EXPLORATION OPPORTUNITIES

OTWAY BASIN SOUTH AUSTRALIA

MINES AND ENERGY
SOUTH AUSTRALIA

MARCH 1995

NUMBER 8083 R 20

EXPLORATION OPPORTUNITIES, OTWAY BASIN, SA
OT95-A TO D

DATA PACKAGE BROCHURE

Submitted by

SADME Petroleum Division
1995

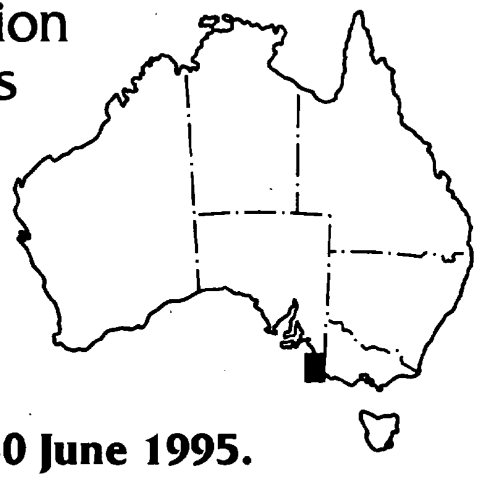
ENVELOPE 8083 R 20

CONTENTS

END OF CONTENTS

OTWAY BASIN – SOUTH AUSTRALIA
CALL FOR APPLICATIONS

Petroleum Exploration Licence applications are invited for the four areas OT95 A to D in South-East South Australia.



Applications close on 30 June 1995.

Exploration well – •

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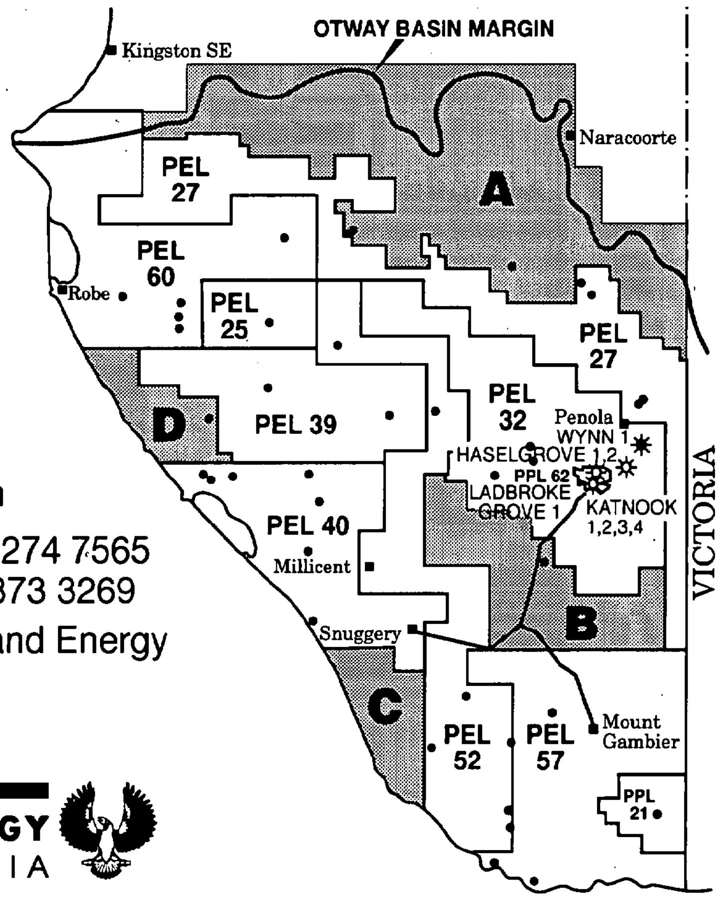

For further information contact: **John Morton**

Telephone: (IAC) 61 8 274 7565
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Department of Mines and Energy
PO Box 151
EASTWOOD SA 5063

MINES AND ENERGY
SOUTH AUSTRALIA

MESA 95-2

EXECUTIVE SUMMARY

Four areas (OT95-A to D) located in the South Australian sector of the onshore Otway Basin, are available for application as Petroleum Exploration Licences (PELs). The areas range from 255 km^2 to 2 023 km^2, and seismic line coverage ranges from 39 line km to 435 line km.

The Otway Basin is one of a series of basins which originated with the rifting and final pull-apart of the Australia-Antarctica landmass, initiated during the Early Cretaceous. The oil and gas productive Gippsland Basin is the best known of these basins as it contains several giant oil and gas fields.

Commercial gas was discovered in the onshore Otway Basin in South Australia at Katnook in 1987. Sufficient reserves were proved by follow-up drilling to enable the signing of contracts and construction of a pipeline to supply local markets in 1991. Oil has been recovered from two wells in Victoria (Lindon 1 and Windermere 1) and two in SA - Caroline 1 and Sawpit 1 (the latter drilled in 1992). In 1994, Wynn 1 flowed oil at 120 BOPD, the first well in the basin to flow oil to surface. In the eastern Otway Basin in Victoria two large discoveries were made in the offshore in 1993, estimated to contain approximately 1 000 BCF of gas in place.

There are a number of undrilled prospects and leads within the area, the largest of which is the Wanda prospect in OT95-A, with a potential reserve of approximately 1 billion barrels in place.

Enquires and applications for a Petroleum Exploration Licences over OT95-A to D may be addressed to:

Mr R A Laws
Director, Petroleum
PO Box 191
EASTWOOD SA 5063
AUSTRALIA
tel (IAC) 61 8 274 7680
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Applications may be made for any or all of the areas OT95-A to D. Applicants are encouraged to apply for all areas of interest. In the event that more than one area is offered for license to the applicant, (on the basis of the most competitive work program), the applicant is not obliged to accept any or all of the offers.

Applications should be accompanied by a proposed 5 year work program, a map of the application area, a $2000 application fee, and details of the technical and financial resources of the applicant (there is no set form for the making of an application). Guidelines for making an application are included at the rear of this publication

The closing date for applications is **5pm on 30 June 1995**.

This brochure refers to vacant onshore areas only, and one offshore area (S95-2) is also currently available (Figure 1) with a closing date of **5 October 1995**. If you require further information or a brochure on S95-2, please contact the department.

OT-95 SUMMARY SHEET

Area A	-	**2 023 km² (495,600 acres).**
Area B	-	**580 km² (142,400 acres).**
Area C	-	**335 km² (82,230 acres).**
Area D	-	**255 km² (62,600 acres).**
AGE OF SEDIMENTS	-	Early to Late Cretaceous.
THICKNESS OF SEDIMENTS	-	Up to : 1.5 km (Area A), 6 km (Area B), 8? km (Area C), 4 km (Area D).
DEPTH TO TARGET ZONES	-	350 - 2 650 m.
BASIN TYPE	-	Rift.
DEPOSITIONAL SETTING	-	Fluvial-lacustrine-deltaic.
REGIONAL STRUCTURE	-	Early half grabens, late growth faulting.
SOURCE ROCKS	-	Casterton and Laira Formation Shales, Eumeralla Formation Coals and Shales (Areas A, B and D). Eumeralla Formation Coals and Shales (Areas C).
RESERVOIRS	-	Fluvial and deltaic sandstones.
TRAPS	-	Largely fault independent 4 way dip closure. Pinchout in Area A.
DEPTH TO OIL/GAS WINDOW	-	1 300 to 3 800 m
EXPECTED HYDROCARBONS	-	Oil in flank areas, Gas with some liquids potential in deeper areas.
NUMBER OF WELLS (Area A)	-	Two (Bool Lagoon 1 & Lucindale 1).
NUMBER OF WELLS (Area B)	-	One (Kalangadoo 1, Carbon Dioxide show).
NUMBER OF WELLS (Area C)	-	None.
NUMBER OF WELLS (Area D)	-	One (St. Clair 1).
SEISMIC COVERAGE (Area A)	-	591 line km (435 line km post 1980).
SEISMIC COVERAGE (Area B)	-	425 line km (320 line km post 1980).
SEISMIC COVERAGE (Area C)	-	65 line km (39 line km post 1980).
SEISMIC COVERAGE (Area D)	-	218 line km. (164 line km post 1980).

INTRODUCTION

The Otway Basin is part of the Australian Southern Rift System, formed along Australia's southern margin during a period of rifting and continental breakup which separated Australia and Antarctica. The northern margin of the basin extends up to 50 miles (80 kilometres) inland while the southern margin is poorly defined and lies in the region of the continental slope some 160 kilometres offshore. Approximately 70 percent of the basin is offshore. The basin straddles the South Australian/Victorian State border.

The four areas span a variety of structural locations (Fig. 1) and play types, from the northern margin of the Robe Trough (OT95-A), St Clair Trough (OT95-D), Tantanoola Trough (OT95-B) and Voluta Trough (OT95-C).

Seismic studies have shown that the structural evolution of the Otway Basin is analogous to basins such as the Tucano-Reconcauo Basin of Brazil and the Gabon and Cabinda Basins of the west coast of Africa. Each of these basins have been found to contain at least one giant oil field.

EXPLORATION HISTORY

The first oil well drilled in the Otway Basin was in 1866 at Alfred Flat. The drilling venture was convinced of the presence of oil in the subsurface on the basis of bitumen strandings frequently found on the coastline and oily algal scums floating on nearby lagoons. Robe 1 was drilled in 1915, but it is believed the well did not penetrate the most prospective reservoir Section (Crayfish Subgroup) although gas shows were encountered in the Eumeralla formation. Lake Eliza 1, drilled in 1969, also encountered gas shows in the Otway group. The first offshore well was drilled in 1967 and over the period 1967 to 1975 Esso and Shell drilled six wells offshore, in the South Australian sector of the basin. Although hydrocarbon shows were encountered, no discoveries were made. Failure is attributed to the then poor quality of seismic data and to a poor understanding of the stratigraphic relationships which together led to all of these wells being invalid tests (either drilled off structure or the main objective not penetrated).

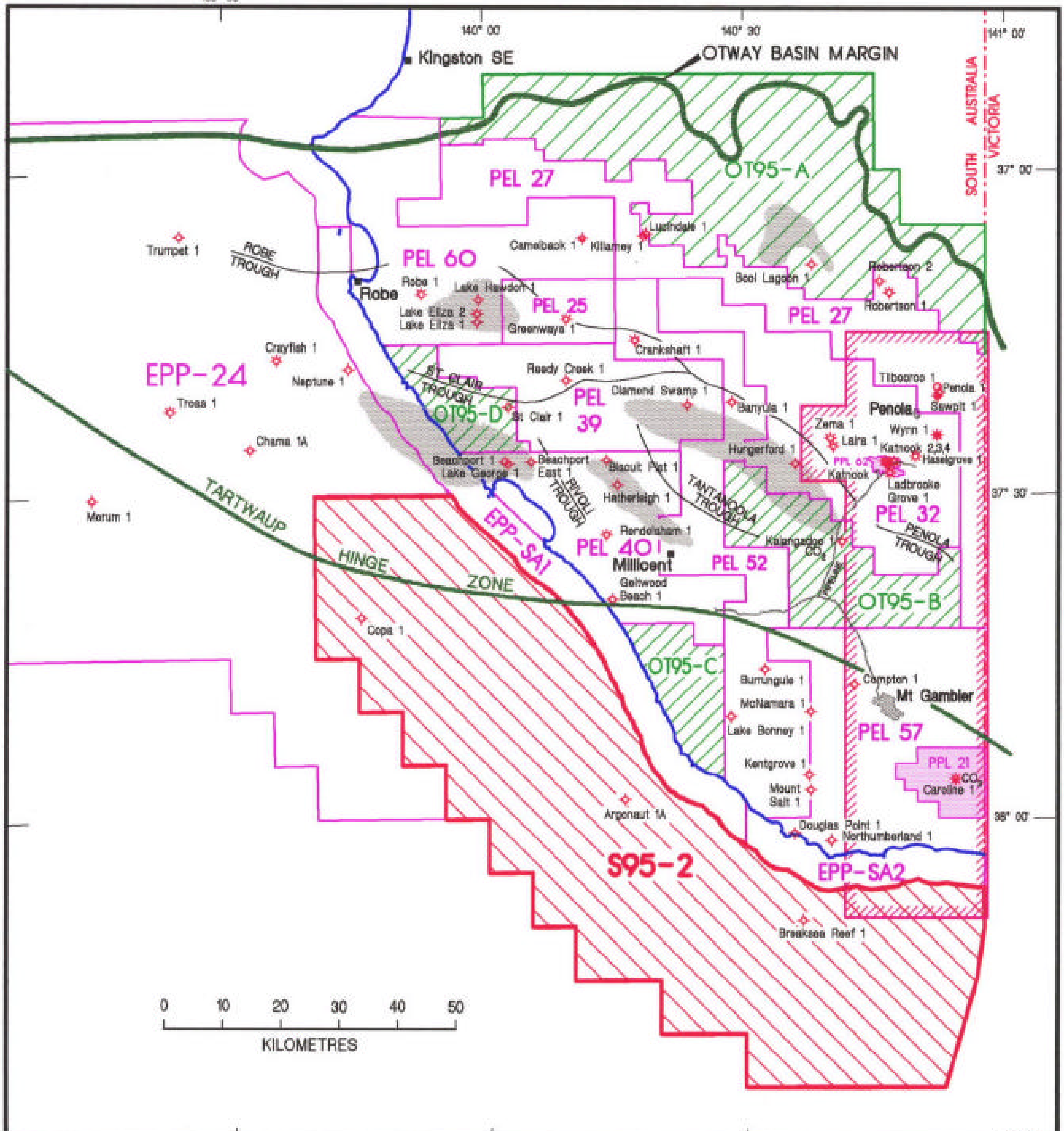
The first commercial production of hydrocarbons was established with the drilling of North Paaratte No. 1, an onshore well located near Port Campbell in Victoria, in 1979. Gas is currently being produced from the Late Cretaceous Waarre Sandstone through this well. Lindon No. 1, drilled in 1983, recovered a heavily biodegraded oil within the Tertiary Pebble Point Formation but commercial production could not be achieved. In 1987, Windermere No. 1 recovered oil from sands within the Early Cretaceous Eumeralla Formation.

In 1987, Katnook 1, an onshore well in the South Australian portion of the basin, flowed gas at rates up to 9 MMCFD during production testing of a sand at the base of the Eumeralla Formation. A follow-up well, Katnook 2, drilled in 1989, flowed gas at rates of over 16 MMCFD during production testing of the Pretty Hill Sandstone. The field is now on commercial production. Another field (Ladbroke Grove) was discovered near to the Katnook field in 1989. Since the early 1990's, advances in seismic acquisition have greatly improved seismic resolution of deep structures in the troughs, and this has been reflected in an improvement in the success ratio, which is now about 1 in 3.
Recent discoveries have included, a small but significant volume of oil recovered from Sawpit 1 (1992) and in early 1993 gas was recovered on RFT in Troas 1, an offshore well in South Australia. In 1994 Haselgrove 1 discovered a commercial gas field near the Katnook Field, and Wynn 1, in PEL 32, flowed oil to surface at 120 BOPD. This well has finally dispelled the previous perception that the Otway Basin is gas prone, and there is now the likelihood of a significant oil discovery in the near future.

TECTONIC HISTORY OF THE OTWAY BASIN

Rifting (Tithonian-Barremian)

Initiation of the Mesozoic Otway Basin began in the Late Jurassic with thermal doming. During the Tithonian to Berriasian, the Casterton Formation was deposited, comprising mainly carbonaceous shale with minor feldspathic sandstone, siltstone and basalt. It is a difficult unit to correlate seismically, and shows as an



- Offshore area available for petroleum exploration
- SAEI aeromagnetic survey area
- PEL 32 — Petroleum Exploration Licence
- PPL 21 — Petroleum Production Licence
- Structural high
- Onshore area available for petroleum exploration

- Proposed well
- Dry well
- Dry well, gas show
- Gas well
- Dry well, oil show
- Oil well

Current February 1995

Figure 1

OTWAY BASIN

PETROLEUM EXPLORATION LICENCES and WELLS

MINES AND ENERGY SOUTH AUSTRALIA

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enigmatic subparallel band of reflectors up to 1 500 m thick above basement. It is best seen on the northern margins of the basin and is presumed to occur in the deepest parts of the troughs. The Casterton Formation is interpreted to have been deposited immediately prior to rifting in relatively deep lakes, probably related to initial fracturing. Extrusion of volcanics within this formation occurred via early faults and fractures within Palaeozoic basement.

Rapid escalation of rifting activity occurred in the Berriasian, with the development of many half graben along the length of the Otway Basin, which are mostly infilled by the Crayfish Group. Crayfish Group deposition was strongly controlled by tectonic uplift and subsidence during this rifting stage. Up to 5 800 m of fluviatile and lacustrine clastics and coals were deposited in a 20 million year period. Contemporaneous rift volcanism provided abundant volcanogenic debris.

Sediment influxes occurring in simple extensional basins commonly depict rugged topography on the upthrown fault block with significant alluvial fan systems. In the Crayfish Group, however, there are no thick alluvial fan deposits and axial drainage dominated over transverse drainage within the Robe and Penola Troughs. The overall depositional setting is one with relatively low relief on the upthrown block, accompanied by high subsidence rates. Although the surface expression of the faults is minimal, they exercised significant control on three-dimensional facies distribution. Maximum subsidence and hence maximum sediment thickness occur adjacent to the main faults.

Knowledge of basement structure and rift features is limited to shallower areas of the basin due to limited penetration by drilling and resolution of seismic. Major half graben vary in orientation from east-northeast-west-southwest in the Robe Trough to southeast-northwest in the Penola Trough. The orientation of the main troughs and the relationship between them has led to a wide range of tectonic models to explain the observed rift system which have varied in extension direction from northwest-southeast to northeast-southwest. Sandbox modelling and mapping have shown that a north-south rift extension direction is the most likely for the Tithonian-Barremian rifting event.

The end of this intensive rift phase occurred in the Barremian, fault-related tilting, folding and uplift resulted in extensive erosion of the Crayfish Group.

Sag and rifting (Aptian-Albian)

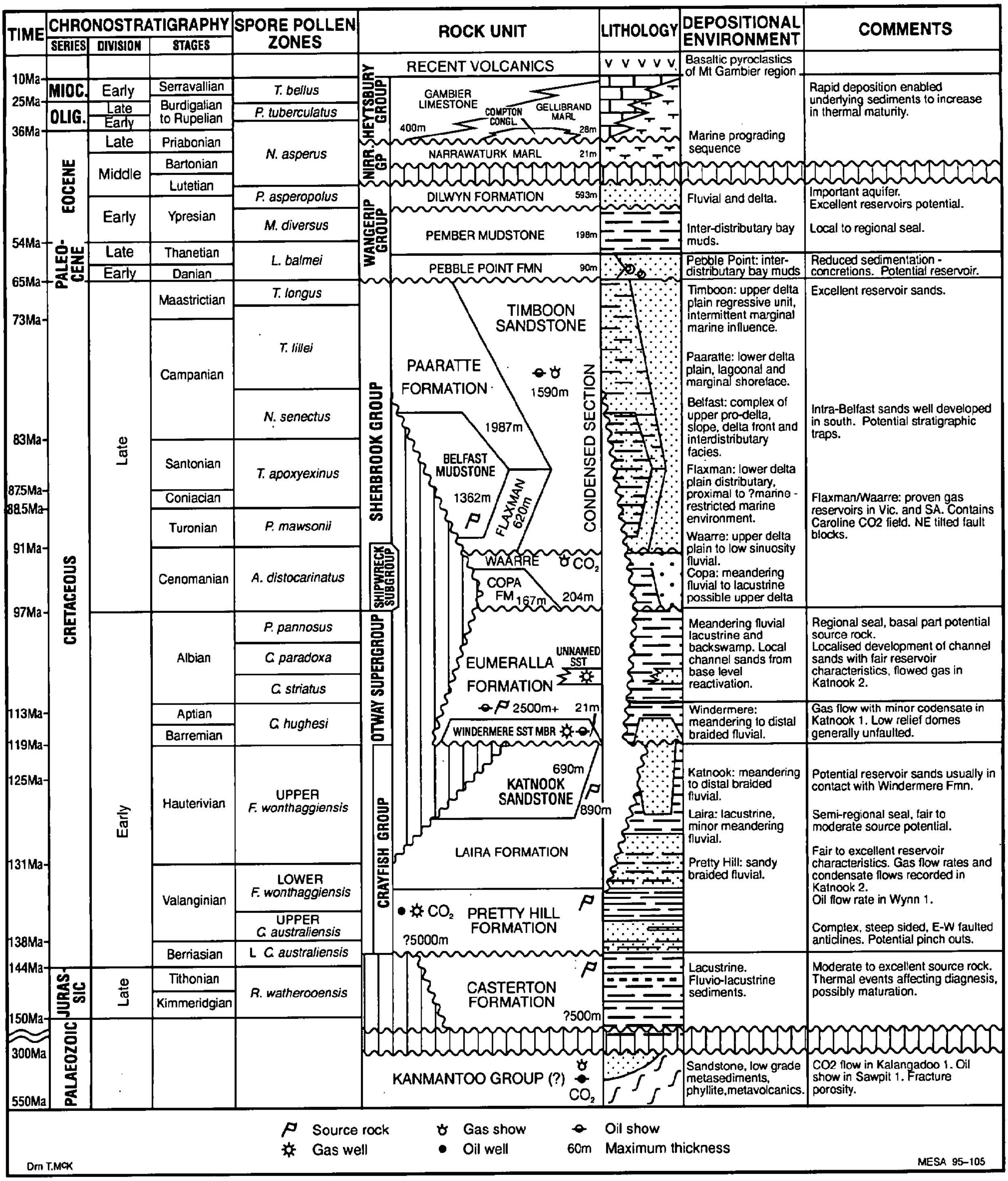
A second major rifting phase developed in the Aptian, resulting in deposition of Eumeralla Formation flood-basin sediments (siltstone, mudstone and minor sandstone and coal seams). Onshore, Eumeralla Formation deposition was mildly controlled by faulting, but the rapid facies changes and thickness variations occurring in the underlying Crayfish Group are not seen. The extension direction of this phase is more widely accepted as being northeast-southwest. Fault trends at top Eumeralla Formation level show a strong subparallel trend in the orthogonal northwest-southeast direction. The sedimentary depocentre, and hence main rift activity, moved southwards at this time.

It is interpreted that the earlier rifting phase failed in the Robe Trough and most of the current onshore areas in the Barremian. The overlying Eumeralla Formation blankets earlier troughs and basement highs, and thickens rapidly southwards of the Tartwaup Hingeline into the Voluta Trough rift axis. Little drilling and seismic evidence is available on the main Eumeralla Formation syn-rift sequence south of this hingeline.

Fission track analysis indicates a major cooling event leading to regional uplift and significant erosion at the end of the Albian. This corresponds to continental break-up at 95 Ma and the onset of sea floor spreading.

Slow sea floor spreading (Cenomanian-Eocene)

Continental separation between the Australian and Antarctic plates began at the start of the Cenomanian. This marks a change from a Late Jurassic-Early Cretaceous intracontinental rift system to a Late Cretaceous-Tertiary passive margin. A slow spreading rate, continued until the Middle Eocene (~45 Ma). This extension and



OTWAY BASIN
STRATIGRAPHIC COLUMN

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associated subsidence resulted in extensive marginal marine to deltaic deposition south of the Tartwaup Hingeline. Up to 5 000 m of Late Cretaceous Sherbrook Group sediments, overlain by up to 1 500 m of Tertiary sediments, have been mapped offshore. Structuring was predominantly down-to-basin listric syndepositional faulting in contrast to previous rifting styles.

A bypass margin existed north of the Tartwaup Hingeline, with thin Sherbrook and Wangerrip Group deposition, as most sediment was transported further south and deposited onto the continental margin. Localised depocentres evolved over the Tithonian-Barremian troughs due to sediment compaction, leading to variations in Sherbrook Group thickness over the bypass margin.

Thermochronological analysis indicated that the western Otway Basin underwent episodes of uplift and erosion throughout the Late Cretaceous and Tertiary, due to inferred tectonic readjustments in response to plate reorganisations and changing stress fields. Rifting of the Tasman Sea during the Campanian (82 Ma) and Eocene (52 Ma); was the primary cause of stress field charge, applying a right lateral stress regime.

Fast sea floor spreading (Eocene-Recent)

A rapid increase in continental spreading rate occurred in the Middle Eocene, around 42 Ma, to reach the current half rate of ~110 mm/year. Continuing thermal subsidence and starvation of clastic input led to deposition of predominantly marine carbonates. At least 670 m of Nirranda and Heytesbury Groups sediment occur in the southeast offshore Otway Basin in South Australia.

Throughout the Tertiary, the shelf edge prograded southwards. Changes in sea level during this period have resulted in spectacular channel cutting and filling.

Wrenching and compression (Miocene-Recent)

Analysis of fault and anticline patterns throughout the Otway Basin indicates an east-west orientated dextral wrench system for this period. This has caused northeast-southwest anticlinal uplift in some areas, and significant inversion along many existing faults. The influence of this event on structures and fault planes is very important in hydrocarbon exploration.

The cause of this change in stress regime has been related to collision on the northern and eastern margin of the Australian plate. Continuity of this stress field to the present day is validated by the persistence of significant earthquake activity, particularly in the Beachport High area, the site of the most intense structural inversion mapped in the South Australian portion of the basin .

Volcanism (Pliocene-Recent)

The most recent phase of tectonic activity involved extrusion of several episodes of volcanics. In Victoria, extensive basaltic and ash volcanics were extruded during the Pliocene-Pleistocene (the Older Volcanics). Two more recent events (the Newer Volcanics) in South Australia and Victoria have been dated as Pleistocene and Holocene. This tectonic phase represents a significant risk to petroleum exploration by introducing magmatic CO_2 into the sedimentary sequence, to the detriment of hydrocarbon entrapment.

For a complete and detailed summary of the geology of the Otway Basin, the reader is referred to Morton and Drexel (1995).

PRODUCTION FACILITIES AND GAS MARKET

Following the discovery of gas at Katnook in 1987, negotiations between the partners of PEL 32 and PASA led to the signing of a contract in 1990 for the supply of 22.5 PJ of sales gas from the Katnook and Ladbroke Grove fields over 15 years. Gas production commenced in February 1991. The main pipeline supplies natural gas to Mount Gambier and the Apcel paper mill at Snuggery. The natural gas replaced the use of LPG at Apcel and tempered LPG at Mount Gambier. If demand warrants, the pipeline may be extended to Millicent. A smaller pipeline supplies gas to the SAFRIES Pty Ltd potato chip factory south of Penola. Condensate recovered from Katnook is stored at the plant and transported (by truck) to the Adelaide refinery at Port Stanvac.

Further discoveries of gas (even if small) would find a market within the South-East. Discovery of 200 - 250 BCF of gas would justify construction of a pipeline to Adelaide.

KEY REFERENCES

Hibburt, J E 1994. Petroleum exploration and development in South Australia (9th edition). *South Australia Department of Mines and Energy. Report Book,* 93/9.

Morton, J.G.G. and Drexel, J.F. 1995 The Petroleum Geology of South Australia Series: *1. Otway Basin.* MESA publication, 280pp, *in press*

PROSPECTIVITY OF AREA OT95-A

The OT95-A area is the largest on offer in the current round, covering nearly 2 000 km^2 of the northern margin of the onshore Otway Basin. Seismic coverage is fair, with 591 line km of seismic in total, however only 435 km is recent vintage (post 1980). Only 2 wells have been drilled in the area; both were dry, and did not test the flank play.

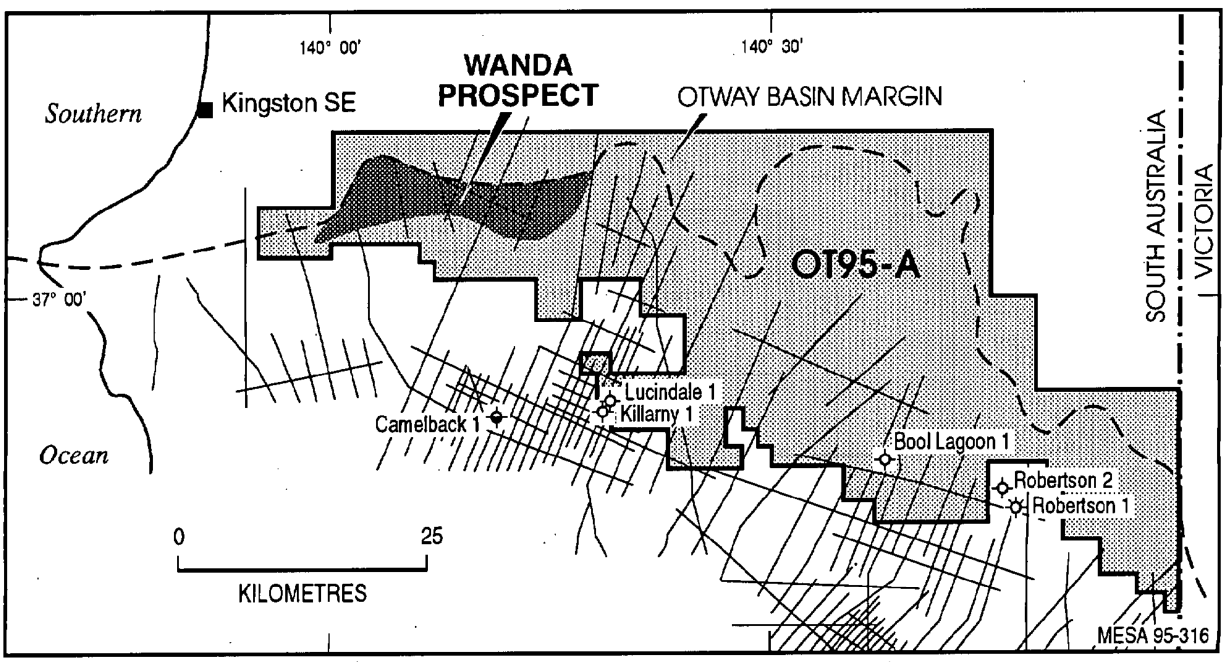
Plays exist mainly in the Early Cretaceous Crayfish Group sediments. Flank plays of Crayfish Group onlapping basement, and sealed by Eumeralla Formation, have the most potential. Trap sizes are very large (up to 1 billion barrels in place), and at shallow drill depths.

Reservoirs and seals

The primary reservoirs in the area are sands within the Crayfish Group sealed by either Eumeralla Formation or intra- Crayfish shales. Secondary targets are fractured basement or the Windermere Sandstone Member. Development of sands within the Crayfish Group is unpredictable: one well in the area (Lucindale 1) has abundant sands, the other (Bool Lagoon 1) has only minimum sand development. Fractured basement, as was found in Sawpit 1, may be a potential reservoir, although the seal/trap integrity may be doubtful. Matrix porosity is necessary if a significant accumulation were to be targeted. The Windermere Sandstone Member of the Eumeralla Formation is conglomeratic near basement highs, and as a result, reservoir quality is likely to be poor in such areas.

Source and migration

The Eumeralla Formation and Crayfish Group sediments are immature over most of the OT95-A area. Charge for the flank plays would require lateral migration out of the Robe and Penola Troughs. Although faults may impede this migration, Sawpit 1 has demonstrated that long distance lateral migration is possible, particularly along the Crayfish/ basement unconformity. A positive aspect of this migration pathway is that potential hydrocarbon accumulations are expected to be oil.



OT95-A Modern Seismic Coverage

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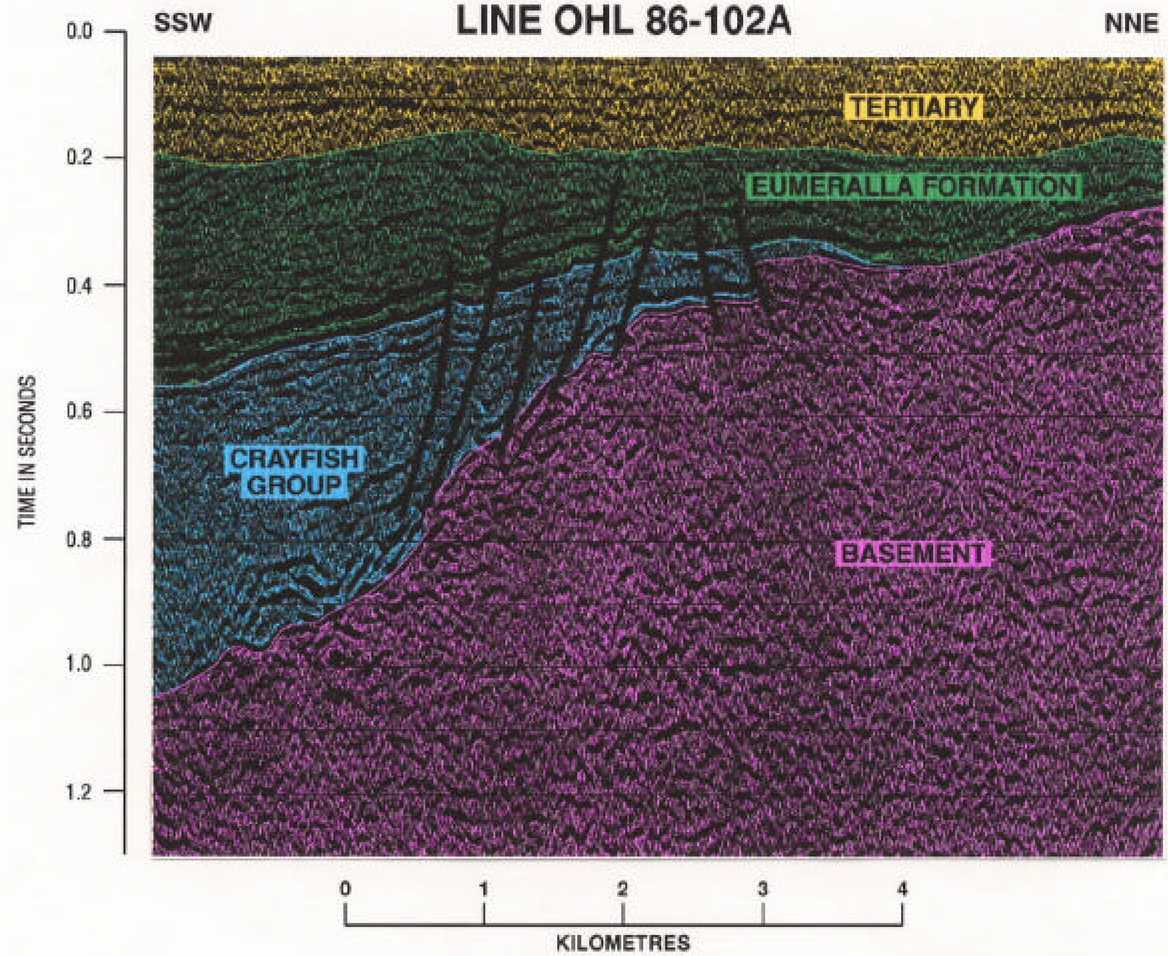
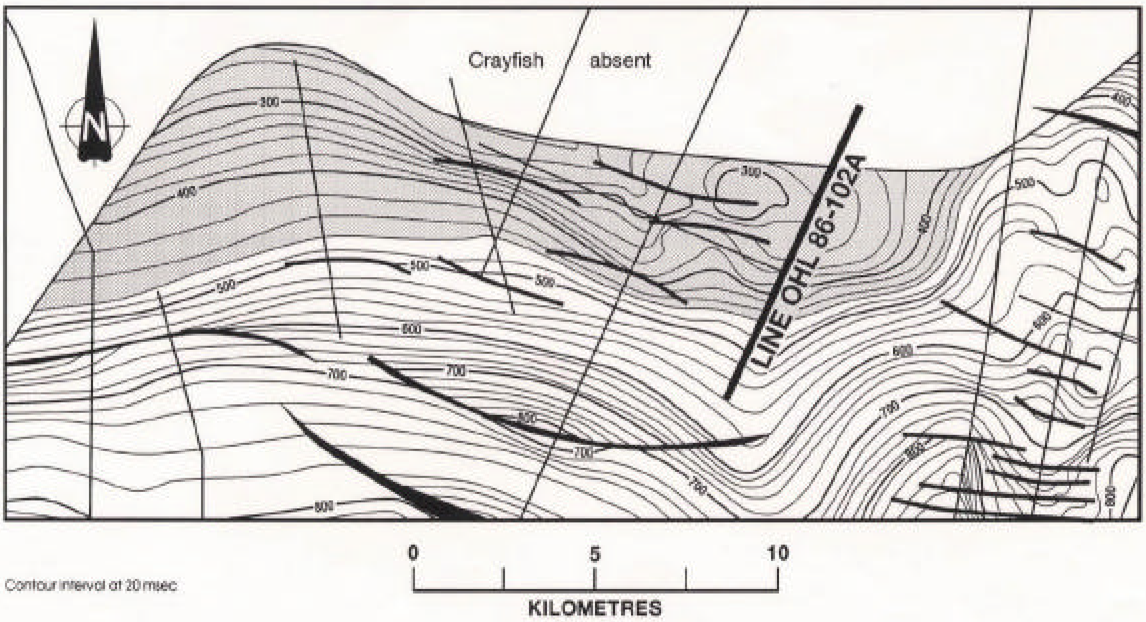
WANDA PROSPECT

POTENTIAL RESERVES
Oil: 260 MMSTB Recoverable oil.
Gas: 126 BCF Recoverable gas.

STRUCTURE: Stratigraphic (Pinchout).	RISK: Medium. Requires more seismic.
SEAL: Laira-Eumeralla Formations.	RISK: Low.
RESERVOIR: Pretty Hill Formation.	RISK: High.
SOURCE: Laira-Intra Pretty Hill Shales.	RISK: High. Faults may impede long range migration.
MAXIMUM AREA OF CLOSURE:	10 320 hectares (25 500 acres)
VERTICAL CLOSURE:	255 metres (836 feet)
DEPTH TO TARGET:	348 metres (1 142 feet)
DEPTH TO BASEMENT:	534 metres (1 752 feet)
POROSITY: 15%	H.C. SATURATION: 65%
NET TO GROSS RATIO: 0.30	
$^1/Bg = 32$	GAS RECOVERY FACTOR: 60%
$^1/Bo = 0.90$	OIL RECOVERY FACTOR: 25%

AREA OT95-A





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CRAYFISH UNCONFORMITY TIME STRUCTURE

WANDA PROSPECT

95—136 MESA

PROSPECTIVITY OF AREA OT95-B

The OT95-B area comprises 580 km^2 adjacent to the south eastern part of the Penola Trough, which is the location for all previous commercial gas discoveries in the Otway Basin in South Australia. Seismic coverage is good, with 425 line km of seismic in total, of which 320 km is recent vintage (post 1980). However, even 1993 vintage seismic is of poor quality, and it is difficult to image structure below the Crayfish unconformity. One well has been drilled in the area (Kalangadoo 1), which flowed CO_2 from fractured basement. The well was drilled too high on the Kalangadoo High to test the lower Crayfish Group flank play.

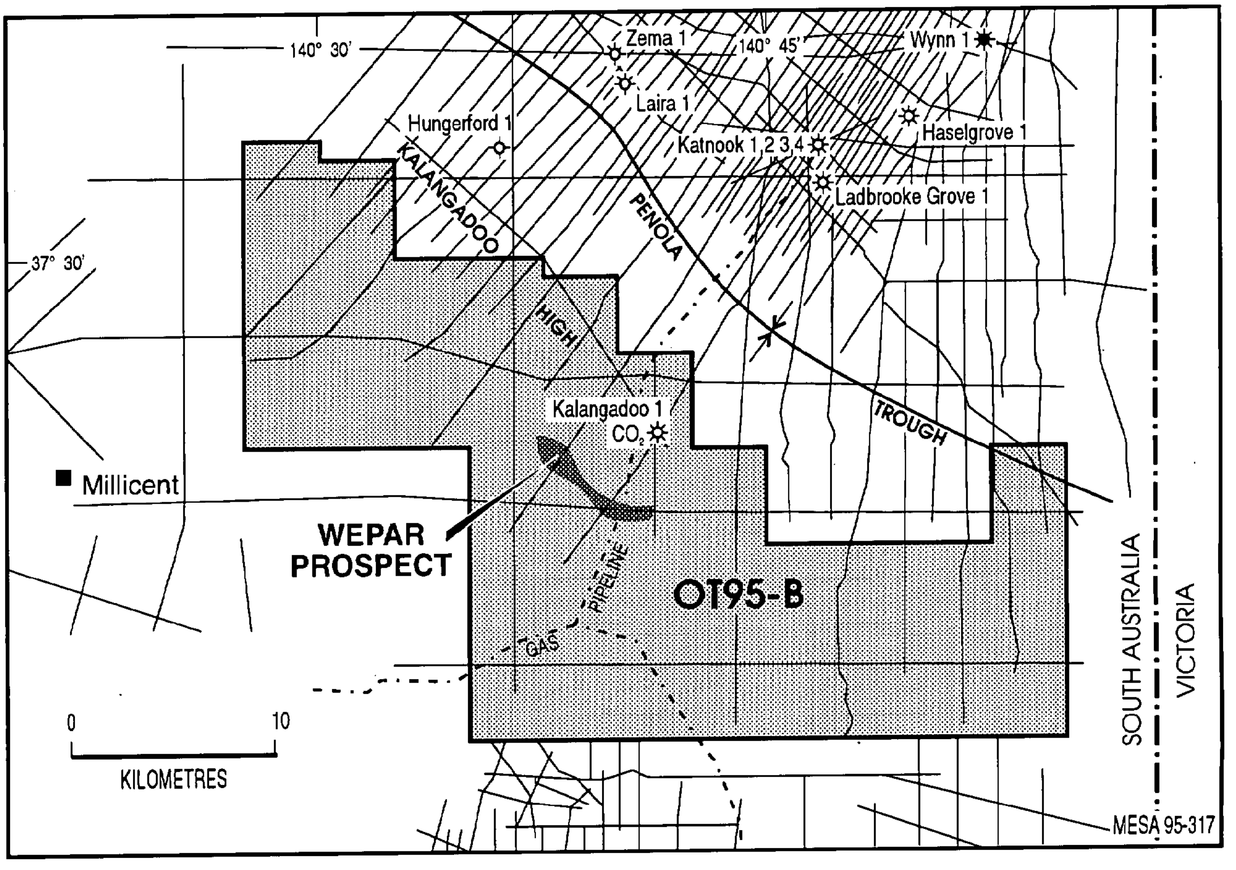
Plays in the Early Cretaceous Crayfish Group sediments are similar to the nearby discoveries in the Penola Trough at Katnook, Ladbroke Grove, and Haselgrove gas fields. However, the area is mainly over the untested Tantanoola Trough, separated from the Penola Trough by the Kalangadoo High. Traps are tilted fault blocks (the Wepar Prospect is a typical example) and faulted anticlines, but with potential for Pretty Hill pinchout plays on the flanks of the Kalangadoo High.

Reservoirs and seals

The primary reservoir target are the upper most sands of the Pretty Hill Formation. There is a risk that the Tantanoola Trough may have different facies to the Penola Trough. Windermere Sandstone Member is a secondary target. As porosity is mostly secondary in the Pretty Hill Formation, good quality reservoir may be encountered at considerable depths. Porosities of >20% (permeabilities > 500 md) are found down to at least 2880m, and extrapolation of trends would suggest good reservoir is possible down to 3600 m. This would make deep targets in the Tantanoola Trough still attractive. Net to gross ratios from the known fields in the Penola Trough indicate improvement towards the Kalangadoo bounding fault.

Source and migration

Within the area, the Laira and lower Eumeralla Formations are early to mid mature for oil and the main gas generation will be from the lower Pretty Hill Formation and Casterton Formation. Some of the deepest parts of the Tantanoola Trough (over 5200 m) may be over mature. Migration would be via sands of the Pretty Hill Formation. Faults may impede migration, or alternatively they may assist migration into shallower reservoirs, such as the Windermere Sandstone. CO_2 charge may be a risk in the area, as several volcanic centres are evident on aeromagnetic surveys and from outcrop mapping. It should be noted that the wellhead value of CO_2 is approximately that of sales gas. Kalangadoo 1 flowed nearly pure CO_2 from fractured basement. However, the discoveries at Ladbroke Grove and Katnook Fields have demonstrated that CO_2 charge is very unpredictable: Ladbroke Grove contained over 50% CO_2, while Katnook, only a kilometre to the north, had virtually none.



OT95-B Modern Seismic Coverage

WEPAR PROSPECT

POTENTIAL RESERVES
Oil: 6 MMSTB Recoverable oil.
Gas: 19 BCF Recoverable gas.

STRUCTURE: Fault bounded anticline.

RISK: Medium. Requires more seismic

SEAL: Laira-Eumeralla Formations.

RISK: Low to Medium. Fault may not seal.

RESERVOIR: Pretty Hill Formation.

RISK: Medium.

SOURCE: Laira-Intra Pretty Hill Shales and Casterton Formation.

RISK: Medium. Faults may impede lateral migration.

MAXIMUM AREA OF CLOSURE: 500 hectares (1 236 acres)

VERTICAL CLOSURE: 80 metres (262 feet)

DEPTH TO TARGET: 2660 metres (8 700 feet)

DEPTH TO BASEMENT: 2900 metres (9 500 feet)

POROSITY: 15%

H.C. SATURATION: 65%

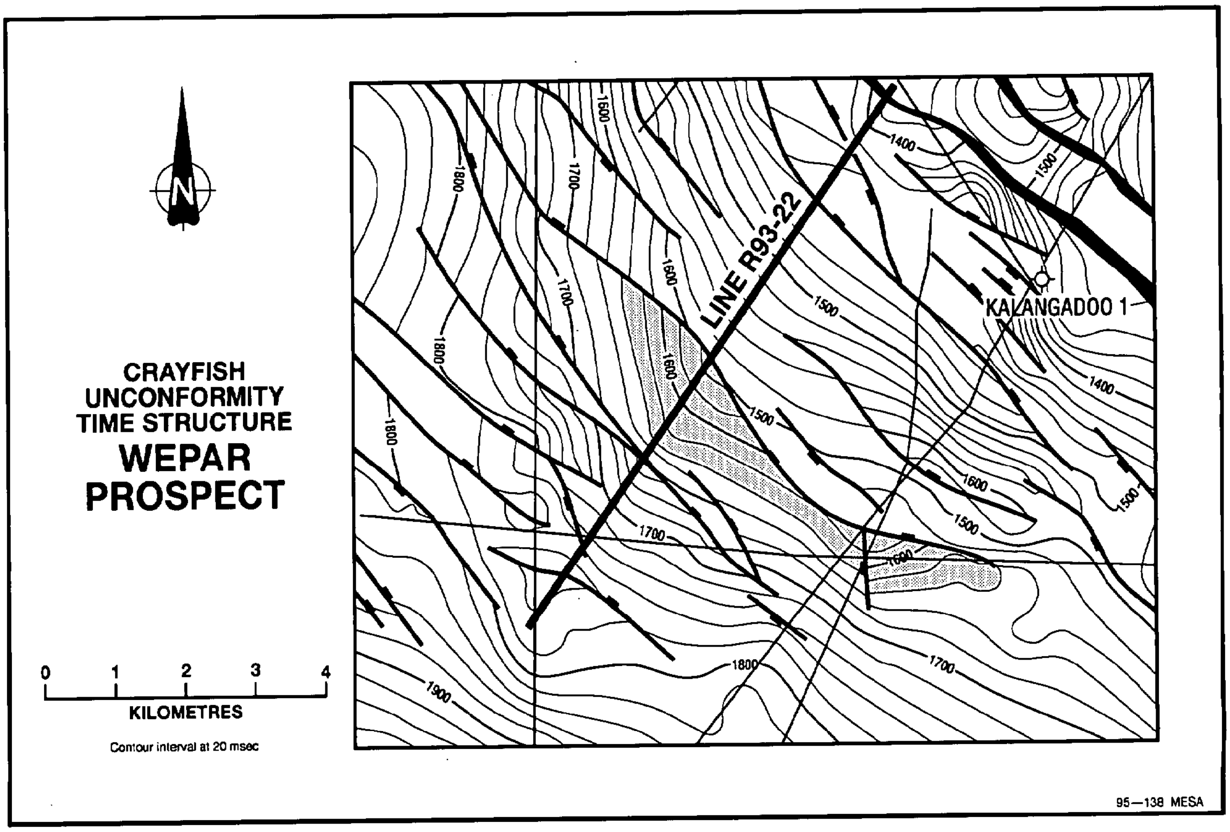
NET TO GROSS RATIO: 0.31

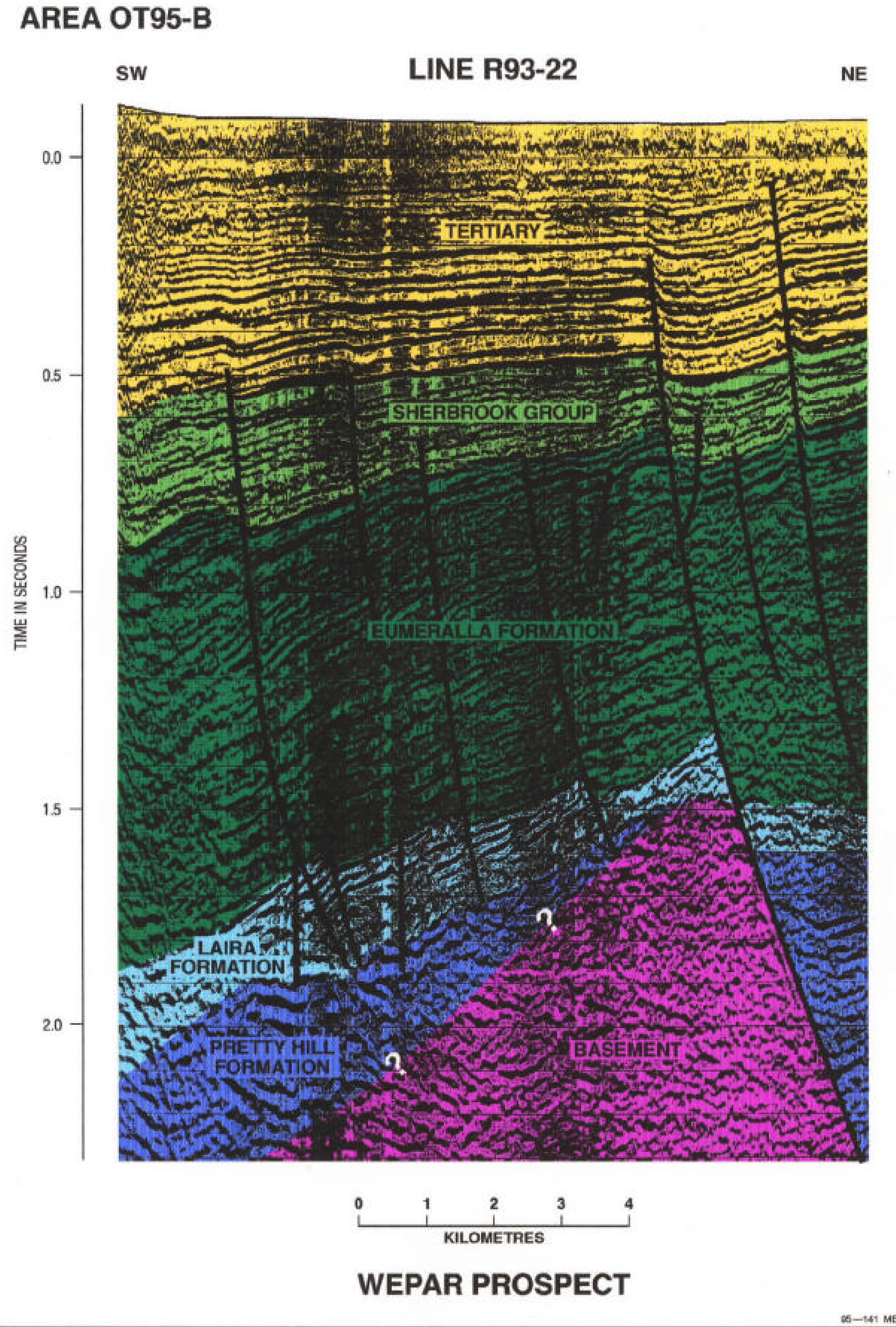
$^1/Bg = 190$

GAS RECOVERY FACTOR: 70%

$^1/Bo = 0.90$

OIL RECOVERY FACTOR: 25%





WEPAR PROSPECT

95—141 MESA

PROSPECTIVITY OF AREA OT95-C

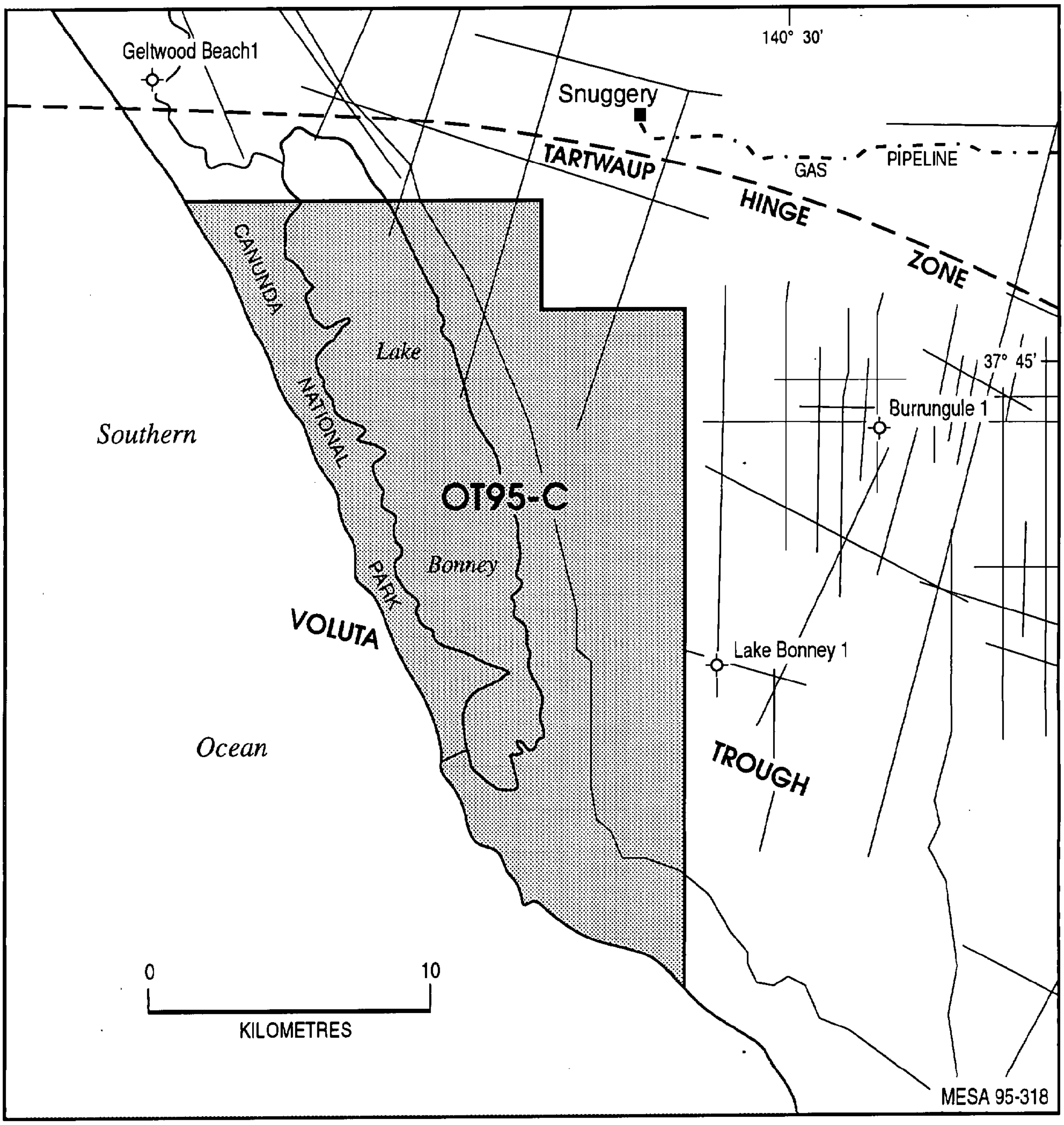
The OT95-C area comprises 335 km^2 of the northern Voluta Trough. Seismic coverage is very poor, with only 65 line km of seismic in total. The 39 km of recent vintage (post 1980), is mostly line ends of surveys in the adjacent PEL 40 to the north. Seismic quality is generally very poor, even for the recent vintage lines, due to the cavernous Gambier Limestone, which absorbs most of the seismic energy. Since the early 1990's, there have been significant advances in acquisition and reprocessing to improve resolution. No wells have been drilled in the area. Canunda National Park occupies the coastal strip of the area; no exploration access is permitted to this park.

Plays in the Early Cretaceous Crayfish Group are too deep to be economically drilled, but plays may exist in the lower Sherbrook Group (Shipwreck Subgroup) sediments.

<u>Reservoirs and seals</u>
Due to limited data in this area, and for this play generally in the South Australian portion of the basin, there is some risk associated with reservoir and seal distribution, and in reservoir quality. Potential reservoirs include the sands of the Copa Formation, Waarre Sandstone and Flaxman Formation. Seals are either intraformational or the Belfast Mudstone provides a regional seal in at least in the southern part of the area. To the north the Belfast Mudstone becomes thin or absent, and the Paaratte and Flaxman Formations may become difficult to distinguish (e.g. Burrungule 1); seals will be only intraformational in those cases. Alternatively, to the north the potential reservoirs of the Waarre Sandstone and sands of the Flaxman Formation may change facies to shale (e.g. Compton 1). Data on reservoir quality is limited, but data from the Caroline field indicate porosities of 10 to 20 %. Data from the Victorian portion of the Basin indicate very good reservoir quality may be found in the Waarre Sandstone.

Source and migration

The main source will be coals of the basal Eumeralla Formation, which maturity modelling has indicated is early mature for oil in the northern part of OT95-C, but where substantial thickness of Sherbrook Group sediments are present, (in the southern part of the area), the lower part of the Formation is in the peak oil generation zone. Migration would rely on fault pathways to charge Shipwreck Subgroup reservoirs. The ability for the Eumeralla to source oil is well documented; oil from Caroline 1 and Breaksea Reef 1 in South Australia, and from several wells in Victoria have been shown to originate from the Eumeralla. Gas in Troas 1 has also been sourced from the Eumeralla Formation. The Belfast Mudstone lacks sufficient maturity over most of the area to generate hydrocarbons.



OT95-C Modern Seismic Coverage

PROSPECTIVITY OF AREA OT95-D

The OT95-D area comprises 255 km^2 of the western St Clair Trough. Seismic coverage is fair in the eastern part of the area but is absent due in the west due to difficulties in acquisition in coastal lake areas. In all there are 218 km of seismic coverage, of which 164 km are of recent vintage. There is one well in the area, St Clair 1, which was dry.

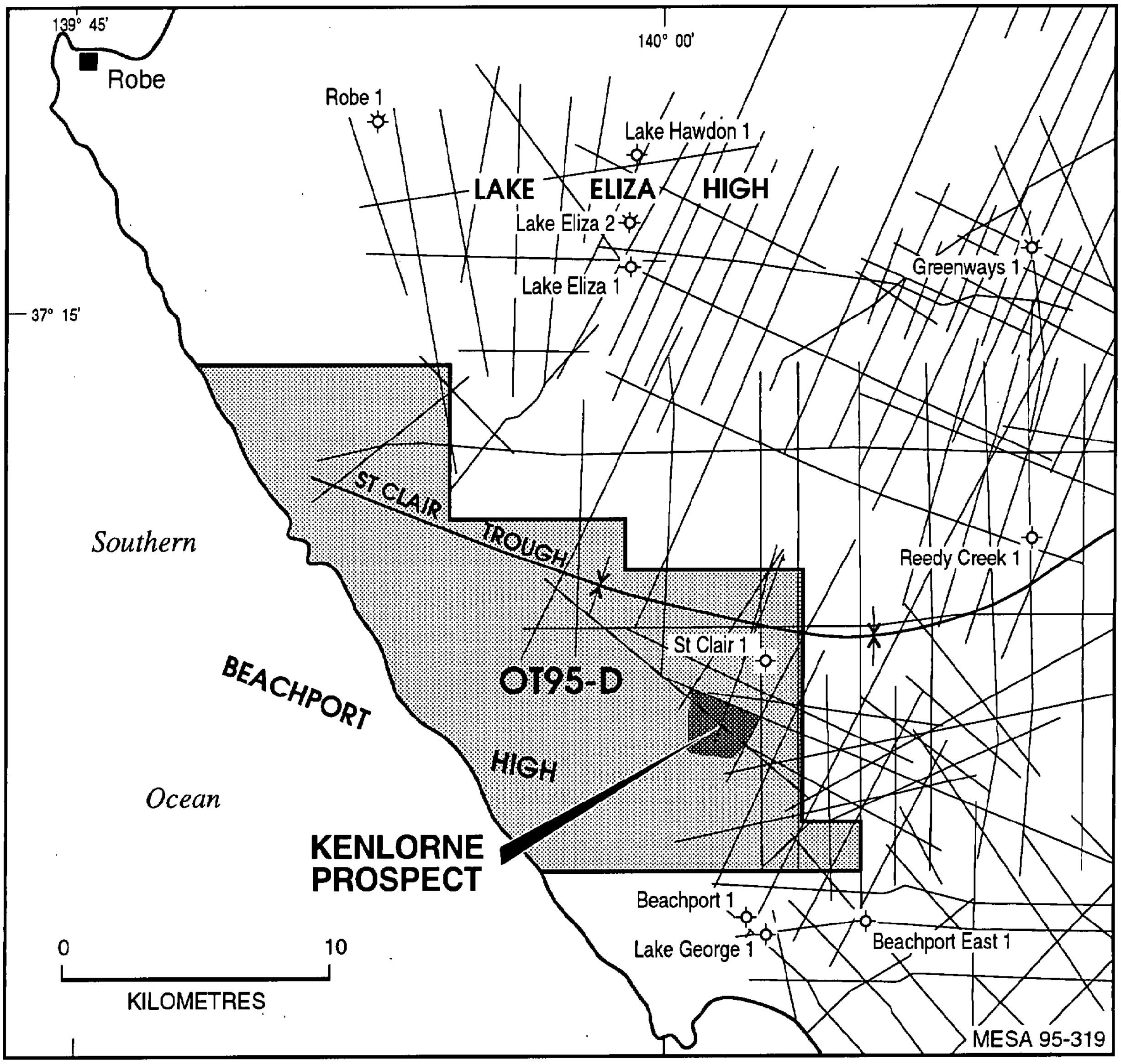
Plays exist mainly in the Crayfish Group sediments, in fault dependent anticlines. Pinchout plays may exist close to the Beachport High, in the southern part of the area.

Reservoir and seals

Reservoirs will be sands of the Crayfish Group and the Windermere Sandstone Member, with the Eumeralla and Laira Formations as seal, as were found in St Clair 1. There is some risk associated with the Laira Formation seal continuity, as the Laira Formation appears to change facies in the St Clair Trough to sand. Reservoir quality appears to be good to excellent in St Clair 1. As in the Otway basin generally, fault leakage may be a problem, but the Beachport High area has undergone recent strong compressional tectonics which may help seal faults in the area.

Source and migration

Source will be either local, from the underlying Pretty Hill and Casterton Formations, or lateral, from the Eumeralla Formation offshore to the west (believed to be the source for the offshore Troas gas discovery). The results of St Clair 1 indicate that the local source may be poor, due to a lack of source facies in the lower Pretty Hill Formation. Local sealing faults may impede migration to the north or south, but charge for prospects is possible parallel to the major fault trends from offshore mature Eumeralla Formation source to the west.



OT95-D Modern Seismic Coverage

KENLORNE PROSPECT

POTENTIAL RESERVES
Oil: 16 MMSTB Recoverable oil.
Gas: 50 BCF Recoverable gas.

STRUCTURE: Horst block.

RISK: Medium. Requires more seismic.

SEAL: Eumeralla Formation.

RISK: Low to Medium. Fault may not seal.

RESERVOIR: Crayfish Group sands.

RISK: Low.

SOURCE: Intra Pretty Hill Shales and Casterton Formation.

RISK: High. Fair-moderate source quality and potential

MAXIMUM AREA OF CLOSURE: 757 hectares (1 871 acres)

VERTICAL CLOSURE: 90 metres (295 feet)

DEPTH TO TARGET: 1 600 metres (5 250 feet)

DEPTH TO BASEMENT: 2 400metres (7 875 feet)

POROSITY: 15%

H.C. SATURATION: 65%

NET TO GROSS RATIO: 0.50

$^{1}/Bg = 180$

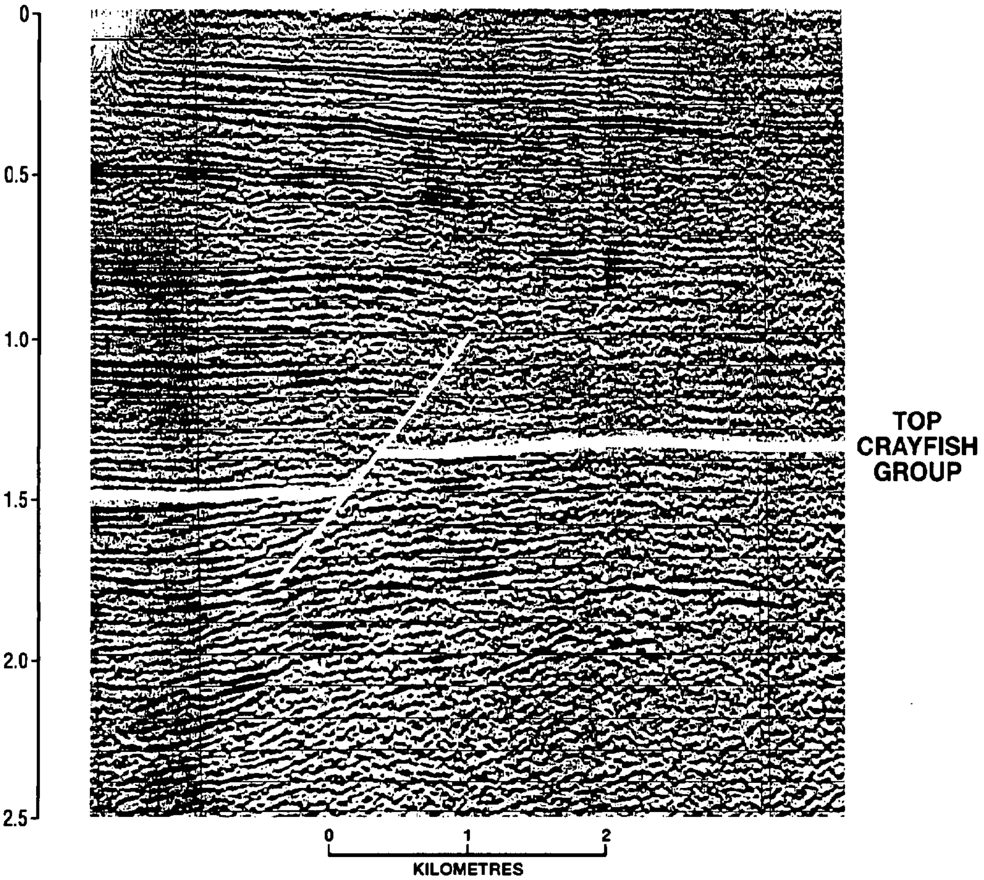
GAS RECOVERY FACTOR: 70%

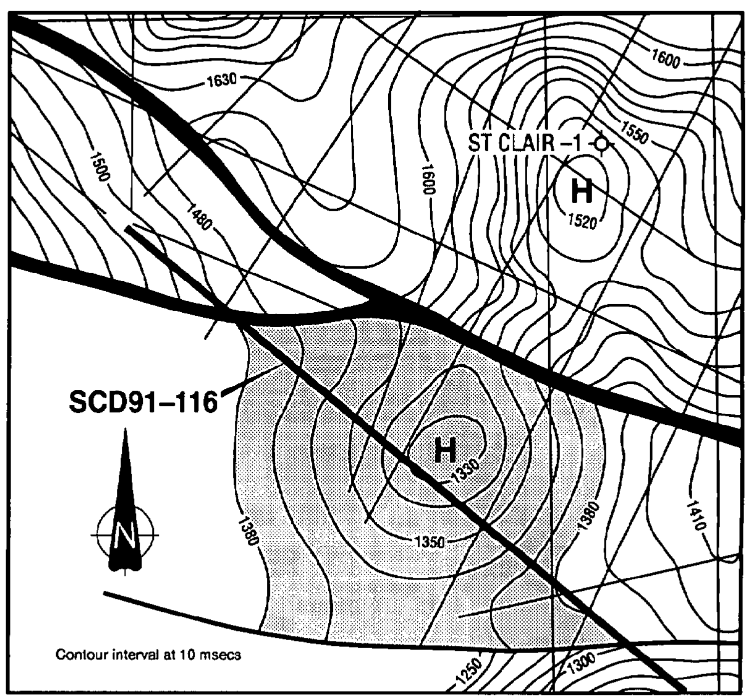
$^{1}/Bo = 0.90$

OIL RECOVERY FACTOR: 25%

AREA OT95–D

LINE SCD91–116





TOP CRAYFISH GROUP
TIME STRUCTURE

KENLORNE PROSPECT

0 1 2
KILOMETRES

DATA AVAILABLE FOR PURCHASE
OT95 A - D

For ordering or further information about data availability, please contact Alan Sansome, Petroleum Data Leader, phone (IAC) 61 8 274 7672 or fax 61 8 373 3269.

Costs listed are approximate and exclude, postage, packaging and handling. Costs will be confirmed on ordering.

1. Well Completion Reports.

	Year	TD(m)	DME Envelope	Cost Micro Fiche	Cost Paper
Bool Lagoon 1	1989	809	7227/6	15.00	131.00
Kalangadoo 1	1965	2755	543	10.00	82.00
Lucindale 1	1969	980	1024	12.50	58.00
St Clair 1	1993	3284	7448/6	35.00	300.00
			TOTAL	$72.50	$571.00

Alternatively the digital database PEPS-SA may be purchased for $2,000 (for Otway Basin data only, $4000 for the whole state); this includes 57 open file wells in the South Australian portion of the Otway Basin and includes more recent data not included in well completion reports.

2. Paper Prints of Logs. (Sepia and 1:600 scale copies also available for extra cost).

Bool Lagoon 1

	From (m)	To (m)	Scale (1 to)	Cost
Sonic-Gamma Ray	282	797	240	11.52
Density-neutron	282	797	240	14.88
Dual Laterolog	282	794	240	14.40
			TOTAL	$40.80

Kalangadoo 1

	From (m)	To (m)	Scale (1 to)	Cost
Electrical (sp)	216	1,026	240	12.00
Electrical (sp)	1,044	2,146	240	15.60
Electrical (sp)	2,116	2,758	240	18.30
Microlog-caliper	1,044	2,146	240	17.10
Microlog-caliper	1,813	1,844	240	1.80
Microlog-caliper	2,116	2,757	240	9.90
Microlog-caliper	216	1,025	240	12.90
Microlog-caliper	2,042	2,279	240	6.00
Sonic-caliper	2,042	2,148	240	9.90
Sonic-caliper	216	1,020	240	15.00
Sonic-gamma	1,044	2,143	240	16.80
Sonic-gamma	2,112	2,755	240	10.50
			TOTAL	$145.80

Lucindale 1

	From (m)	To (m)	Scale (1 to)	Cost
Sonic-Gamma Ray	16	976	240	18.70
Cali-Density-Gamma Ray	349	978	240	13.00
Induction Electric log	16	979	240	21.80
			TOTAL	$53.50

St Clair 1

	From (m)	To (m)	Scale (1 to)	Cost
Dual Laterolog-Sonic-Gamma Ray	50	1692	200	34.50
Dual Laterolog-Sonic-Gamma Ray	1702	3286	200	32.64
High Resolution Dip Meter	1702	3266	200	28.80
Density-neutron-Gamma Ray	1702	3286	200	34.56
			TOTAL	$130.50

Other wells outside the four areas are also available upon request.

3. Digital log data

Field tapes (LIS or LAS) are generally as received from companies. Verified data are available in either CWLS-LAS or LIS format, 9 track tape or floppy disk.
An order form is included at the rear of this brochure.

Bool Lagoon 1 - $358.85 (Verified- Field/Edit tape not available)

Log Type	Units	From	to (feet)
CALI	IN	640.00	2,687.50
CGR	GAPI	640.00	2,687.50
DRHO	G/C3	640.00	2,687.50
DT	US/F	640.00	2,687.50
GR	GAPI	-64.00	2,687.50
GRC	GAPI	640.00	2,687.50
LLD	OHMM	-64.00	2,687.50
LLS	OHMM	-64.00	2,687.50
NPHI		640.00	2,687.50
PEF		640.00	2,687.50
POTA		640.00	2,687.50
RHOB	G/C3	640.00	2,687.50
SGR	GAPI	640.00	2,687.50
SP	MV	-64.00	2,687.50
THOR	PPM	640.00	2,687.50
URAN	PPM	640.00	2,687.50

Kalangadoo 1 - $990.70 (Verified- Field/Edit tape not available)

AKHC*	MD	2,905.50	7,385.00
APHC*	FRAC	2,905.50	7,385.00
DT	U/FT	186.50	9,274.00
GR	GAPI	-5.50	9,274.00
188L	OHMM	698.50	9,274.00
SN	OHMM	698.50	9,274.00
SP	MV	698.50	9,274.00
LN	OHMM	667.00	9,050.50
CALI	IN	730.00	9,113.50
MNOR	OHMM	1114.50	9,050.00
MINV	OHMM	1114.50	9,050.00

Lucindale 1 - $280 (Verified)

Log Type	Units	From	to (feet)
AKHC	MD	2,383.50	3,215.00
APHC	FRAC	2,347.50	2,795.00
DT	U/FT	-55.50	3,400.00
GR	GAPI	-55.50	3,400.00
ILD	OHMM	-55.50	3,400.00
RHOB	G/CC	904.50	3,400.00
DRHO	G/CC	904.50	3,400.00
SN	OHMM	-55.50	3,400.00
SP	MV	-55.50	3,400.00

St Clair 1 - $270 (CWLS-LAS format) **or $1090** (Verified)

Log Type	Units	From	to (Metres)
CAL	IN	1,677.0	3,286.0
CALA	IN	39.0	3,286.0
DRHO	G/CC	1,677.6	3,286.0
DT	US/F	234.0	3,286.0
GR	API	39.0	3,286.0
LLD	OHMM	39.0	3,286.0
LLS	OHMM	39.0	3,286.0
NPHI	PU	1,677.6	3,286.0
PEF	BARN	1,677.6	3,286.0
RHOB	G/CC	1,677.6	3,286.0
SP	MV	39.0	3,286.0

* Core porosity and permeability.
Other wells outside the four areas are available upon request.

4. Paper prints of Seismic lines

Area OT95-A.
Note: Line length represents total length shot not length of line within OT95-A

Line Name	Line Length (km)		
61MU-1	8.5	OHK85-05	11.3
64OT1-11	4.0	OHK85-06	17.0
64OT1-13	3.9	OHK85-07	12.5
64OT1-16	7.8	OHK85-08	16.8
64OT1-18	1.7	OHK85-09	14.2
64OT1-19	8.4	OHK85-10	10.7
64OT1-9	1.2	OHK85-11	20.1
64OT1-CK	68.3	OHK85-12	20.3
64OT1-CL	12.4	OHK85-13	16.9
64OT1-RN	88.6	OHK85-14	18.8
64OT1-SB	86.8	OHL86-101	9.0
65OT2-A1	29.9	OHL86-102	9.0
65OT2-A2	8.4	OHL86-102A	9.0
65OT2-B	29.9	OHL86-103	5.5
65OT2-D	12.5	OHL86-103A	5.5
65OT2-E	10.0	OHL86-104	15.5
65OT2-G	6.0	OHL86-105	13.4
66OT1-6	17.9	OHL86-106	13.5
66OT1-7	10.0	OHL86-107	13.5
66OT1-8	13.5	OHL86-108	13.2
66OT1-9	1.1	OHL86-109	11.2
C90-40	13.3	OHL86-110	10.9
LSA81-01	39.9	OHL86-111	15.5
O69A-14	7.6	OHL86-112	10.0
O69A-16	12.1	OHL86-113	10.0
OHA88-303	8.0	OHL86-114	8.0
OHA88-306	8.0	OHL86-115	10.1
OHA88-308	12.0	OHL86-116	9.8
OHA88-309	18.0	OHL86-118	26.2
OHA88-310	7.0	OK90-401	12.1
OHA88-311	18.0	OK90-402	12.1
OHB88-217	21.1	OK90-403	9.3
OHB88-221	19.0	OK90-404	5.8
OHB88-222	13.1	OK90-405	6.4
OHB88-223	12.0	OK90-406	8.0
OHB88-224	11.0	OK90-407	6.3
OHB88-225	10.2	OK90-408	6.5
OHB88-226	9.6	OO91-03	12.7
OHB88-227	10.3	OO91-04	17.8
OHB88-228	14.2	OO91-07	14.1
OHB88-229	14.5	OTSA82-1	17.0
OHB88-230	14.4	TOTAL	1275.8km
OHK85-02	21.3	TOTAL (Post 1979)	825.0km
OHK85-03	24.9		

Total seismic recorded within Area OT95-A is **591 km. (435km post 1979)**

Area OT95-B.

Note: Line length represents total length shot not length of line within OT95-B

Line Name	Line Length (km)
61PEN-4	19.7
64OT1-LW	19.2
64OT1-MP	44.6
64OT1-PN	32.6
64OT2-A	33.8
64OT2-B	41.4
64OT3-GL3	3.3
64OT3-SD1	2.0
65OT3-GL3	3.3
74OT1-TA	36.7
74OT1-TB3	9.6
85-ULT04	33.6
85-ULT10	48.1
85-ULT18	52.0
85-ULT26	48.6
85-ULT31S	32.4
85-ULT37	8.6
85-ULT43	42.3
85-ULT49	38.1
87-171	29.1
87-193	17.0
AT-6 (1970 line)	21.4
BMR92OT4	87.1
BMR92OT6	34.9
BUD86-62	8.1
BUD86-64	5.6
BUD86-88	8.0
C90-12EXT	23.0
C90-14EXT	20.5
C90-24	35.6
C90-32	35.8
C90-34EXT	9.6
OR87-12	2.8
R93-10	17.0
R93-12	14.2
R93-14	12.8
R93-17	16.5
R93-21	12.6
R93-22	17.1
R93-23	11.0
R93-27	19.9
R93-29	32.3
R93-30	26.4
ULT86-156	11.0
ULT86-173	17.3
ULT86-185	18.5
TOTAL	1115.0km
TOTAL (Post 1979)	847.0km

Total seismic recorded within Area OT95-B is **425 km. (320km post 1979)**

Area OT95-C.
Note: Line length represents total length shot not length of line within OT95-C

Line Name	Line Length (km)
62MAY-D	10.2
62MAY-J	9.4
62MAY-K	3.8
62MAY-M	1.6
62MAY-N	1.0
62MAY-P	0.8
62MAY-X	6.6
63OT-1	19.8
AT-4 (1970 line)	8.9
AT-7 (1970 line)	6.4
BMR92OT7	82.2
ME93-07	19.6
ME93-08	17.6
TOTAL	187.9km
TOTAL (Post 1979)	119.4

Total seismic recorded within Area OT95-C is **65 km. (39km post 1979)**

Area OT95-D.
Note: Line length represents total length shot not length of line within OT95-D

Line Name	Line Length (km)
61BEACH-4A	5.7
61BEACH-4B	3.8
64OT1-C	40.5
64OT1-KN	36.1
90SC-02	35.5
90SC-04A	27.5
90SC-06	8.7
90SC-08	11.5
90SC-25	8.2
90SC-27	18.6
90SC-29	18.3
90SC-31	11.6
90SC-33	9.4
91MH-03	40.1
B92-250	18.9
B92-251	7.3
B92-252	12.0
B92-253	7.4
B92-254	15.0
B92-255	7.1
O69A-11	6.5
O69A-2A	14.4
O69A-3B	6.1
O69A-4A	3.8
O69A-4A	1.6
O69A-5A	1.8
O69A-5B	6.0
O69A-7A	4.3
O69A-7B	6.9
O71A-12	9.4
O71A-14	10.8
OHE86-120	10.0
OHE86-121	10.0
OHE86-137	8.0
OHH88-204	13.2
OHK85-04	43.8
OHK85-18S	18.4
SCD91-102	24.1
SCD91-116	12.3
SCD91-118	5.0
SCD91-119	14.9
SCD91-121	10.1
SCD91-123	7.1
SCD91-125	13.6
SCD91-129	7.3
SCD91-133	5.9
TOTAL	618.5km
TOTAL (Post 1979)	460.8

Total seismic recorded within Area OT95-D is **218km. (164km post 1979)**

PETROLEUM GEOLOGY OF SOUTH AUSTRALIA SERIES VOLUME 1: OTWAY BASIN

Edited by J.G.G. Morton and J.F. Drexel

This publication by Mines and Energy, South Australia is a comprehensive summary of the petroleum geology of the Otway Basin in South Australia, and will be of interest to both active explorers in the basin, and essential to those who have little previous experience with the complex geology of the region.

The publication has been dedicated to the late Reg Sprigg, and is due for release at the 1995 APEA conference in Adelaide, 2-5 April, 1995. It will contain approximately 280 pages of text and figures (many in colour), and includes several large scale plans.

Topics covered include structural and tectonic history, litho- and bio-stratigraphy, source rock distribution and maturity modelling, reservoirs and seals, trap development, review of previous discoveries (including reserve estimates), existing infrastructure, potential gas markets, and environmental issues.

The cost will be $175 per copy.

If you wish to order a copy of this publication, please fill out the details below and return to:

Petroleum Division,
Mines and Energy , South Australia,
P.O.Box 151,
Eastwood SA 5063,
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SOUTH AUSTRALIA

OTWAY BASIN SEISMIC MAPPING

PRODUCTS OFFERED BY MESA

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- Coloured contour maps of 5 horizons and 4 isopachs at 1:250 000 and 1:100 000 (north and south sheets) scales covering onshore and offshore SA. Includes time and depth datatypes.
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  Top Eumeralla Formation
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  Top Basement
  Isopachs: Cainozic
  Sherbrook Group
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  Crayfish Group
  Price: $700 per sheet set (of 9) per datatype or $100 per map sheet.

- Colour filled contour maps of 5 horizons and 4 isopachs (as above) at 1:250 000 scale. Includes time, depth and velocity datatypes.
  Price: $700 per sheet set (of 9) per datatype.

- Isometric displays of 5 horizons (depth only) at approximately 1:250 000.
  Price: $500 per set or $100 per plan.

- Image displays of 5 horizons and 4 isopachs (depth only) at 1:250 000; coloured and greyscaled versons.
  Price: $1,000 per set or $150 per image.

- Interpreted coloured seismic sections over 47 wells (onshore and offshore) (drafted at A3 size).
  Price $500 per set or $20 per well section.

- Customised coloured contour maps, isometric displays and images of above datasets. Price: POA.

Digital:

- Digitized seismic section interpretation (500 lines).
  Price: $4 850 for all lines or $15 per line.

- Grid files of time, depth and velocity datasets of 5 horizons and 4 isopachs (Petroseis grid files (including fault files) or ER Mapper gridfiles).
  Price: $5 000 per dataset (includes 5 horizons and 4 isopachs) or $1 000 per grid file.

Contact:

Dave Cockshell
MESA
PO Box 151, EASTWOOD 5063
Ph: (08) 274 7671
Fax: (08) 373 3269.

Date: MARCH 1995

SA DEPARTMENT OF MINES AND ENERGY

DIGITAL PETROLEUM WELL LOG DATA ORDER FORM

For further information please contact:

Mr Alan Sansome
Petroleum Data Leader
Petroleum Geology
Department of Mines and Energy
191 Greenhill Road
PO Box 151
EASTWOOD SA 5063

Telephone:(08) 274 7672 within Australia
(IAC)* 61 8 274 7672 overseas
Facsimile:(08) 373 3269 with Australia
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* *Dial the appropriate International Access Code*

COST *(June 1994, includes postage and packaging)*

BASIC
Basic validated data, as originally supplied in digital format, EDIT or FIELD processing:
$30 per order and $100 per megabyte of data
(A typical well would cost $170.00)

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Fully verified and merged digital data, or data digitzed from analogue source:
$0.04 per recorded log metre, per log type.
(A typical well would cost $480.00)

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2. All verified data must be kept exclusively for the use of the purchaser/ purchasing company and must not be transmitted, traded or sold to anythird-party without the permission in writing of the Director-GeneralDepartment of Mines and Energy, South Australia.
3. All efforts are made to record best possible data and to correct errors or omissions made known to DME-SA. However, DME-SA take no responsibility for the consequence of errors or omissions in these data .

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☐ CWLS-LAS (ASCII)
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WELLFORM.WP

APPENDIX 1
ADMINISTRATIVE GUIDELINES FOR PETROLEUM EXPLORATION AND PRODUCTION TENEMENTS

ONSHORE EXPLORATION GUIDELINES

Petroleum Act, 1940

The area to which this Act applies covers all of onshore SA exclusive of Commonwealth Lands; it extends south to the State Territorial Sea Baseline and includes the waters of Spencer and St Vincent Gulfs.

	ONSHORE PETROLEUM EXPLORATION	Petroleum Act Reference
Title of Tenement	Petroleum Exploration Licence (PEL)	
Who Can Apply	An individual, a body corporate (ie. a company) or an unincorporated association of persons and bodies corporate (ie. a joint venture involving several persons and/or companies). A foreign corporation applicant must be registered under the provisions of the Corporations Law.	6(1)
	Where application is made on behalf of a company, the application must be made under the company seal.	41(b)&(c)
When Application Can be Made	Initial licence - at any time over any area not already under licence.	6(1a)
	Renewal of licence - not less than 3 months before existing licence is due to expire.	18(5b)
Maximum Area	26 000 km^2	15(1)
Application Fee	For initial application - $2 000	7(2)
	For each renewal - $1 000	7(2)
Bond (to ensure compliance with licence conditions)	$15 000 minimum. Amount required is specified in letter of offer. Bond may be in the form of cash, cheque or bank guarantee.	13(1)
Term of Licence	Initial term - 5 years	15(2)
	Each renewal (to a maximum of 3) - 5 years	15(2)
Annual Rental Payable	Initial 5 year licence term - 24 c/km^2	18c(a)
	First renewal (2nd 5 year licence term) - 36 c/km^2	18c(b)
	Second renewal (3rd 5 year licence term) - 48 c/km^2	18c(c)
	Third & final renewal (4th 5 year licence term) - 60 c/km^2	18c(d)

Minimum Work Commitments	As negotiated with applicant after application (which must contain a proposed 5 year work program) has been received.	
Minimum Expenditure Commitments	Initial 5 year licence term - first two years - \$16 per sq. km per year - last three years - \$24 per sq. km per year.	 17(1)(a) 17(1)(b)
	First renewal (2nd 5 year licence term) - \$100 per sq. km per year.	18a(1)(a)
	Second renewal (3rd 5 year licence term) - \$125 per sq. km per year.	18a(1)(b)
	Third & final renewal (4th 5 year licence term) - \$150 per sq. km per year.	18a(1)(c)
Area to be Relinquished on each Renewal	25% of original licence area. This is in addition to any areas voluntarily surrendered during each 5 year licence term.	18(2)
Fee for Minister's Consent to Dealings in Licence	\$1 000 per transaction (document).	42(3)
Fee for Inspection of Register	\$100	Reg.13(2)
Fee for Copy or Extract from Register	\$1 per page	Reg.13(4)
Method of Application	Letter of application addressed to the Director-General, SADME (there is no prescribed form).	7(1)
	Attached to the application should be:	
	(1) full names and addresses of the party/ parties making the application, including (where applicable) the percentage interests of the various parties.	
	(2) two copies of a map and description of the area being applied for.	7(3)
	(3) a table showing the work intended to be carried out, and the estimated cost of that work, during each year of the five year licence term. (Expenditure estimates should satisfy the minimum expenditure commitments set out in Sections 17 and 18.)	7(3a)
	(4) particulars of the technical qualifications and expertise available to the applicant party/parties (e.g. qualifications and experience of employees, consultants retained etc.).	7(4)
	(5) particulars of the financial resources available to the applicant party/parties to carry out the proposed terms and conditions of the licence. (In the case of a company application, this is generally supplied in the form of a copy of the company's most recent Annual Report.)	7(4)
	(6) the \$2 000 application fee. Where the application is made on behalf of a company, the application must be made under the company seal.	7(2) 41(b)&(c)

Penalty for Non-Payment of Annual Rental Fees	All fees are payable in advance. If fees are not paid by the due date, a fine of 10% is imposed and in addition, interest accrues at the rate of 6% per annum. If any fee is in arrears for 3 months or more, the licence may be cancelled.	83(1)&(2)
Licence Variations	Only on application by the licensee, the Minister may at any time during the term of the licence, vary or revoke a condition of the licence or attach new conditions to the licence.	17(3)
Environmental Conditions	As set out in the Regulations. Any special conditions will be outlined in the letter of offer attached to the licence.	
Surrenders (Partial or Whole of Licence)	The Act requires the licensee to:	
	(1) apply to the Minister for permission to surrender	38(1)
	(2) give 3 months notice in writing	38(1)(a)
	(3) pay all outstanding fees	38(1)(b)
	(4) pay all outstanding monies and wages to workmen and employees.	38(1)(c)
	Surrenders are only permitted if the licensee has fulfilled all the terms and conditions of the licence up to and including the year in which the application to surrender is lodged.	38(2a)
	Licensees are required to lodge all outstanding data on their licences and carry out the cleanup and rehabilitation of their licence areas (where necessary) as a condition of surrender.	
	Surrenders are effective from the end of the appropriate year of the term of the licence (unless specified otherwise).	38(2b)
Required Notice for Approval to Undertake Work in Licence Area	Three months notice is required to arrange necessary clearances with other Government Agencies. This is carried out by SADME on the licensee's behalf.	
Required Notice of Entry to Landholders	No risk of damage to land or improvements thereon - 14 days.	51(1)
	Risk of damage to land or improvements thereon - 28 days.	51(1)
Gazettals	Gazettals occur on:	
	(1) grant of licence	6(2)
	(2) surrender of licence	
	(3) cancellation of licence.	71(1)
Suspension and Cancellation	The Act provides for suspension and/or cancellation for failure to comply with licence conditions.	87a(1)

All monetary amounts are subject to review. Current 1 March 1993.

NATIVE TITLE

Any land which potentially may have common law native title rights associated with it will be excluded from the licence to the effect that the land comprised in such licence will only be:

'(a) *land that now is or was formerly the subject of a grant of a freehold estate or of a perpetual Crown lease where such an estate or lease was first granted before 31 October 1975,*

(b) *land which is or was formerly subject to a lease under the* Pastoral Land Management and Conservation Act 1989 *(or any preceding legislation in relation to leases for pastoral purposes) except that this licence does not authorise the undertaking of any act or activity on such land that would be inconsistent with the rights of Aborigines preserved or conferred by section 47 of that Act.'*

or

(c) *land (other than any reserve under the* National Parks and Wildlife Act 1972). *which has been, before 31 October 1975, reserved or dedicated for a public purpose and used before that date for that purpose in a manner wholly inconsistent with the continuing existence of common law native title rights.*

The land within the application area which may be subject to claim under common law native title rights will continue to be subject to the successful application. Once common law native title issues have been resolved in respect of any of these areas, the application in respect of such areas will be considered at that time.