Creek-2
 Longitude (E): 149.0150
 Latitude (S): -27.7564
 Date total depth reached: 15 APR 82
 Ground level: 250.7 m
 Kelly bushing: 257.6 m
 Operator: Bridge Oil Ltd
 Total depth: 1900 mKB
 NUMBER OF WELLS DRILLED: 3
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Showgrounds Sandstone
 CONTENTS: Oil
 FORMATION: Showgrounds Sandstone
 AGE: Middle Triassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONBMENT: Fluvial

TEST DATA FROM THE DISCOVERY WELL (Yellowbank Creek-2):

DST 1, 1830.6-1836.9 m, Showgrounds Sandstone
 Flowed oil at 1536 bbl/day.

RESERVES (as at 30/6/96) :

OIL :

RESERVOIR	INITIAL RECOVERABLE OIL (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE OIL (Megalitres)
Showgrounds Ss	65	62	3

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	ASSOCIATED GAS Showgrounds Ss
Methane	48.29
Ethane	13.94
Propane	18.16
Isobutane	6.77
N-butane	5.33
Isopentane	5.52 (C5+)
N-pentane	na
Hexanes +	na
N ₂ + O ₂	2.42
CO ₂	0.56
H ₂ S	-
Specific Gravity	1.100
BTU/ft ³ (gross)	-

STRATIGRAPHY (Yellowbank Creek-2) :

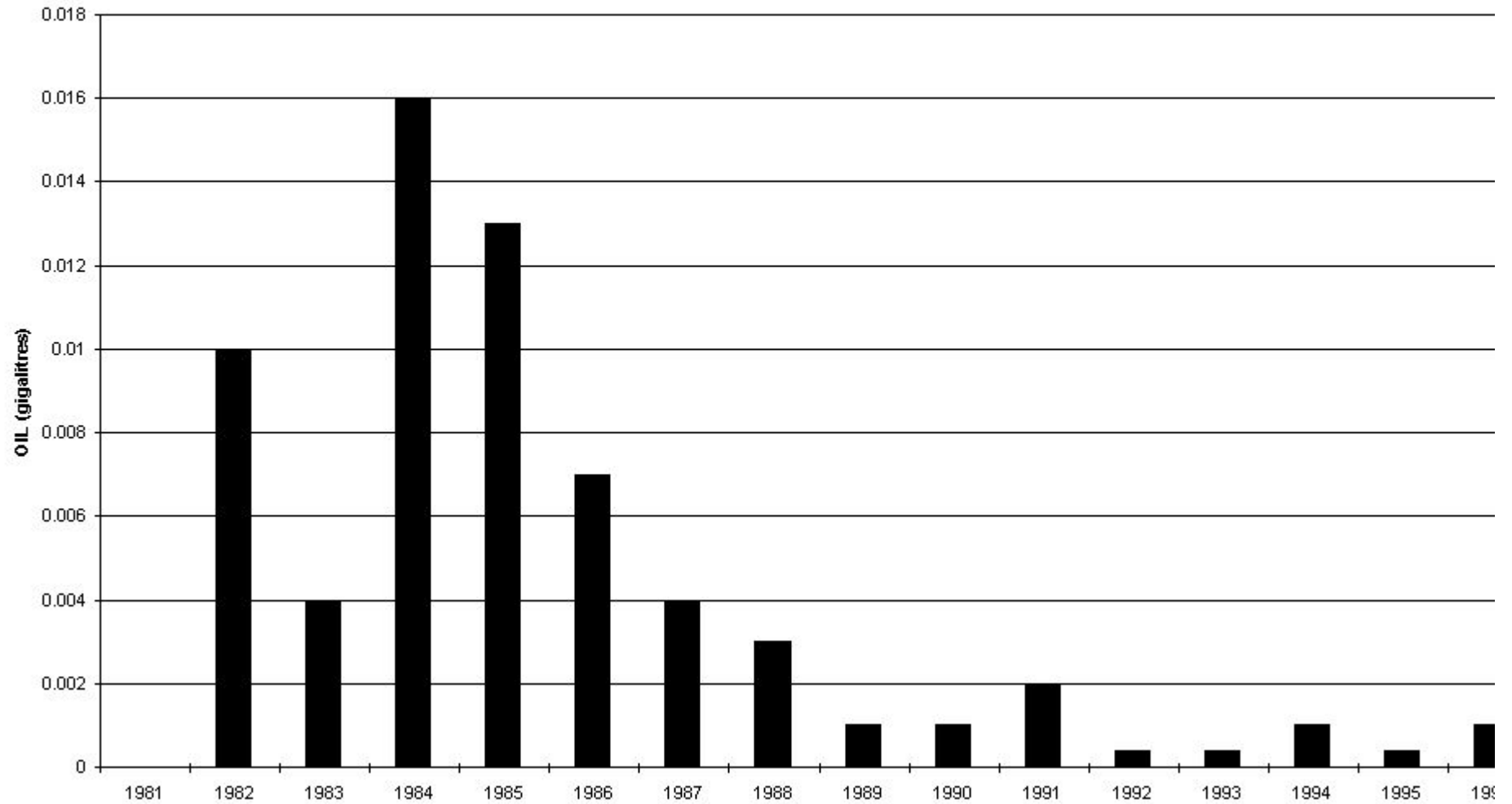
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	260.0
	Wallumbilla Fm	394.0
	Bungil Fm	606.0
	Mooga Sandstone	805.0
JURASSIC	Orallo Fm	943.0
	Gubberamunda Sandstone	1031.0
	Westbourne Fm	1255.0
	Springbok Sandstone	1326.0
	Walloon Coal Measures	1392.0
	Hutton Sandstone	1536.0
	Evergreen Fm	1676.0
TRIASSIC	Moolayember Fm	1761.0
	Snake Creek Mudstone Mbr	1825.0
	Showgrounds Sandstone	1831.0
PERMIAN	Blackwater Group	1836.0
DEVONIAN	Timbury Hills Fm	1876.0

* Picked by Geological Survey of Queensland

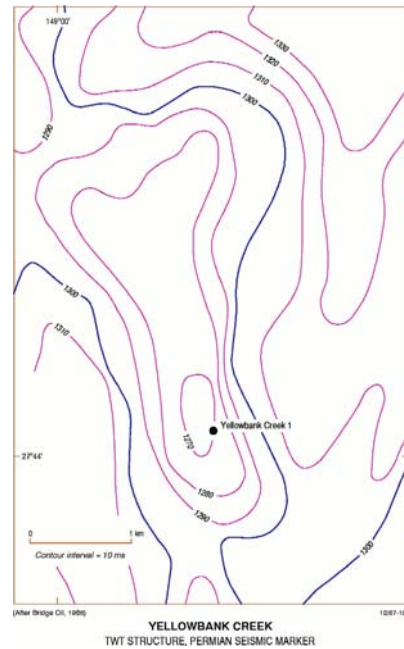
YELLOWBANK CREEK, OIL PRODUCTION (Showgrounds Sandstone)

Discovered 15 April 1982 Production commenced May 1982

Total Wells = 3 (1 Producer; 2 Plugged and Abandoned)



YELLOWBANK CREEK MAP



YELLOWBANK CREEK NORTH

PRESENT OPERATOR:	Santos Ltd
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	126 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 18
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Yellowbank Creek North-1
Longitude (E):	149.0103
Latitude (S):	-27.7261
Date total depth reached:	06 AUG 87
Ground level:	285.8 m
Kelly bushing:	291.7 m
Operator:	Sydney Oil Company Pty Ltd
Total depth:	1911 mKB
NUMBER OF WELLS DRILLED:	1
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Showgrounds Sandstone
CONTENTS:	Oil
FORMATION:	Showgrounds Sandstone
AGE:	Middle Triassic
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT:	Fluvial
FORMATION TOP (mKB):	1863.0 m
 TEST DATA FROM THE DISCOVERY WELL (Yellowbank Creek North-1):	
DST 1, 1841.0-1872.0 m, Flowed 54.3° API oil at 2 bbl/day and recovered 17 bbl of gas cut water.	Showgrounds Sandstone
 DST 2, 1859.2-1870.0 m, Flowed water at 11 bbl/day.	 Showgrounds Sandstone

STRATIGRAPHY (Yellowbank Creek North-1) :

AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	310.0
	Wallumbilla Fm	439.5
	Bungil Fm	626.8
	Mooga Sandstone	840.0
JURASSIC	Orallo Fm	967.5
	Gubberamunda Sandstone	1080.2
	Westbourne Fm	1292.0
	Springbok Sandstone	1371.0
	Birkhead Formation	1417.5
	Eurombah Formation	1533.0
	Hutton Sandstone	1553.0
	Evergreen Fm	1709.2
	Boxvale Sandstone Mbr	1741.5
TRIASSIC	Moolayember Fm	1773.5
	Snake Creek Mudstone Mbr	1860.0
	Showgrounds Sandstone	1863.0
PERMIAN	Volcanics	1867.0
DEVONIAN	Timbury Hills Fm	1891.5

* Picked by Geological Survey of Queensland

YURANIGH

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Producer
LOCATION:	53 km south-southeast of Roma.
STATE:	Queensland
PETROLEUM TITLES:	PL 22
BASIN:	Bowen
SUB-BASIN:	Saint George-Bollon Slope
DISCOVERY WELL:	Yuranigh-1
Longitude (E):	148.9697
Latitude (S):	-27.0567
Date total depth reached:	04 DEC 87
Ground level:	269.0 m
Kelly bushing:	273.0 m
Operator:	Hartogen Energy Ltd
Total depth:	1722 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline
AREAL CLOSURE:	0.5 km ² (on top Permian)
RESERVOIR UNITS:	1

PETROLEUM BEARING UNIT No.1:	Blackwater Group
CONTENTS:	Gas
FORMATION:	Blackwater Group
AGE:	Late Permian
LITHOLOGY:	Sandstone.
DEPOSITIONAL ENVIRONMENT: Fluvial to paludal.	

TEST DATA FROM THE DISCOVERY WELL (Yuranigh-1):

DST 1, 1679.9-1712.4 m,	Blackwater Group
Flowed gas at 184 000 m ³ /day and	
recovered 12.2 m of condensate and	
15.2 m of mud and condensate cut water.	

DST 2, 1657-1661.2 m,	Showgrounds Sandstone
Flowed water at 500 barrels/day.	

RESERVES (as at 30/6/96) :

GAS :

RESERVOIR	INITIAL RECOVERABLE GAS (MCM)	CUMULATIVE PRODUCTION (MCM)	REMAINING RECOVERABLE GAS (MCM)
Blackwater Group	57	35	22

RESERVES (as at 30/6/94) CONTD :

CONDENSATE :

RESERVOIR	INITIAL RECOVERABLE CONDENSATE (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE CONDENSATE (Megalitres)
Blackwater Group	4	2	2

LPG :

RESERVOIR	INITIAL RECOVERABLE LPG (Megalitres)	CUMULATIVE PRODUCTION (Megalitres)	REMAINING RECOVERABLE LPG (Megalitres)
Blackwater Group	6	4	2

STRATIGRAPHY (Yuranigh-1) :

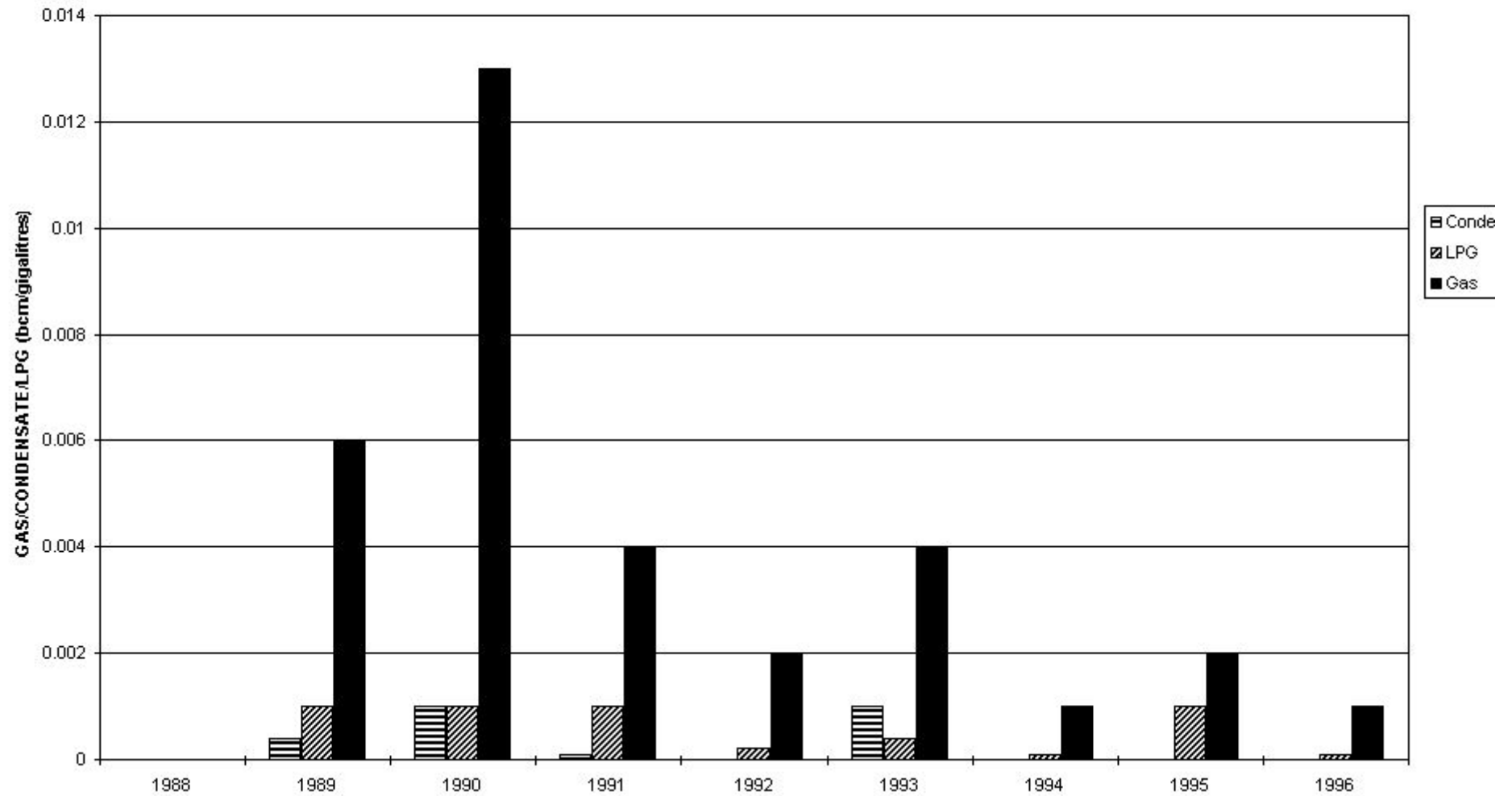
AGE	UNIT	FORMATION TOP * (mKB)
CRETACEOUS	Griman Creek Fm	00.0
	Surat Siltstone	70.1
	Wallumbilla Fm	145.1
	Bungil Fm	349.9
	Mooga Sandstone	467.6
JURASSIC	Orallo Fm	621.8
	Gubberamunda Sandstone	791.0
	Westbourne Fm	940.0
	Springbok Sandstone	982.4
	Birkhead Formation	1061.6
	Hutton Sandstone	1249.7
	Evergreen Fm	1453.0
	Boxvale Sandstone Mbr	1499.0
TRIASSIC	Moolayember Fm	1556.3
	Snake Creek Mudstone Mbr	1650.5
	Showgrounds Sandstone	1657.7
PERMIAN	Blackwater Group	1663.0
DEVONIAN	Timbury Hills Fm	1696.5

* Picked by Geological Survey of Queensland

YURANIGH, GAS / CONDENSATE / LPG PRODUCTION (Basal Permian)

Discovered 4 December 1987 Production commenced June 1989

Total Wells = 1 (1 Producer)



APPENDIX 2.

ACCUMULATION SUMMARIES

CLARENCE-MORETON BASIN

HOGARTH

PRESENT OPERATOR:	Oil Company of Australia Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	20 km west-southwest of Casino.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 9
BASIN:	Clarence-Moreton
SUB-BASIN:	Casino Trough
DISCOVERY WELL:	Hogarth-2
Longitude (E):	152.8669
Latitude (S):	-28.9061
Date total depth reached:	03 SEP 70
Ground level:	93.8 m
Kelly bushing:	96.3 m
Operator:	Clarence Oil and Minerals Company Ltd
Total depth:	1113 mKB
NUMBER OF WELLS DRILLED:	4
STRUCTURE/TRAP:	Anticline with stratigraphic component.
AREAL CLOSURE:	
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Koukandowie Formation
CONTENTS:	Gas
FORMATION:	Koukandowie Formation
AGE:	Early Jurassic
LITHOLOGY:	Sandstone, coarse, quartzose.
DEPOSITIONAL ENVIRONMENT:	Fluvial with possible minor marine influences.
FORMATION TOP (mKB):	725.4 m (Hogarth-2)
POROSITY:	10-20%
PERMEABILITY:	0.1 - 70 md

TEST DATA FROM THE DISCOVERY WELL (Hogarth-2):

DST 6, 906.8-932.7 m, Flowed gas at 14 000 m ³ /day through a 3/8" choke.	Koukandowie Formation
DST 10, 912.3-921.4 m, Flowed gas at 960 m ³ /day through a 1/8" choke.	Koukandowie Formation
DST 11, 912.3-921.4 m, Flowed gas at 240 m ³ /day through a 1/8" choke.	Koukandowie Formation

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Koukandowie Fm
Methane	94.10
Ethane	2.60
Propane	0.36
Isobutane	Trace
N-butane	0.04
Pentane +	0.65
N₂ + O₂	2.20
CO₂	0.07
H₂S	-
Specific Gravity	0.598
BTU/ft³ (gross)	-

STRATIGRAPHY (Hogarth-2) :

AGE	UNIT	FORMATION TOP (mKB)
JURASSIC	Kangaroo Creek Sandstone	00.0
	Basalt	270.7
	Walloon Coal Measures	315.2
	Koukandowie Formation	725.4

CLIFDEN

PRESENT OPERATOR: Oil Company of Australia Ltd
 TYPE: Gas
 COMMERCIAL STATUS: Other discovery
 LOCATION: 13 km north of Grafton..
 STATE: New South Wales
 PETROLEUM TITLES: Vacant
 BASIN: Clarence-Moreton
 SUB-BASIN: Clarence Syncline
 DISCOVERY WELL: Clifden-2
 Longitude (E): 152.9225
 Latitude (S): -29.5658
 Date total depth reached: 05 JUNE 62
 Ground level: 85 m
 Kelly bushing: Unknown
 Operator: Clarence River Basin Oil Exploration Co. N.L.
 Total depth: 592 mKB
 NUMBER OF WELLS DRILLED: 6
 STRUCTURE/TRAP: Anticline.
 AREAL CLOSURE:
 RESERVOIR UNITS: 1

 PETROLEUM BEARING UNIT No.1: Heiffer Creek Sandstone Member ?
 CONTENTS: Gas
 FORMATION: Koukandowie Formation
 AGE: Early to Middle Jurassic
 LITHOLOGY: Sandstone.
 DEPOSITIONAL ENVIRONMENT: Fluvial.
 FORMATION TOP (mKB): 307.0 m (Clifden-2)
 POROSITY: 7.8 -20.5%
 PERMEABILITY: 0.1 - 70 md

 TEST DATA FROM THE DISCOVERY WELL (Clifden-2):

 Gas Blowout, 592 m, Koukandowie Formation
 Flowed gas at 2830 m³/day at 140 kpa.

STRATIGRAPHY (Clifden-2) :

AGE	UNIT	FORMATION TOP (mKB)
JURASSIC	Walloon Coal Measures	00.0
	Koukandowie Formation	307.0

APPENDIX 3.

ACCUMULATION SUMMARIES

GEORGINA BASIN

ETHABUKA

PRESENT OPERATOR:	Vacant
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	330 km south-southwest of Mount Isa.
STATE:	Queensland
PETROLEUM TITLES:	Vacant
BASIN:	Georgina
SUB-BASIN:	Toko Syncline
DISCOVERY WELL:	Ethabuka-1
Longitude (E):	138.4250
Latitude (S):	-23.6889
Date total depth reached:	22 SEP 74
Ground level:	122 m
Kelly bushing:	127 m
Operator:	Alliance Oil Development Australia N.L.
Total depth:	1960 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticlinal closure associated with a high-angle, reverse fault.
AREAL CLOSURE:	130 km ² (including the adjacent Mirrica structure).
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Coolibah Formation
CONTENTS:	Gas
FORMATION:	Coolibah Formation
AGE:	Early Ordovician
LITHOLOGY:	Fine grained, silty sandstone stringers.
DEPOSITIONAL ENVIRONMENT:	Subtidal to intertidal.
FORMATION TOP (mKB):	1734.3 m
TEST DATA FROM THE DISCOVERY WELL (Ethabuka-1):	
DST (Open hole), 1788.3 m,	Coolibah Formation
Flowed gas at 5600 m ³ /day.	

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Coolibah Fm
Methane	71.00
Ethane	5.80
Propane	2.50
Isobutane	0.33
N-butane	0.78
Pentane	0.45
Hexane +	0.36
N ₂ + O ₂	18.70
CO ₂	0.11
H ₂ S	-
Specific Gravity	0.723
BTU/ft ³ (gross)	958

STRATIGRAPHY (Ethabuka-1) :

AGE	UNIT	FORMATION TOP (mKB)
QUATERNARY	Undifferentiated	00.0
CRETACEOUS	Undifferentiated	30.5
DEVONIAN	Cravens Peak Beds	640.0
ORDOVICIAN	Ethabuka Beds	1024.1
	Mithaka Formation	1202.5
	Carlo Sandstone	1328.9
	Nora Formation	1503.0
	Coolibah Formation	1734.3
	Kelly Creek Formation	1813.0

APPENDIX 4.

ACCUMULATION SUMMARIES

GUNNEDAH BASIN

WILGA PARK

PRESENT OPERATOR:	Petroleum Securities Australia Pty Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	15 km west-southwest of Narrabri.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 238
BASIN:	Gunnedah
SUB-BASIN:	West Gunnedah Sub-basin.
DISCOVERY WELL:	Wilga Park-1
Longitude (E):	149.6722
Latitude (S):	-30.3583
Date total depth reached:	19 OCT 85
Ground level:	220.3 m
Kelly bushing:	224.6 m
Operator:	Hartogen Energy Ltd
Total depth:	795.8 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline with a stratigraphic component.
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Porcupine Formation
CONTENTS:	Gas
FORMATION:	Porcupine Formation
AGE:	Early Permian
LITHOLOGY:	Sandstone. Main gas reservoir is intruded by a 6 metre thick diorite sill.
DEPOSITIONAL ENVIRONMENT:	Marine Shelf
 TEST DATA FROM THE DISCOVERY WELL (Wilga Park-1):	
DST 1, 422.1-446.8 m, Flowed water at 120 bbls/day.	Black Jack Formation ?
DST 2, 609.6-630.6 m, Flowed gas at 28 300 m ³ /day through a 3/8" choke at 285 psi. Gas comprised 0.43% helium.	Porcupine Formation
DST 3, 721-795.8 m, Recovered 12 m of mud.	Maules Creek Formation ?

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Porcupine Fm
Methane	73.05
Ethane	0.24
Propane	0.03
Isobutane	0.01
N-butane	0.01
Pentane +	25.10
N₂ + O₂	1.60
CO₂	-
H₂S	-
Helium	0.43
Specific Gravity	-
BTU/ft³ (gross)	-

COONARAH

PRESENT OPERATOR:	Petroleum Securities Australia Pty Ltd
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	22 km west-southwest of Narrabri.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 238
BASIN:	Gunnedah
SUB-BASIN:	West Gunnedah Sub-basin.
DISCOVERY WELL:	Coonarah-1
Longitude (E):	149.5424
Latitude (S):	-30.3697
Date total depth reached:	05 SEP 93
Ground level:	218 m
Kelly bushing:	220 m
Operator:	Petroleum Securities Australia Pty Ltd
Total depth:	531 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Anticline.
RESERVOIR UNITS:	1
 PETROLEUM BEARING UNIT No.1:	 Digby Formation
CONTENTS:	Gas
FORMATION:	Digby Formation
AGE:	Early Triassic
LITHOLOGY:	Sandstone, quartzose, lithic in part with minor claystone and lithic conglomerate.
DEPOSITIONAL ENVIRONMENT:	Fluvial.
POROSITY:	13-27%
PERMEABILITY:	14-719 md
 TEST DATA FROM THE DISCOVERY WELL (Coonarah-1):	
DST 1, 485-498 m,	Digby Formation
Flowed gas at 9628 m ³ /day through a	
3/8" choke at 85 psi. Gas comprised	
1.14% helium.	

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Coonarah-1 Digby Fm	GAS Coonarah-2 Black Jack Fm
Methane	86.53	92.67
Ethane	0.27	0.04
Propane	-	-
Isobutane	-	-
N-butane	-	-
Pentane +	-	-
N₂ + O₂	11.20	7.08
CO₂	0.86	0.01
H₂S	-	-
Helium	1.14	0.20
Specific Gravity	-	-
BTU/ft³ (gross)	-	-

STRATIGRAPHY (Coonarah-1) :

AGE	UNIT	FORMATION TOP (mKB)
TRIASSIC	Napperby Formation	
	Digby Formation	437.8
PERMIAN	Black Jack Formation	511.0

APPENDIX 5.

ACCUMULATION SUMMARIES

McARTHUR BASIN

BALMAIN

PRESENT OPERATOR:	Mataranka Oil NL
TYPE:	Oil
COMMERCIAL STATUS:	Other discovery
LOCATION:	300 km Southeast of Katherine.
STATE:	Northern Territory
PETROLEUM TITLES:	EP 18
BASIN:	McArthur
DISCOVERY WELL:	Balmain-1
Longitude (E):	133.5774
Latitude (S):	-16.6204
Date total depth reached:	04 NOV 92
Ground level:	227 m
Kelly bushing:	231 m
Operator:	Pacific Oil and Gas Pty Ltd
Total depth:	1050 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Drilled to test a lateral resistivity anomaly within the Bukalorkmi Sandstone('Jamison Sst') which was oil bearing in the Jamison-1 well.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	"Hayfield Sand"
CONTENTS:	Oil
FORMATION:	Hayfield Mudstone
AGE:	Proterozoic
LITHOLOGY:	Very fine to fine grained, light grey, quartzose sandstone with common clay matrix, grading upwards into interbedded, finely laminated siltstone and mudstone.
DEPOSITIONAL ENVIRONMENT:	Restricted marine.
FORMATION TOP (mKB):	404 m
POROSITY:	8.9%-13.5% (core analysis)
PERMEABILITY:	0.04 - 20 millidarcies
TEST DATA FROM THE DISCOVERY WELL (Balmain-1):	
DST 1, 777.5-790.5 m, Recovered 4 m of crude oil and 21.6 m of oil cut rathole mud.	Hayfield Mudstone ("Hayfield Sand")
DST 2, 879.8-887.1 m, Recovered 70.5 m of formation water.	Bukalorkmi Sandstone ("Jamison Sst")

POROSITY AND PERMEABILITY DATA (Balmain-1) :

DEPTH (mKB)	POROSITY (%)	PERMEABILITY (millidarcies)	FORMATION
854.05	10.6	0.02	"Jamison Sandstone"
854.92	15.0	0.04	"Jamison Sandstone"
855.98	11.4	0.02	"Jamison Sandstone"
857.06	13.8	0.04	"Jamison Sandstone"
858.47	13.7	0.04	"Jamison Sandstone"
859.22	14.0	0.08	"Jamison Sandstone"
860.34	13.7	0.05	"Jamison Sandstone"
861.08	13.7	0.03	"Jamison Sandstone"
861.91	13.4	1.96	"Jamison Sandstone"
862.75	14.3	0.03	"Jamison Sandstone"
863.22	12.8	0.05	"Jamison Sandstone"
864.27	14.7	0.20	"Jamison Sandstone"
865.14	10.4	0.12	"Jamison Sandstone"
865.64	10.4	0.11	"Jamison Sandstone"
866.37	9.8	0.44	"Jamison Sandstone"
867.06	2.9	<0.01	"Jamison Sandstone"
867.95	3.6	0.02	"Jamison Sandstone"
868.37	8.0	0.04	"Jamison Sandstone"
869.60	8.2	0.29	"Jamison Sandstone"
870.09	6.7	0.05	"Jamison Sandstone"
871.00	9.7	0.04	"Jamison Sandstone"
871.93	9.3	0.07	"Jamison Sandstone"
872.78	7.4	0.02	"Jamison Sandstone"
873.91	13.6	0.06	"Jamison Sandstone"
874.62	11.3	0.18	"Jamison Sandstone"
875.40	13.5	0.44	"Jamison Sandstone"
876.33	9.6	0.64	"Jamison Sandstone"
877.11	10.1	0.04	"Jamison Sandstone"
877.55	6.1	0.05	"Jamison Sandstone"
878.27	9.3	0.06	"Jamison Sandstone"
879.03	7.9	0.04	"Jamison Sandstone"
879.75	10.5	<0.01	"Jamison Sandstone"
880.26	8.8	0.02	"Jamison Sandstone"
880.50	13.1	0.05	"Jamison Sandstone"
881.08	8.4	27.7	"Jamison Sandstone"
881.33	8.5	24.7	"Jamison Sandstone"
881.66	8.0	27.5	"Jamison Sandstone"
882.08	7.0	18.3	"Jamison Sandstone"
882.56	9.4	5.0	"Jamison Sandstone"
883.29	10.0	0.77	"Jamison Sandstone"
884.25	3.3	<0.01	"Jamison Sandstone"
885.12	11.7	0.03	"Jamison Sandstone"
886.14	13.3	0.04	"Jamison Sandstone"
887.05	9.0	0.02	"Jamison Sandstone"
886.15	6.1	<0.01	"Jamison Sandstone"

POROSITY AND PERMEABILITY DATA CONTINUED (Balmain-1) :

DEPTH (mKB)	POROSITY (%)	PERMEABILITY (millidarcies)	FORMATION
888.76	7.9	<0.01	"Jamison Sandstone"
889.60	11.3	0.02	"Jamison Sandstone"
890.52	11.7	0.02	"Jamison Sandstone"
891.10	12.3	0.04	"Jamison Sandstone"
892.10	8.4	<0.01	"Jamison Sandstone"
893.12	12.1	0.03	"Jamison Sandstone"
894.09	12.9	1.66	"Jamison Sandstone"
895.10	8.0	0.02	"Jamison Sandstone"
896.09	13.8	0.05	"Jamison Sandstone"
897.16	10.8	0.01	"Jamison Sandstone"
898.08	13.6	0.03	"Jamison Sandstone"
899.10	9.2	0.01	"Jamison Sandstone"
900.07	11.0	0.02	"Jamison Sandstone"
901.06	13.0	0.04	"Jamison Sandstone"
902.24	10.4	<0.01	"Jamison Sandstone"
903.06	13.7	0.02	"Jamison Sandstone"
904.70	12.2	0.02	"Jamison Sandstone"
905.90	12.3	0.03	"Jamison Sandstone"
906.09	12.0	0.02	"Jamison Sandstone"
907.10	11.9	0.02	"Jamison Sandstone"
908.08	7.6	<0.01	"Jamison Sandstone"
909.08	11.0	0.02	"Jamison Sandstone"
910.07	9.3	0.01	"Jamison Sandstone"
911.15	12.2	0.12	"Jamison Sandstone"
912.08	11.7	0.02	"Jamison Sandstone"
913.07	11.5	0.02	"Jamison Sandstone"
914.08	8.6	0.01	"Jamison Sandstone"
915.06	10.9	0.01	"Jamison Sandstone"
916.08	9.9	<0.01	"Jamison Sandstone"
917.10	12.8	0.02	"Jamison Sandstone"
918.07	9.6	0.01	"Jamison Sandstone"
919.09	9.8	0.03	"Jamison Sandstone"
920.11	12.2	0.02	"Jamison Sandstone"
921.07	11.6	0.01	"Jamison Sandstone"
922.11	11.5	0.02	"Jamison Sandstone"
923.05	10.6	0.01	"Jamison Sandstone"
924.15	6.6	<0.01	"Jamison Sandstone"
925.12	11.5	0.03	"Jamison Sandstone"
926.06	11.9	0.02	"Jamison Sandstone"
927.07	13.0	0.02	"Jamison Sandstone"
928.08	13.2	0.02	"Jamison Sandstone"
929.09	12.1	0.03	"Jamison Sandstone"
930.09	11.4	0.02	"Jamison Sandstone"
931.07	11.5	0.02	"Jamison Sandstone"
932.06	11.3	0.02	"Jamison Sandstone"

POROSITY AND PERMEABILITY DATA CONTINUED (Balmain-1) :

DEPTH (mKB)	POROSITY (%)	PERMEABILITY (millidarcies)	FORMATION
933.07	11.2	0.02	"Jamison Sandstone"
934.07	8.7	<0.01	"Jamison Sandstone"
935.07	5.5	<0.01	"Jamison Sandstone"
936.10	7.8	<0.01	"Jamison Sandstone"
937.09	2.8	<0.01	"Jamison Sandstone"
938.12	0.6	<0.01	"Jamison Sandstone"

GEOCHEMICAL DATA (Balmain-1) :

DEPTH (mKB)	TOC (%)	S1	S2	S3	Tmax (°C)	HI	OI	FORMATION
941.62	0.22							Kyalla Member
946.56-946.59	0.29							Kyalla Member
953.82-953.84	0.63	0.52	2.50	0.14	440	396	22	Kyalla Member
960.00-960.02	1.71	1.67	10.47	0.21	438	612	12	Kyalla Member
965.60-965.62	1.11	1.33	6.61	0.11	438	595	10	Kyalla Member
972.74-972.75	1.02	0.97	6.24	0.23	437	611	23	Kyalla Member
980.13-980.14	2.56	1.43	14.68	0.22	441	573	9	Kyalla Member
985.82-985.83	2.72	1.96	15.49	0.07	440	569	3	Kyalla Member
990.38-990.39	1.61	1.54	11.08	0.12	438	688	7	Kyalla Member
998.26-998.27	0.96	0.75	4.44	0.08	438	462	8	Kyalla Member
1005.86-1005.87	1.43	1.38	9.39	0.07	439	656	5	Kyalla Member
1010.64-1010.65	1.62	1.45	9.25	0.07	437	570	4	Kyalla Member
1012.60-1012.61	2.05	1.66	10.33	0.07	438	503	3	Kyalla Member
1018.70-1018.71	0.71	1.00	3.72	0.07	437	523	10	Kyalla Member
1023.89-1023.90	0.25							Kyalla Member
1031.93-1031.94	0.20							Kyalla Member
1038.82-1038.83	0.15							Kyalla Member
1044.38-1044.39	0.18							Kyalla Member
1049.27-1049.28	0.17							Kyalla Member

STRATIGRAPHY (Balmain-1) :

AGE	UNIT	FORMATION TOP (mKB)
CAMBRIAN	Undifferentiated	00.0
	Jindolkin Formation	52.5
	Tindall Limestone	81.5
	Antrim Plateau Volcanics	263.0
	Cambrian Sandstone	346.0
PROTEROZOIC	Hayfield Mudstone	404.0
	Bukalorkmi Sst ("Jamison Sst")	854.0
	Kyalla Member (McMinn Fm)	938.5

JAMISON

PRESENT OPERATOR:	Pacific Oil and Gas Pty Ltd
TYPE:	Oil and Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	300 km southeast of Katherine.
STATE:	Northern Territory.
PETROLEUM TITLES:	EP 18
BASIN:	McArthur
DISCOVERY WELL:	Jamison-1
Longitude (E):	133.7790
Latitude (S):	-16.4528
Date total depth reached:	20 DEC 90
Ground level:	261m
Kelly bushing:	263.4m
Operator:	Pacific Oil and Gas Pty Ltd
Total depth:	1767 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Stratigraphic well.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Bukalorkmi Sandstone
CONTENTS:	Oil and Gas
FORMATION:	Bukalorkmi Sandstone
AGE:	Proterozoic
LITHOLOGY:	Sandstone, white to light grey, very fine to coarse, subangular to rounded. Massive to crudely planar and cross-bedded stratification observed in cores.
DEPOSITIONAL ENVIRONMENT: Tidal shelf sands.	
FORMATION TOP (mKB):	871.0 m
POROSITY:	8.4 - 12.4 % (core)
PERMEABILITY:	13 - 121 md (core)
TEST DATA FROM THE DISCOVERY WELL (Jamison-1):	
DST 1, 804.8-818.8 m, Flowed gas at a rate too small to measure and recovered 15 litres of gas cut mud.	Chambers River Formation
DST 2, 868.0-895.0 m, Recovered 470 litres of gas and oil cut mud. Flowed gas for 5 hours at an unmeasured rate.	Bukalorkmi Sandstone
DST 3, 865.9-930.5 m, Flowed gas at 450 m ³ /day and recovered 2 m of oil and 448 m of oil and gas cut formation water.	Bukalorkmi Sandstone
DST 4, 889.3-904.6 m, Recovered 5 cm of oil and 687 m of formation water.	Bukalorkmi Sandstone

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Jamison-1 Chambers River Fm	GAS Jamison-1 Bukalorkmi Sst
Methane	78.63	90.74
Ethane	10.48	2.18
Propane	5.01	1.53
Isobutane	0.68	0.58
N-butane	1.33	0.73
Isopentane	0.43	0.34
N-pentane	0.38	0.24
Neo-pentane	-	0.01
Hexanes	0.39	0.26
Heptanes	0.19	0.12
Octanes +	0.09	0.15
N₂ + O₂	2.39	2.77
CO₂	0.00	0.03
H₂S	-	-
Helium	0.36	-
Specific Gravity	0.727	0.635
MJ/m³ (gross)	45.29	40.72

GEOCHEMICAL DATA (Jamison-1) :

DEPTH (mKB)	TOC (%)	S1	S2	S3	Tmax (°C)	HI	OI	FORMATION
517.00	0.17							Chambers River Fm
542.00	0.16							Chambers River Fm
668.00	0.09							Chambers River Fm
672.00	0.11							Chambers River Fm
715.00	0.34							Chambers River Fm
766.00	0.49	0.19	1.24	1.02	434	253	208	Chambers River Fm
791.00	0.40	0.09	0.58	0.09	432	145	23	Chambers River Fm
865.00	0.43							Chambers River Fm
870.00	0.43	0.06	0.79	0.04	437	183	9	Chambers River Fm
971.87	0.52	0.10	0.94	0.04	436	180	8	Kyalla Member
982.21	0.58	1.05	3.30	0.12	431	568	21	Kyalla Member
992.42	2.37	0.47	3.20	0.22	436	135	9	Kyalla Member
1001.14	0.33							Kyalla Member
1012.18	2.51	2.64	14.03	0.13	442	558	5	Kyalla Member
1018.08	3.23	3.59	18.02	0.16	443	557	5	Kyalla Member
1024.82	2.55	2.75	12.82	0.30	441	502	12	Kyalla Member
1031.51	0.28							Kyalla Member
1043.99	2.25	1.89	9.70	0.09	441	431	4	Kyalla Member
1054.49	0.84	0.51	2.50	0.09	439	297	11	Kyalla Member
1067.18	0.41	0.08	0.21	0.07	445	51	17	Kyalla Member
1071.80	0.36							Kyalla Member
1082.50	0.29							Kyalla Member
1091.60	0.35							Kyalla Member

GEOCHEMICAL DATA CONTINUED (Jamison-1) :

DEPTH (mKB)	TOC (%)	S1	S2	S3	Tmax (°C)	HI	OI	FORMATION
1103.68	0.28							Kyalla Member
1119.44	0.62	0.35	1.22	0.12	439	196	19	Kyalla Member
1142.82	1.03	0.84	3.31	0.15	439	321	15	Kyalla Member
1158.42	0.97	0.68	3.20	0.09	442	329	9	Kyalla Member
1173.75	0.40	0.10	0.45	0.08	449	112	20	Kyalla Member
1190.67	0.39	0.12	0.13	0.10	360	33	26	Kyalla Member
1208.31	0.43	0.11	0.20	0.11	429	46	26	Kyalla Member
1234.20	0.95	0.43	1.12	0.10	449	117	11	Kyalla Member
1258.80	0.70	0.49	1.10	0.10	438	157	14	Kyalla Member
1285.38	1.02	0.71	2.17	0.06	445	212	6	Kyalla Member
1304.60	0.46	0.18	0.38	0.08	281	82	17	Kyalla Member
1319.59	0.52	0.22	0.38	1.22	389	73	235	Kyalla Member
1338.45	0.51	0.22	0.37	0.23	281	72	45	Kyalla Member
1348.44	0.80	0.46	1.10	0.10	413	137	13	Kyalla Member
1370.35	1.11	0.72	1.70	0.11	411	153	10	Kyalla Member
1391.09	0.76	0.82	1.34	0.13	326	176	17	Kyalla Member
1407.65	0.66	1.12	1.50	0.09	377	227	14	Kyalla Member
1427.60	0.63	0.06	0.05	0.10	430	7	15	Kyalla Member
1451.05	0.66	0.24	0.44	0.13	338	66	19	Kyalla Member
1469.08	2.22	1.69	2.62	0.11	421	118	4	Kyalla Member
1492.78	2.18	1.02	2.36	0.26	455	108	11	Kyalla Member
1507.40	2.64	1.51	3.34	0.53	461	126	20	Kyalla Member
1542.97	1.44	0.53	1.02	0.08	462	70	6	Kyalla Member
1557.06	1.40	0.57	0.96	0.03	463	68	2	Kyalla Member
1574.00	1.33	1.15	1.71	0.09	462	128	6	Kyalla Member
1580.30	8.97	1.54	1.81	0.18	471	20	2	Kyalla Member
1603.79	2.47	0.92	1.11	0.08	460	44	3	Kyalla Member
1611.60	1.40	0.83	1.01	0.10	442	72	7	Kyalla Member
1622.58	2.42	1.10	1.49	0.11	464	61	5	Kyalla Member
1640.58	2.67	1.72	2.33	0.14	459	87	5	Kyalla Member
1657.98	1.65	0.91	0.87	0.08	450	52	4	Kyalla Member
1660.15	1.89	0.71	0.84	0.12	478	44	6	Kyalla Member
1698.46	1.47	0.27	0.38	0.09	492	25	6	Kyalla Member
1698.99	1.21	0.28	0.33	0.10	488	27	8	Kyalla Member
1707.30	1.29	0.20	0.25	0.03	495	19	2	Kyalla Member

STRATIGRAPHY (Jamison-1) :

AGE	UNIT	FORMATION TOP (mKB)
CAMBRIAN	Tindall Limestone	77.0
	Antrim Plateau Volcanics	372.0
	Bukalara Sandstone	475.6
PROTEROZOIC	Chambers River Formation	501.5
	Bukalorkmi Sandstone	871.0
	Kyalla Member	968.8
	Moroak Sandstone Member	1714.3

APPENDIX 6.

ACCUMULATION SUMMARIES

SYDNEY BASIN

BADGELLY

PRESENT OPERATOR:	Amoco Australia Development Company.
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	Approximately 40 km west northwest of Sydney.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 2
BASIN:	Sydney
DISCOVERY WELL:	Badgelly-1
Longitude (E):	150.7947
Latitude (S):	-34.0450
Date total depth reached:	1964
Ground level:	89.6 m
Kelly bushing:	90.6 m
Operator:	Australian Oil and Gas Corporation Ltd
Total depth:	660.2 mKB
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Fault bounded structural high delineated by seismic.
RESERVOIR UNITS:	1 (Multiple sands).
PETROLEUM BEARING UNIT No.1:	Narrabeen Group
CONTENTS:	Gas
FORMATION:	Narrabeen Group
AGE:	Triassic
LITHOLOGY:	Interbedded light grey, fine to medium lithic sandstone, grey, micaceous shale laminae and chocolate shale.
DEPOSITIONAL ENVIRONMENT:	Alluvial flood plain.
FORMATION TOP (mKB):	280.4 m
TEST DATA FROM THE DISCOVERY WELL (Badgelly-1):	
DST, 364 m, Flowed gas at 2662 m ³ /day.	Narrabeen Group
DST, 381 m, Flowed gas at 4135 m ³ /day.	Narrabeen Group
DST, 403 m, Flowed gas at 2393 m ³ /day.	Narrabeen Group
DST, 434 m, Flowed gas at 515 m ³ /day.	Narrabeen Group
DST, 495 m, Flowed gas at 357 m ³ /day.	Narrabeen Group
DST, 554 m, Flowed gas at 2917 m ³ /day.	Narrabeen Group

STRATIGRAPHY (Badgelly-1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	88.7
	Narrabeen Group	280.4

BAULKHAM HILLS

PRESENT OPERATOR: Amoco Australia Development Company.
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: Approximately 50 km north northwest of Sydney.
STATE: New South Wales
PETROLEUM TITLES: PEL 2
BASIN: Sydney
DISCOVERY WELL: Baulkam Hills -1
 Longitude (E): 151.0086
 Latitude (S): -33.7514
 Date total depth reached: 1961
 Ground level: 89.6 m
 Operator: Australian Oil and Gas Corporation Ltd
 Total depth: 1066.8 mGL
NUMBER OF WELLS DRILLED: 1
STRUCTURE/TRAP: Stratigraphic test.
RESERVOIR UNITS: 2

PETROLEUM BEARING UNIT No.1: Narrabeen Group
CONTENTS: Gas
FORMATION: Narrabeen Group
AGE: Triassic
LITHOLOGY: Light grey, fine grained shaley sandstone interbedded with grey shale.
DEPOSITIONAL ENVIRONMENT: Alluvial flood plain.
FORMATION TOP (mGL): 243.8 m

PETROLEUM BEARING UNIT No.2: Illawarra Coal Measures
CONTENTS: Gas
FORMATION: Illawarra Coal Measures
AGE: Permian
LITHOLOGY: Interbedded grey shale, sandstone, tuff and coal.
DEPOSITIONAL ENVIRONMENT: Delta plain
FORMATION TOP (mGL): 831.5 m

TEST DATA FROM THE DISCOVERY WELL (Baulkam Hills -1):

DST, 608 m, Narrabeen Group
 Flowed gas at 283m³/day.

DST, 935 m, Illawarra Coal Measures
 Flowed gas at 127m³/day.

STRATIGRAPHY (Baulkam Hills -1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Hawkesbury Sandstone	00.0
	Narrabeen Group	243.8
PERMIAN	Illawarra Coal Measures	831.5

CAMDEN

PRESENT OPERATOR: Amoco Australia Development Company.
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: 50 km west northwest of Sydney
STATE: New South Wales
PETROLEUM TITLES: PEL 2
BASIN: Sydney
DISCOVERY WELL: Camden-1
 Longitude (E): 150.7242
 Latitude (S): -34.0766
 Date total depth reached: 1958
 Ground level: 535.5m
 Operator: Australian Oil and Gas Corporation Ltd
 Total depth: 692.5mGL
NUMBER OF WELLS DRILLED: 11
STRUCTURE/TRAP: Stratigraphic test.
RESERVOIR UNITS: 1

PETROLEUM BEARING UNIT No.1: Narrabeen Group
CONTENTS: Gas
FORMATION: Bulgo Sandstone
AGE: Triassic
LITHOLOGY: Sandstone with interbedded grey shale.
DEPOSITIONAL ENVIRONMENT: Alluvial flood plain.
FORMATION TOP (mGL): 281.3m

TEST DATA FROM THE DISCOVERY WELL (Camden-1):

DST, 413 m, Bulgo Sandstone
Flowed gas at an initial rate of
1274 m³/day.

Note : Highest flow rates from the Narrabeen Group were recorded in Camden-10 (14 160 m³/day)

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Camden-1 Bulgo Sandstone
Methane	87.60
Ethane	1.70
Propane	0.39
C₄⁺	0.40
N₂	1.00
O₂	0.10
CO₂	8.80
H₂S	-
Helium	-
Specific Gravity	-
MJ/m³ (gross)	-

STRATIGRAPHY (Camden-1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	89.6
	Narrabeen Group	281.3
PERMIAN	Illawarra Coal Measures	679.7

CECIL PARK

PRESENT OPERATOR:	Amoco Australia Development Company.
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	Approximately 50 km northwest of Sydney.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 2
BASIN:	Sydney
DISCOVERY WELL:	Cecil Park-1
Longitude (E):	150.8500
Latitude (S):	-33.8714
Date total depth reached:	1964
Ground level:	109.1 m
Operator:	Australian Oil and Gas Corporation Ltd
Total depth:	697.7 mGL
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Crestal test of an anticline.
RESERVOIR UNITS:	2

PETROLEUM BEARING UNIT No.1:	Narrabeen Group
CONTENTS:	Gas
FORMATION:	Bulgo Sandstone ?
AGE:	Triassic
LITHOLOGY:	Interbedded sandstone, siltstone and shale.
DEPOSITIONAL ENVIRONMENT:	Alluvial flood plain.
FORMATION TOP (mKB):	390.1 mGL

TEST DATA FROM THE DISCOVERY WELL (Cecil Park-1):

DST, 614-617 m and 622-626 m,	Narrabeen Group

Flowed gas from two sands at a combined rate of 5664 m³/day.

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Cecil Park-1 Bulgo Sandstone ?
Methane	88.00
Ethane	6.70
Propane	1.33
C₄⁺	1.14
N₂	2.30
O₂	0.50
CO₂	0.30
H₂S	-
Helium	-
Specific Gravity	-
MJ/m³ (gross)	-

STRATIGRAPHY (Cecil Park-1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	161.5
	Narrabeen Group	390.1

DURAL

PRESENT OPERATOR:	Amoco Australia Development Company.
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	Approximately 60 km north northwest of Sydney.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 2
BASIN:	Sydney
DISCOVERY WELL:	Dural-2
Longitude (E):	151.0152
Latitude (S):	-33.6669
Date total depth reached:	1958
Ground level:	174.0 m
Operator:	Australian Oil and Gas Corporation Ltd
Total depth:	1970.5 mGL
NUMBER OF WELLS DRILLED:	2
STRUCTURE/TRAP:	Four-way-dip closure (Dural Dome).
RESERVOIR UNITS:	3
PETROLEUM BEARING UNIT No.1:	Narrabeen Group
CONTENTS:	Gas
FORMATION:	Bulgo Sandstone ?
AGE:	Triassic
LITHOLOGY:	Interbedded grey shale, light grey fine sandstone and chocolate-green, grey shale.
DEPOSITIONAL ENVIRONMENT:	Alluvial flood plain.
FORMATION TOP (mGL):	276.5 m
PETROLEUM BEARING UNIT No.2:	Illawarra Coal Measures
CONTENTS:	Gas
FORMATION:	Illawarra Coal Measures
AGE:	Permian
LITHOLOGY:	Interbedded carbonaceous shale, coal, claystone, mudstone and medium to fine sandstone.
DEPOSITIONAL ENVIRONMENT:	Delta plain.
FORMATION TOP (mGL):	877.8 m
PETROLEUM BEARING UNIT No.3:	Shoalhaven Group
CONTENTS:	Gas
FORMATION:	Shoalhaven Group
AGE:	Permian
LITHOLOGY:	Interbedded dark grey claystone, siltstone, sandstone with common carbonaceous shale and occasional thin limestone beds.
DEPOSITIONAL ENVIRONMENT:	Shallow marine to delta front.
FORMATION TOP (mGL):	1245.7 m

TEST DATA FROM THE DISCOVERY WELL (Dural-2):

DST, 473 m, Flowed gas at 42 m ³ /day.	Bulgo Sandstone ?
DST, 1026 m, Flowed gas at 623 m ³ /day.	Illawarra Coal Measures
DST, 1050 m, Flowed gas at 623 m ³ /day.	Illawarra Coal Measures
DST, 1266 m, Flowed gas at 736 m ³ /day.	Shoalhaven Group
DST, 1452 m, Flowed gas at 878 m ³ /day.	Shoalhaven Group
DST, 1522 m, Flowed gas at 1020 m ³ /day.	Shoalhaven Group
DST, 1625 m, Flowed gas at 48 m ³ /day.	Shoalhaven Group

COMPOSITIONAL DATA :

GAS :

GAS PROPERTIES	GAS Dural-2 Bulgo Sandstone ?
Methane	80.60
Ethane	9.00
Propane	-
C ₄ ⁺	0.70
N ₂	6.70
O ₂	1.60
CO ₂	0.10
H ₂ S	-
Helium	-
Specific Gravity	-
MJ/m ³ (gross)	-

STRATIGRAPHY (Dural-2) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Hawkesbury Sandstone	00.0
	Narrabeen Group	276.5
PERMIAN	Illawarra Coal Measures	877.8
	Shoalhaven Group	1245.7

FAIRFIELD

PRESENT OPERATOR: Amoco Australia Development Company.
TYPE: Gas
COMMERCIAL STATUS: Other discovery
LOCATION: Approximately 40 km northwest of Sydney.
STATE: New South Wales
PETROLEUM TITLES: PEL 2
BASIN: Sydney
DISCOVERY WELL: Fairfield-1
 Longitude (E): 150.9150
 Latitude (S): -33.8711
 Date total depth reached: 1964
 Ground level: 22.3 m
 Kelly bushing: 23.2 m
 Operator: Australian Oil and Gas Corporation Ltd
 Total depth: 855.3 mGL
NUMBER OF WELLS DRILLED: 1
STRUCTURE/TRAP: Elongate, NE-SW orientated anticline.
RESERVOIR UNITS: Multiple sands in the Narrabeen Group.

PETROLEUM BEARING UNIT No.1: Narrabeen Group
CONTENTS: Gas
FORMATION: Narrabeen Group
AGE: Triassic
LITHOLOGY: Interbedded siltstone, poorly sorted sandstone with subordinate mudstone and shale
DEPOSITIONAL ENVIRONMENT: Alluvial flood plain.
FORMATION TOP (mGL): 312.1 m

TEST DATA FROM THE DISCOVERY WELL (Fairfield-1):

 DST, 496 m, Narrabeen Group
 Flowed gas at an initial rate of
 821 m³/day. Gas comprised 96% CO₂.

 DST, 542 m, Narrabeen Group
 Flowed gas at an initial rate of
 1862 m³/day. Gas comprised 96% CO₂.

STRATIGRAPHY (Fairfield-1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	73.5
	Narrabeen Group	312.1

MOUNT HUNTER

PRESENT OPERATOR:	Amoco Australia Development Company.
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	Approximately 60 km west northwest of Sydney.
STATE:	New South Wales
PETROLEUM TITLES:	PEL 2
BASIN:	Sydney
DISCOVERY WELL:	Mount Hunter-1
Longitude (E):	150.6472
Latitude (S):	-34.0583
Date total depth reached:	1962
Ground level:	86.0 m
Operator:	Australian Oil and Gas Corporation Ltd.
Total depth:	1070.5 mGL
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Stratigraphic.
RESERVOIR UNITS:	1
PETROLEUM BEARING UNIT No.1:	Narrabeen Group
CONTENTS:	Gas
FORMATION:	Narrabeen Group
AGE:	Triassic
LITHOLOGY:	Interbedded coarse to pebbly sandstone and grey shale.
DEPOSITIONAL ENVIRONMENT:	Alluvial flood plain.
FORMATION TOP (mGL):	227.7 m
TEST DATA FROM THE DISCOVERY WELL (Mount Hunter-1):	
DST, 526 m,	Narrabeen Group
Flowed gas at 2407 m ³ /day.	

POROSITY AND PERMEABILITY DATA (Mount Hunter-1) :

DEPTH (mKB)	POROSITY (%)	PERMEABILITY (horizontal) (millidarcies)	PERMEABILITY (vertical) (millidarcies)	FORMATION
67.4	11.0	-	0.0	Hawkesbury Sandstone
68.0	6.0	0.0	-	Hawkesbury Sandstone
153.1	21.0	-	9.0	Hawkesbury Sandstone
358.5	16.0	-	0.0	Narrabeen Group
359.1	11.0	7.5	-	Narrabeen Group
496.9	30.0	-	0.0	Narrabeen Group
497.2	9.0	4.8	-	Narrabeen Group
612.0	13.0	-	0.0	Narrabeen Group
865.0	20.0	-	0.0	Illawarra Coal Measures
1017.1	10.0	-	0.0	Illawarra Coal Measures
1070.3	26.0	-	0.0	Shoalhaven Group

STRATIGRAPHY (Mount Hunter-1) :

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	54.9
	Narrabeen Group	227.7
PERMIAN	Illawarra Coal Measures	643.4
	Shoalhaven Group	1017.4

MULGOA	
PRESENT OPERATOR:	Vacant
TYPE:	Gas
COMMERCIAL STATUS:	Other discovery
LOCATION:	Approximately 40 km east of Lithgow.
STATE:	New South Wales
PETROLEUM TITLES:	Vacant
BASIN:	Sydney
DISCOVERY WELL:	Mulgoa-2
Longitude (E):	150.6408
Latitude (S):	-33.8111
Date total depth reached:	1959
Ground level:	151.5 m
Operator:	Australian Oil and Gas Corporation Ltd.
Total depth:	1716 mGL
NUMBER OF WELLS DRILLED:	1
STRUCTURE/TRAP:	Drilled as a test of the Permian section in the Mulgoa Anticline.
RESERVOIR UNITS:	Probably multiple sands.
PETROLEUM BEARING UNIT No.1:	Illawarra Coal Measures
CONTENTS:	Gas
FORMATION:	Illawarra Coal Measures
AGE:	Permian
LITHOLOGY:	Interbedded grey shale, black carbonaceous shale, coal, fine to medium lithic sandstone and grey tuffaceous shale.
DEPOSITIONAL ENVIRONMENT:	Lower delta-plain.
FORMATION TOP (mGL):	761.4 m
TEST DATA FROM THE DISCOVERY WELL (Mulgoa-2):	
DST, 1084 m,	Illawarra Coal Measures
Flowed gas at an initial rate of 1 132 800 m ³ /day, decreasing to 283 200 m ³ /day after 20 hours.	

STRATIGRAPHY (Mulgoa-2):

AGE	UNIT	FORMATION TOP (mGL)
TRIASSIC	Wianamatta Group	00.0
	Hawkesbury Sandstone	21.3
	Gosford Formation	259.1
	Bald Hill Claystone	289.6
	Clifton Subgroup	300.2
PERMIAN	Illawarra Coal Measures	761.4
	Shoalhaven Group	1096.4

BOWEN - SURAT BASINS

