Acreage release

OTWAY BASIN
SOUTH AUSTRALIA

Petroleum Exploration Data Package 10

EXPLORATION OPPORTUNITIES
BLOCKS OT2001-A and B
January 2001

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

Government of South Australia

PRIMARY INDUSTRIES AND RESOURCES SA

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Northern Otway Basin exploration opportunities — Blocks OT2001-A and B

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Petroleum Group

January 2001

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Cover photos from left to right:
Vibroseis geophysical survey in pine forest, Otway Basin. (Courtesy of Origin Energy; photo 47562)
View of Katnook Plant, Otway Basin. (Courtesy of Boral Energy; photo 43599)
Otway Basin production testing. (Courtesy of Sagasco Resources; photo 44357)

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Northern Otway Basin exploration opportunities — Blocks OT2001-A and B

EXECUTIVE SUMMARY

Two onshore blocks in the northern Otway Basin of South Australia are offered for petroleum exploration licences ((P)ELs) on the basis of competitive work program bidding (Table 1). Blocks OT2001-A and B contain mostly Early Cretaceous Crayfish Group targets. Bidding closes at 4.00 p.m. on Thursday 26 July 2001 and the winning bids will be announced in August 2001. These areas are being made available at an exciting time in exploration of the onshore part of the basin — oil was discovered in 1999 by Origin Energy in Jacaranda Ridge 1, less than a year after OCA's non-commercial oil discovery at Killanoola 1 (Fig. 1). Jacaranda Ridge 1 was the first well in the Otway Basin to flow oil to the surface, flowing at a rate of 408 bopd.

The market for even small gas discoveries is positive, with Origin Energy recently investing $65 million to develop an 80 megawatt (MW) gas turbine power station adjacent to Ladbroke Grove gas field to exploit the peak electricity markets in Victoria and South Australia. Such gas discoveries in the South Australian portion of the basin (including low-quality gas in Ladbroke Grove) are ideally located to exploit the southeastern Australian energy markets. In addition, construction of a pipeline from Victoria to Adelaide has been recently proposed (Fig. 1).

Table 1. *Summary of areas on offer in January 2001 for the Otway Basin, SA*

Block	Area (km²)	Petroleum wells	Seismic (km)
OT2001-A	1418	10	1804
OT2001-B	3371	4	1434

OT2001-A comprises most of the St Clair and Robe Troughs, with primary targets being sandstone reservoirs in the Crayfish Group. Two wells in the area (Lake Eliza 1, Robe 1) have had gas shows and another (Nunga Mia 1) had oil shows.

OT2000-B is on trend with recent oil discoveries in the Crayfish Group at Killanoola 1 and Jacaranda Ridge 1, and at least one well in the area offered contains oil shows (Camelback 1). A number of deep coal exploration holes in the area provide additional stratigraphic control.

Applications may be made for either or both of the two areas, OT2001-A and B. Licences are offered on the basis of the most competitive work program. In the event that more than one area is offered to an applicant for licence, there is no obligation for the applicant to accept any or all of the offers. It should be noted that there are no criteria limiting the number of exploration licences which may be offered to one applicant. Comments, inquiries and applications for exploration licences may be addressed to:

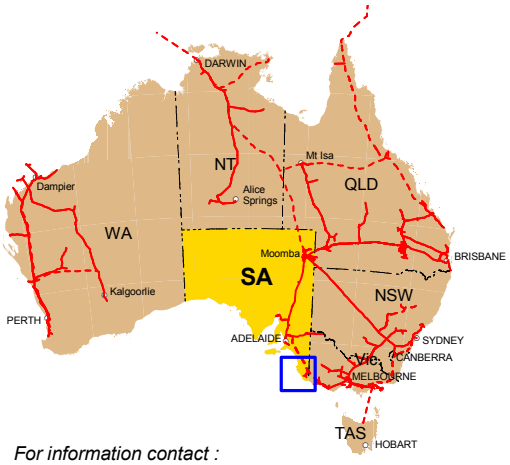
Director, Petroleum Group	Phone	National	(08) 8463 3204
Office of Minerals and Energy Resources		International	+61 8 8463 3204
Primary Industries and Resources South Australia	Fax	National	(08) 8463 3229
Level 7, 101 Grenfell Street		International	+61 8 8463 3229
Adelaide SA 5000	Web site	www.petroleum.pir.sa.gov.au	
AUSTRALIA	Email	pirsa.petroleum@saugov.sa.gov.au	

The envelope containing your application(s) must be marked 'CONFIDENTIAL — (P)EL APPLICATION'. Successful bids will be announced in August 2001.

The closing date for OT2001-A and B applications is 4.00 p.m. on Thursday 26 July 2001

PRIMARY INDUSTRIES AND RESOURCES SA

Otway Basin - South Australia
PETROLEUM TENEMENTS



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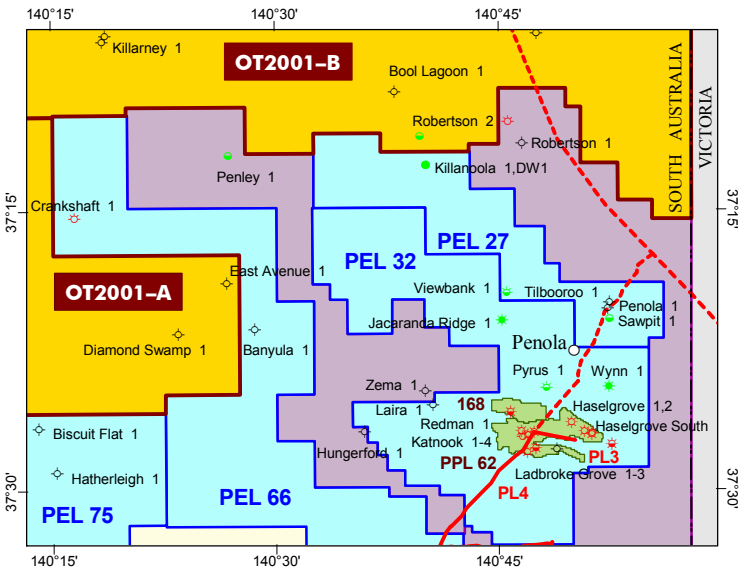
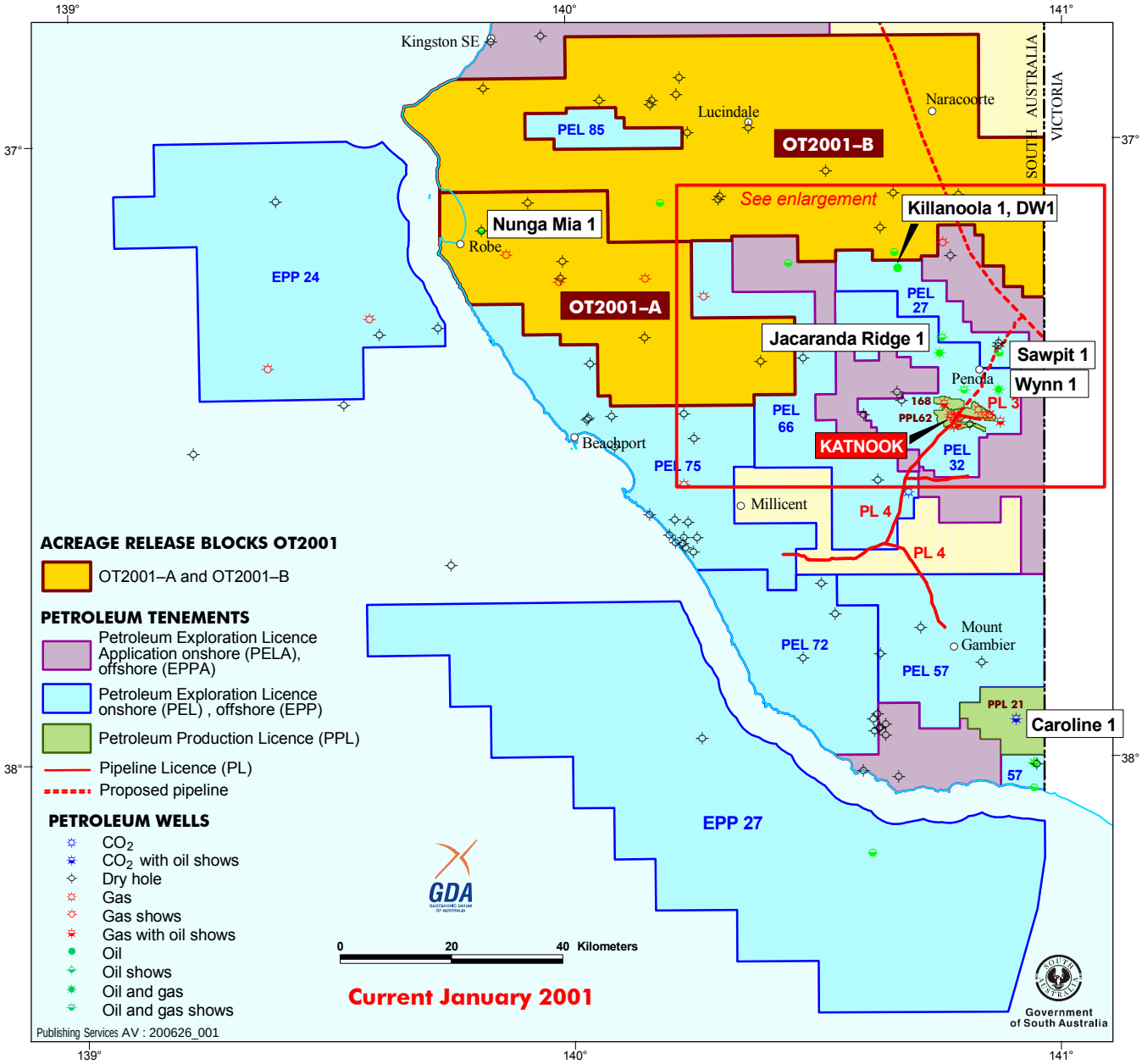
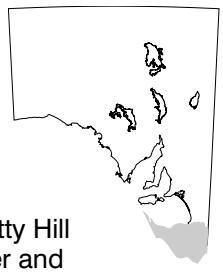
KATNOOK ENLARGEMENT





OTWAY BASIN SUMMARY



Age	?Jurassic – Late Cretaceous
Area in South Australia	25 000 km² (9650 sq. miles)
Depth to target zones	1000–4000+ m (3300 – 13 000+ ft)
Thickness	up to 8 km (5 miles)
Hydrocarbon shows	commercial gas from the Early Cretaceous Pretty Hill Formation and Windermere Sandstone Member and from Late Cretaceous Waarre Sandstone in Victoria; oil shows in Pretty Hill Formation and Early Palaeozoic basement
First commercial discovery in SA	1987 gas (Katnook 1)
Basin type	rift
Depositional setting	fluvial–lacustrine–deltaic
Reservoirs	braided and meandering fluvial and deltaic sandstones
Regional structure	early half grabens, late growth faulting
Seals	Laira and Eumeralla Formations or Belfast Mudstone
Source rocks	Laira or ?Casterton Formations
Depth to oil/gas window	oil 2800–4000+ m (9200 – 13 100+ ft); gas 2600–4000+ m (8500 – 13 100+ ft)
Number of wells	76 exploration, 7 development/appraisal
Seismic line km	35 600 (includes several 3D surveys)

PETROLEUM GEOLOGY

Introduction

The Otway Basin is one of the best known and most actively explored of the series of Mesozoic rift basins that span the southern coastline of Australia, and which were formed as a result of the separation of Australia and Antarctica (Figs 2, 3). 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 80 km inland while the southern margin is poorly defined and lies in the region of the continental slope some 160 km offshore. Approximately 70% of the basin is offshore. The basin straddles the South Australian – Victorian State border.

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.

A recent Primary Industries and Resources South Australia (PIRSA) survey of Australian explorers indicated the Australian petroleum industry regarded the onshore Otway Basin as the second most prospective basin in South Australia after the Cooper Basin. The main risk factors indicated by those surveyed were seal–structural integrity and small targets. Sophisticated fault leakage analysis of prospects is now being conducted by some operators prior to drilling and regional three-dimensional (3D) seismic surveys are now addressing the first risk factor. The economics of small discoveries have been improved by the proximity to markets for gas discoveries and the potential use of small gas discoveries for peak electricity generation opportunities in the national electricity market (as demonstrated by the 80 MW Ladbroke Grove Power Station). The proposal to construct a pipeline from Victoria–Adelaide through the region would also favourably improve the economics of small gas discoveries in the Otway Basin.

Source rock distribution and maturity modelling

There are numerous source rocks throughout the Late Jurassic to Tertiary section of the western Otway Basin (Fig. 2). Current knowledge of the source potential of the Crayfish Group sediments is

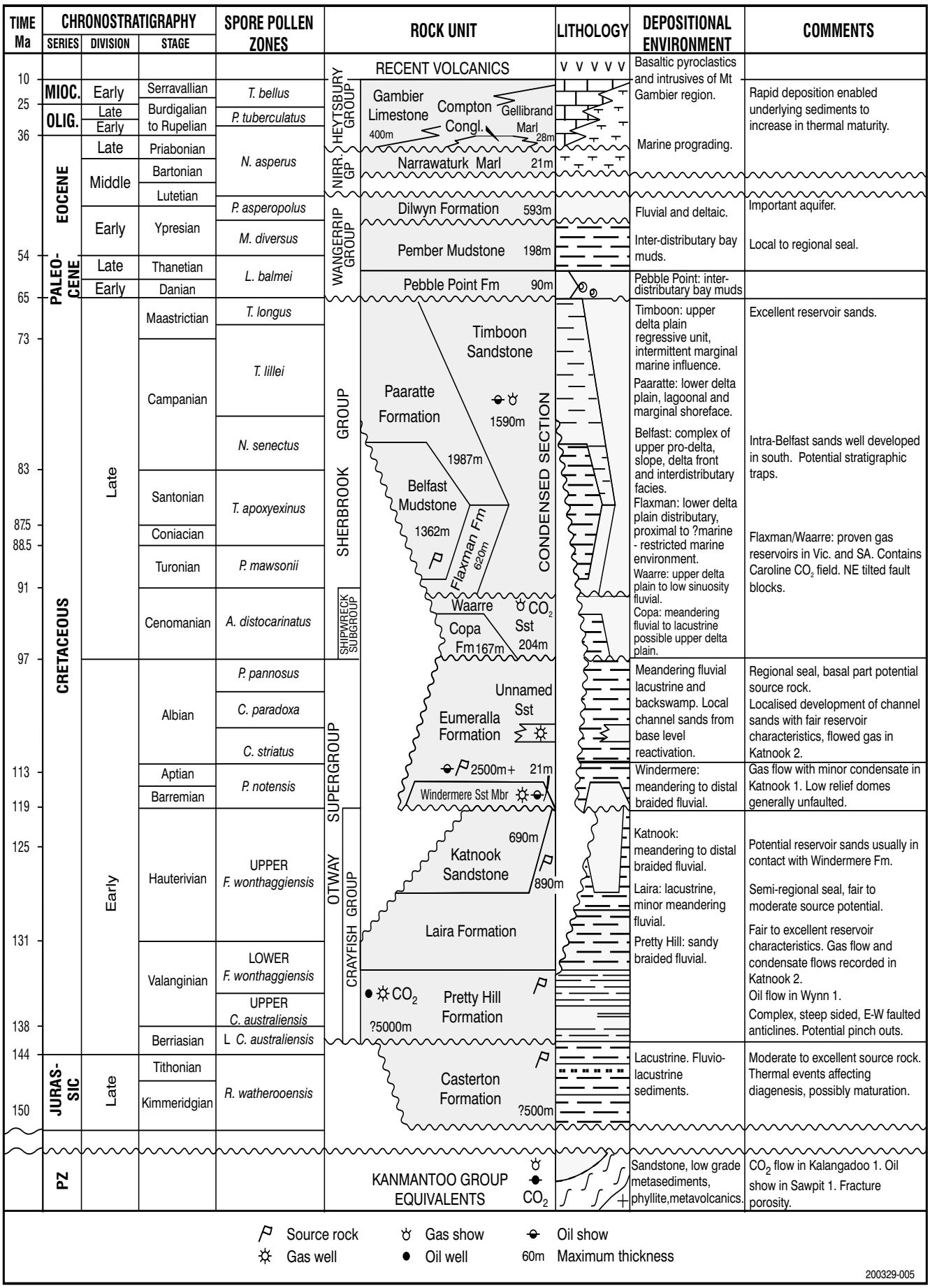


Fig. 2 *Geological summary, Otway Basin, SA.*

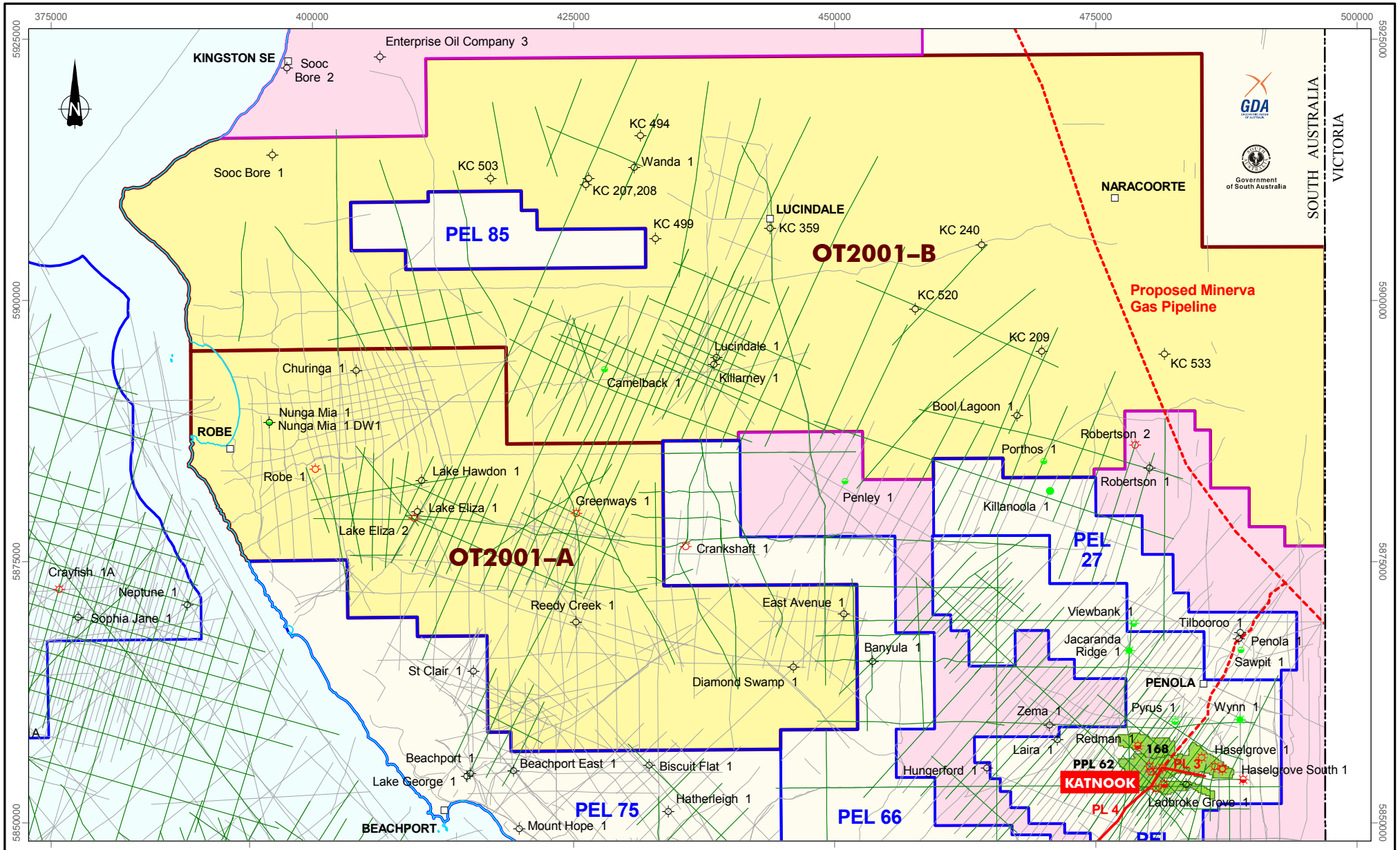


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Figure 3

restricted to the area north of the Tartwaup Hingeline. These source rocks are non-marine, Type III to IV kerogen type derived from land plants with some non-marine Type II algal rich shales occurring, especially in the early rift succession. Sediments of the Crayfish Group tend to be over mature for oil generation in the deeper portions of half grabens and mature for gas. On the flanks of these troughs they tend to be early mature to mature for oil whilst on basement highs they are immature to marginally mature for oil generation (Figs 4, 5).

Basal coals of the Eumeralla Formation are the most prospective rocks of the Otway Supergroup but are mostly immature in the area north of the Tartwaup Hingeline. By comparison, the source potential of the Late Cretaceous section is generally low and is restricted to the area south of the Tartwaup Hingeline.

Maturation profiles are strongly influenced by the thickness of Tertiary carbonates of the Heytesbury Group. In addition, each discrete half graben or structural province appears to have its own intrinsic sedimentological and thermal history. Accordingly, source rock distribution, richness, kerogen type and quality can be highly variable as a consequence of the basin architecture.

Reservoirs and seals

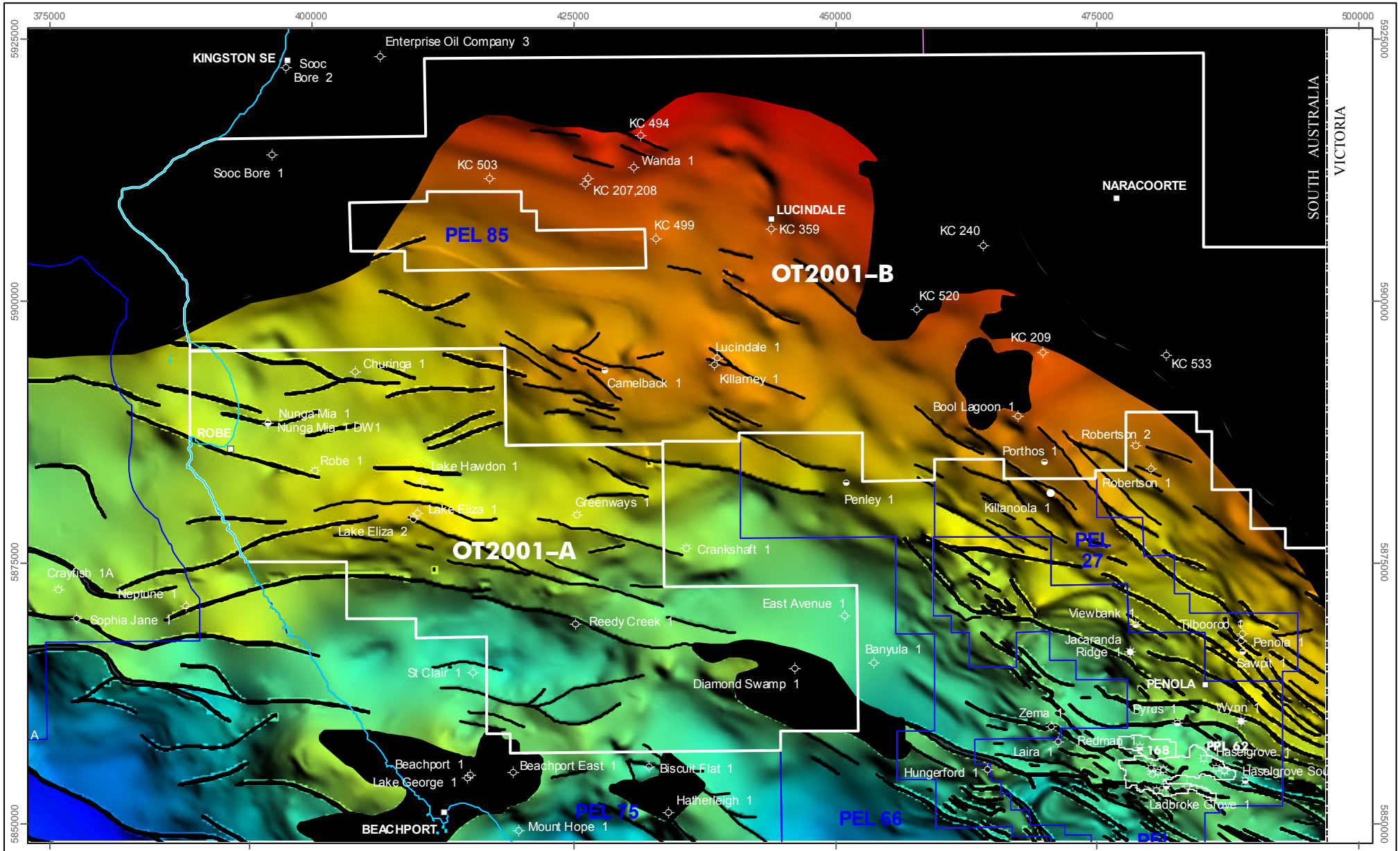
The basin contains a range of reservoirs that generally exhibit good porosity and permeability, and are almost exclusively in non-marine fluvial sandstones. Exploration risk associated with reservoir quality, distribution and seal is generally low. Almost all formations from Palaeozoic basement to Early Tertiary sands contain potential reservoirs. The most important reservoir in South Australia is the Early Cretaceous Pretty Hill Formation, which hosts the commercial Katnook, Ladbroke Grove, Haselgrove and Redman gas fields, and recently flowed significant amounts of oil and gas in the Wynn 1, Killanoola 1 and Jacaranda Ridge 1 wells. The Windermere Sandstone Member has had commercial gas production from the Katnook 1 well, although the thin hydrocarbon column has resulted in water production problems. The Late Cretaceous Waarre Sandstone is host to the Caroline carbon dioxide (CO_2) field in South Australia and hosts a number of commercial gas fields in the Victorian portion of the basin.

Petroleum entrapment

The risks associated with traps in the Otway Basin have been identified as fault leakage and CO_2 charge. The intensity of faulting in the Otway Basin provides a risk to trap integrity, as most traps rely on fault closure. Extensional east–west Cretaceous faults are more likely to leak, and prediction of fault leakage risk is complicated by east–west compression in the Cainozoic which may have reactivated some faults, depending on the orientation. The degree of fault leakage risk is also associated with the nature and thickness of each seal. For the Pretty Hill Formation reservoirs, the Laira Formation seal is a regionally thick shale unit (up to 900 m) with few interbedded sands. Any leakage along such faults would therefore require failure of the clay gouge and passage through a large vertical thickness of shale abutting shale. However, several examples are known of such leakage occurring (palaeo-hydrocarbon columns in Laira, Zema and Pyrus). An additional risk factor may be that if the hydrocarbon column in the reservoir reaches a sufficient height, the pressure in the reservoir may be sufficient to dilate the fault seal and allow the trap to be breached.

Undiscovered resources

The Otway Basin in South Australia is an immature exploration province, with high potential for further discoveries. Although gas discoveries to date are relatively modest in size (average recoverable reserves per field is approximately 20 bcf), some discoveries in the Victorian portion of the basin are an order of magnitude larger (up to approximately 350 bcf in the Minerva Field). Oil discoveries have only recently been made, and there is considerable potential for significant oil discoveries in the future. Table 2 summarises the undiscovered potential for gas in the key plays of the onshore South Australian portion of the basin only.



PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS and ENERGY RESOURCES

Petroleum Exploration Licence (PPL)
Petroleum Exploration Licence Application (PPLA)
Crayfish Group faults

GDA

0 5 10 15 20 Kilometers

Otway Basin - South Australia

RELEASE BLOCKS OT2001-A and OT2001-B
TOP CRAYFISH GROUP MATURITY PLAN

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Figure 4

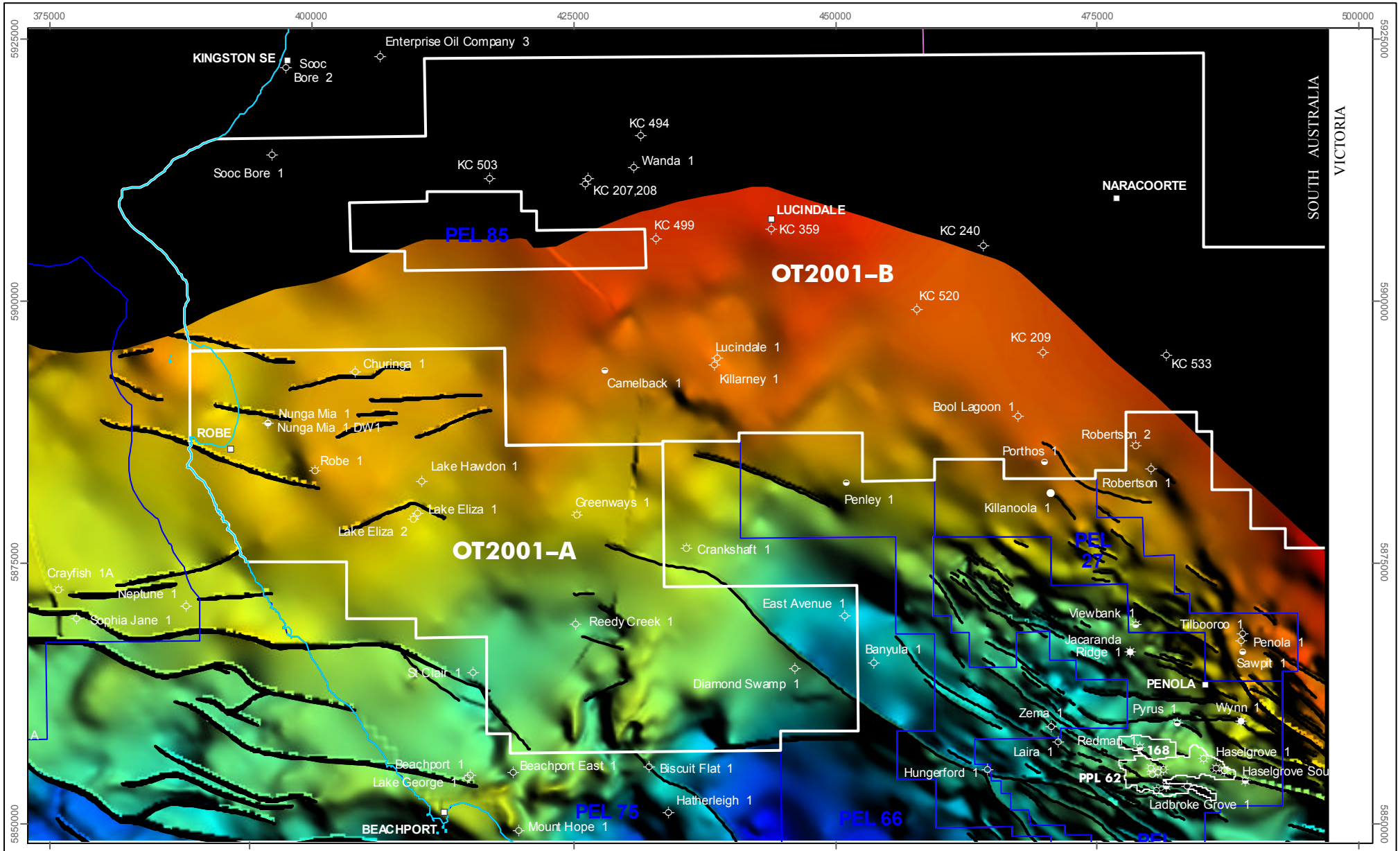

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Figure 5

Table 2. *Undiscovered potential of key plays, onshore Otway Basin, SA.*

Play	Undiscovered potential (bcf)		
	Probability that the ultimate potential will exceed the stated value:		
	90%	50%	10%
Waarre–Flaxman	30	150	560
Crayfish	120	680	2330
Total	**180**	**900**	**2760**

INFRASTRUCTURE AND MARKETS

Five gas fields have been discovered in the Otway Basin in South Australia and total resources are estimated at 100 bcf. Three pipelines were constructed in 1990. Epic Energy owns and operates a 46 km long pipeline, 150 mm diameter, from the Katnook gas processing plant to the Apcel paper mill at Snuggery, 7 km southeast of Millicent (Fig. 1). A second line, also 150 mm diameter and 19 km long, runs from this line to Mount Gambier. A third line, 50 mm diameter, runs from Katnook due east for 4.5 km to the Safries potato chip factory, 9 km south of Penola. In the second half of 2000 a fourth line was constructed, 12 km long and 89 mm diameter, connecting Kalangadoo to Nangwarry timber mill. All the pipelines have a maximum operating pressure of 10 000 kPa (1450 psi) and none have compression installed.

Gas from producing wells in the Katnook, Haselgrove and Redman gas fields is piped to a gas treatment plant located 300 m southeast of Katnook 1 built in 1991. The plant is operated by Origin Energy Resources, as operator for the joint venture and supplies about 2.8 bcf of gas per year to local domestic and industrial markets. The gas requires a minimum of processing to yield sales gas, which is then sold at the pipeline outlet from the Katnook Plant. The main gas customers are the Kimberly Clark paper mill near Millicent, where gas replaced the use of liquefied petroleum gas (LPG) and brown coal briquettes, the Safries potato chip factory near Penola, which was attracted to the area by the natural gas supply, and domestic and industrial customers in Mount Gambier, which were previously supplied tempered LPG via a reticulation network. Condensate is stored onsite at the Katnook Plant before transportation by road tanker and sale to the Adelaide refinery at Port Stanvac.

Opportunities created for small power stations in the more competitive electricity market, and the strategic location of the Ladbroke Grove Field adjacent to the main electricity link between Adelaide and Victoria, led to Origin Energy seeing an opportunity to use the high CO_2 gas to fire a 40 MW power station. The power station utilises an advanced turbine design capable of burning the low quality gas. The station began supplying power into the national electricity grid in January 2000. A second turbine was added in May 2000 boosting generating capacity to 80 MW. With both turbines operating, annual production is estimated to exceed 6 bcf of gas per year. The total investment in the electricity development project by Origin is about $65 million and the maximum electricity price which can be obtained by generators is currently capped at A$5000/MW.h. During a heat wave in southern Australia in October 2000, the Ladbroke Grove Power Station generated up to A$1.8 million per day in revenue.

For some years, the concept of a pipeline to connect the Minerva gas discovery and the existing Gippsland Basin fields in offshore Victoria with the Adelaide market has been proposed, which if constructed would allow direct access to the whole eastern Australian market for discoveries made in the South Australian portion of the basin. In addition, the South East of South Australia and western Victoria exhibit a high diversity of local industry — consequently, opportunities for gas marketing linked to industry development in the region are good given the industry base and service provision in the region. The region is strategically located between the major cities of Adelaide and Melbourne and the eastern Australian market which has a shortfall in supply from known discoveries from about 2005 (Fig. 6).

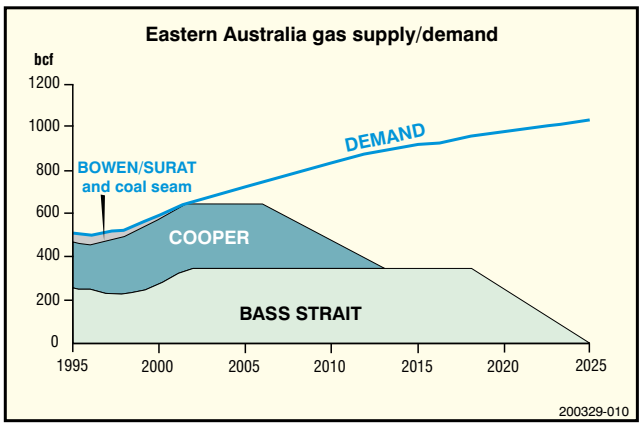

Fig. 6 *Gas supply and demand, eastern Australia (source: Australian Gas Association).*

EXPLORATION ACCESS

Climate and land use

The climate in the South East is characterised by mild dry summers and cold wet winters, Consequently exploration activities are generally conducted in the summer and autumn months of December through to April. However, with advanced preparation of sites it is possible to conduct drilling activities year round. The main land use in the area is for mixed farming ranging from sheep and cattle grazing to crops and wine grapes. The South East is characterised by a near-surface unconfined aquifer which is the main water supply for the landholders, and requires consideration while conducting exploration activities.

Parks and reserves

There are a number of parks and reserves which have been created to conserve the best examples of vegetation and landforms in the region. Exploration is permitted in some of them, and in others their small size makes it possible to work around them (Fig. 7). The conditions of access vary based upon the type of classification, the activity proposed and its likely impact on the environment.

European heritage

A number of sites of European heritage significance such as historic buildings and structures and geological monuments occur in the region. These are indicated on environmental sensitivity maps held by PIRSA. The majority of the sites are small and easily avoided by exploration activities.

Aboriginal heritage and native title

In South Australia it is an offence to disturb or destroy Aboriginal sites, objects or remains. Standard procedures for determining the presence of Aboriginal heritage prior to the commencement of activities have been determined. These procedures involve consulting with the relevant Aboriginal organisation and maintaining a watch for sites, objects or remains during activities. Generally the sites are no larger than a few hundred square metres and are easily avoided. Since the inception of the *Aboriginal Heritage Act 1988,* there have been no conflicts between Aboriginal heritage sites and exploration or production activities in South Australia. Licence holders are encouraged to develop a dialogue with regard to Aboriginal heritage and related matters with Aboriginal people having associations with their licence area. Native title may be applicable on non freehold land. There are currently no native title applications over the areas on offer, and native title is not likely to be a significant issue in the Otway Basin area, as most land is freehold or permanent leasehold.

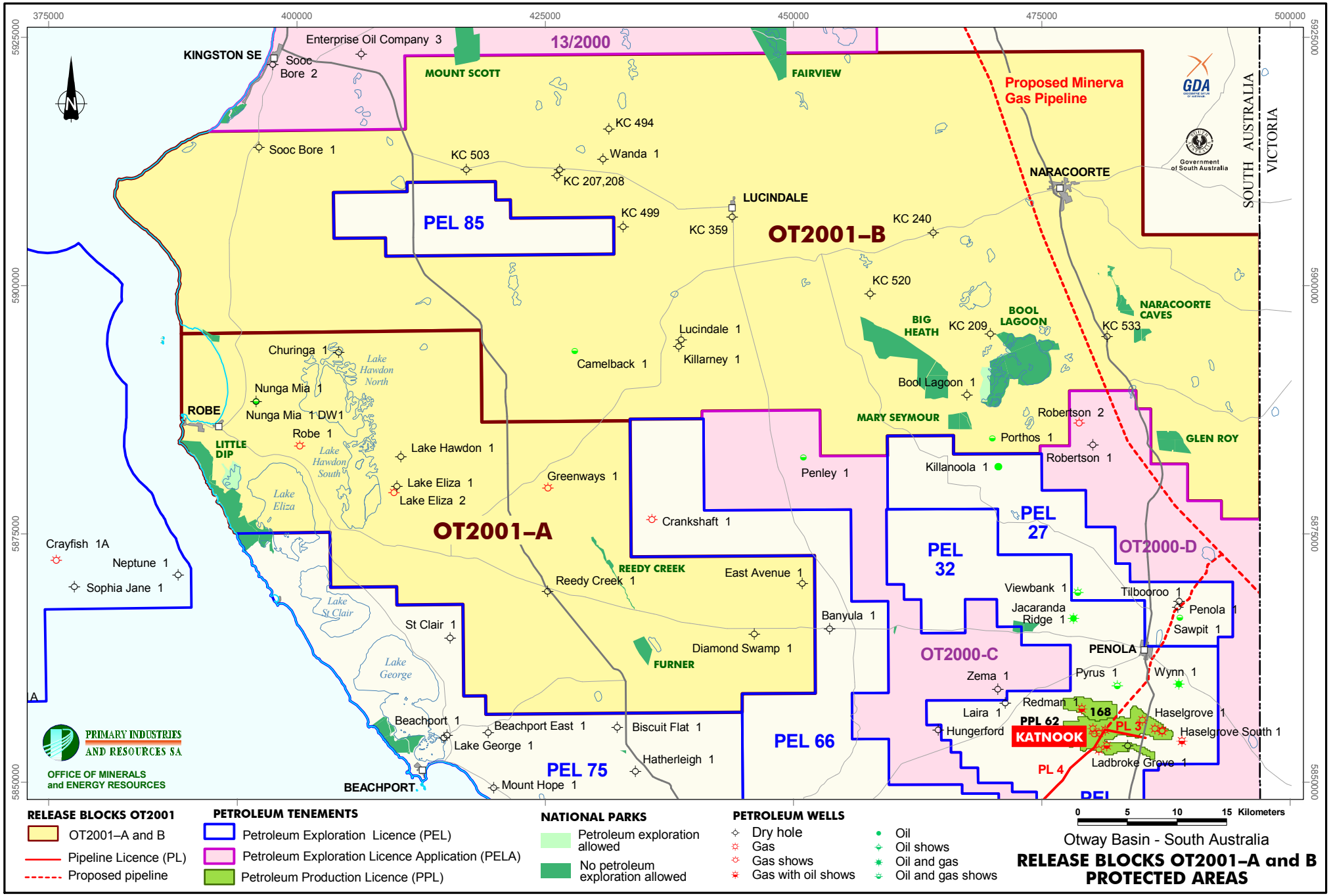

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Figure 7

Environmental management

PIRSA Petroleum Group acts as a one-stop shop for explorers in obtaining any necessary environmental approvals on the occasions when they are required from other government agencies. Approvals to conduct field operations etc. are first submitted to PIRSA, which arranges distribution to the other relevant government agencies for comment and then issues the necessary approvals. Petroleum Group staff are available to assist licensees prepare the necessary paperwork.

PIRSA Petroleum Group has introduced an objective based co-regulatory approach to the regulation of the upstream petroleum industry to reduce compliance costs and deliver better environmental outcomes. As this is a move away from prescriptive regulation and the pre-existing 'command and control' regime a change in both culture and method are required. There will still be inspection of field operations, including audits by PIRSA authorised officers.

The legislation governing onshore petroleum exploration and production in South Australia was reviewed through an extensive process of industry and public stakeholder consultation commencing in 1996 which led to the proclamation of the new *Petroleum Act 2000* and the promulgation of the Petroleum Regulation 2000 on 25 September 2000.

The main drivers behind the need for this new Act were:

- Changing attitudes and expectations of the community at large in particular to environmental issues. These changing expectations called for legislation which can adequately address environmental and heritage issues more openly and transparently than the previous Act.
- Competition policy reform facing the industry required exposing the industry to greater competition, e.g. smaller blocks, shorter licence terms and access to prospective areas to more licensees.
- A need for regulations to be more receptive to changing and improving technology by focusing on the achievement of objectives rather than prescribing what needs to be done.

To address these issues the new Act was developed through embracing six key principles of certainty, openness, transparency, flexibility, practicality and efficiency. In applying these principles the Act achieves:

- a more effective means for allocating and managing the rights to explore for and develop petroleum and other natural resources so as to facilitate competition
- greater security of title of petroleum rights through improved registration procedures and greater flexibility in the types of licences that can be granted
- a regulatory regime designed to more effectively and efficiently set and achieve environment and public safety protection objectives
- effective public consultation processes for the establishment of environmental objectives
- a more effective means for ensuring that security of production and supply of natural gas is maintained at a prudent level
- effective public reporting to provide all stakeholders with sufficient information on industry performance and government decision-making
- a flexible regulatory approach which allows the selection of the most appropriate level of regulatory intervention and enforcement in order to ensure compliance with the regulatory objectives.

AVAILABLE DATA

Open file well and seismic data available for Blocks OT2001-A and B are listed in Tables 3 and 4.

Table 3. *Exploration wells drilled in Blocks OT2001-A and B.*

Well	Operator	Spud	Rig release	Total depth (m)
OT2001-A				
Robe 1	SA Oil Wells	15.02.1915	01.02.1916	1373
Lake Eliza 1	Esso	06.09.1969	26.09.1969	1473
Diamond Swamp 1	John Henry Resources	14.07.1973	08.08.1973	1595
Lake Eliza 2	Genex	31.08.1973	11.09.1973	1158
Lake Hawdon 1	Hartogen	12.11.1988	29.11.1988	2083
Greenways 1	Mosaic Oil	26.06.1991	12.07.1991	1607
Reedy Creek 1	Gas and Fuel	27.02.1992	28.03.1992	2669
Nunga Mia 1	Oil Co of Australia	06.11.1996	25.11.1996	2650
Nunga Mia DW1	Oil Co of Australia	26.11.1996	07.12.1996	2644
East Avenue 1	Cultus Petroleum	28.03.1998	12.04.1998	2900
Churinga 1	Oil Co of Australia	07.05.1998	15.05.1998	1670
OT2001-B				
Lucindale 1	Esso	10.11.1969	10.11.1969	980
Wanda 1	Lakes Oil	16.12.1996	24.12.1996	678
5 deep Kingston Coal holes	Western Mining Corporation	1979–80		202–379
4 deep Kingston Coal holes	Western Mining Corporation	1979–80		370–396
Killarney 1	Hartogen	27.04.1987	01.05.1987	818
Camelback 1	Hartogen	05.04.1987	24.04.1987	1783
Bool Lagoon 1	Hartogen	09.11.1989	16.11.1989	810
Porthos 1	Lakes Oil	20.04.2000	06.05.2000	840

Table 4. *Seismic data recorded in Blocks OT2001-A and B.*

Survey	OT2001-A No. lines	Line km	Survey	OT2001-B No. lines	Line km
2D (27 surveys, 189 lines, 1804 km)			**2D** (23 surveys, 141 lines, 1434 km)		
61 OT01	4	17.9	61 MU01	3	3.9
64 OT01	8	169.6	64 OT01	15	226.9
64 OT03	2	9.0	65 OT02	6	87.5
65 OT02	2	18.7	65 OT03	1	8.4
69 OT02	10	69.7	66 OT01	4	18.7
71 OT02	9	102.8	69 OT02	5	55.3
73 OT02	1	2.4	81 OT02	1	28.7
74 OT01	1	5.0	81 OT03	2	0.1
81 OT03	9	40.8	85 OT01	14	209.5
85 OT01	1	0.6	85 OT02	10	126.5
85 OT02	11	162.6	86 OT02	6	56.3
85 OT04	2	1.7	86 OT03	20	214.6
86 OT02	15	102.6	88 OT02	13	142.9
86 OT05	1	2.4	88 OT03	2	11.0
88 OT03	14	129.6	88 OT06	11	109.4
88 OT06	2	0.4	90 OT01	8	46.7
90 OT03	5	16.1	90 OT02	1	1.3
90 OT04	23	290	91 OT04	2	2.1
92 OT03	11	52.4	95 OT03	4	7.8
92 OT04	7	42.8	95 OT04	8	70.0
94 OT01	7	56.9	96 OT01	2	0.2
95 OT02	3	8.4	97 OT01	1	0.1
95 OT04	10	166.5	98 OT03	2	5.7
96 OT01	13	142.5			
96 OT03	3	25.0			
97 OT01	14	166.3			
99 OT01	1	1.7			
2.5D (5 surveys, 39 lines, 307 km)			**2.5D** (2 surveys, 4 lines, 32 km)		
80 OT01	9	119.5	82 OT02	2	31.6
82 OT02	1	0.2	93 OT02	2	0.7
91 OT01	5	9.5			
91 OT02	22	175.1			
92 OT02	2	2.7			

APPLICATION PROCEDURES

Required information

Although there is no form set by regulation, it is preferred that an application for an exploration licence ((P)EL) includes the information listed below and is prepared using the pro formas included herein. It must also be accompanied by two copies of a plan of the application area and the prescribed fee (currently A$2362 per licence application, but scheduled to be subject to a consumer price index adjustment on 1 July 2001).

An application can be made by one or more individuals, one or more companies or a combination of both. Where a foreign company makes an application, that company must be registered under the

provisions of the Australian Corporations Law. Information on registration requirements can be supplied on request.

Technical qualifications and experience

The applicant must submit with the application a summary of their technical qualifications and experience (or their consultants/agents) to satisfy requirements that the applicant is capable of satisfying compliance with the Petroleum Act and the terms and conditions of the licence.

Financial position

Evidence of the financial resources available to the applicant is to be supplied to demonstrate ability to fulfil the proposed work program and in particular, any 'guaranteed' portion of the program (see below). Such evidence can be in the form of the latest annual report or a verifiable statement from an independent accountant, auditor or financial institution for each applicant company. If other known financial and exploration commitments over the next five years are such as to subsequently impact on the applicants ability to carry out the program set out in the application, attention must be drawn to this fact and the implications briefly described.

Work program

The applicant must submit with the application a statement of exploratory operations proposed for each year of the first five-year term of the licence, including an estimate of exploration expenditure (in A$) to be incurred in each year of the licence. Note that the program must be on a dry-hole basis, and that appraisal drilling will not be counted towards the first five-year work program bid. Work programs proposed in bids must significantly advance the exploration status of the area. At least one well must be proposed within the five years of the licence term.

The work program pro formas are included herein and must be submitted with the application. Under the provisions of the Petroleum Act, the Year 1 program of the licence is a requirement (i.e. 'guaranteed'). Programs proposed for Years 2 to 5 of the licence must be designated either 'guaranteed' or 'non-guaranteed' (i.e. years cannot be designated part guaranteed and part non-guaranteed), and non-guaranteed years cannot precede guaranteed years.

Guaranteed program

The Petroleum Act provides that as a minimum the first year of the program is guaranteed. A guaranteed program is a firm commitment by the applicant regardless of circumstances (force majeure excepting). Failure to fulfil the work program for any year of the guaranteed program will, if a genuine force majeure case is not proved, result in cancellation of the licence. Such cancellations will be taken into account in assessing future applications for exploration licences in South Australia, by the applicant company or its directors.

Non-guaranteed program

For those years of the program not guaranteed, once that licence year has been entered the licensee guarantees to carry out the work program stipulated. The licensee may apply to withdraw from the licence prior to entering a non-guaranteed year. A surrender in such circumstances will not jeopardise future applications for exploration licences.

Variation of work programs

Variation of work programs are possible, but this would only generally be done where extraordinary cause exists (force majeure or a significant technical issue), especially for a licence issued for which there were competing bids. In that case, variations below the next highest bids received at the time of award would not be approved, and may require partial relinquishment of the licence area.

Special conditions

The licences will be offered under the Petroleum Act with the right of renewal for a further five-year term at the end of the initial five-year term, with a non-negotiable relinquishment of 50% at renewal.

Award criteria

The basic objective in awarding an exploration licence is to select the work program most likely to evaluate the prospectivity of the licence area and discovering petroleum within the initial five-year term of the licence. Work program bids will be assessed taking account of the criteria listed below. All these criteria are used when selecting the winning bid. It is important to note that the timing of activities, especially the drilling of wells, and the extent of the guaranteed nature of the program carry substantial weight in the assessment process.

The most important criteria for assessment of work programs are:

- number of exploration wells (dry-hole basis) to be drilled, their timing and the anticipated number of exploration objectives to be drilled by the wells
- extent that the wells proposed to be drilled are supported by adequate seismic or other geophysical techniques
- number of years that the applicant is willing to guarantee the work program
- adequacy of financial resources and technical expertise available to the applicant
- past performance in fulfilling work program commitments of the applicant elsewhere in Australia.

Secondary criteria that may be taken into account are:

- the amount and nature of seismic surveying to be carried out and its timing
- other data acquisition and seismic reprocessing to be carried out.

In addition to the above criteria, where work program bids are similar, the benefits of the introduction of new explorers into the area (including intention with regard to establishing an office in South Australia) may be taken into account. It should be noted that there are no criteria limiting the number of (P)ELs which may be offered to one applicant providing the applicant has adequate financial resources to complete all programs. In the case of 'cascading bids' (i.e. multiple or hybrid bids for an area by one applicant or joint venture) only the highest of the bids will be considered.

Notification of assessment

Successful bids will be announced in August 2001. The basis for the selection of the successful applicant, including the successful applicants proposed work program for each block will be published. Unsuccessful applicants will be notified of the reasons for the rejection of their application.

Contact information

Comments, inquiries and applications for exploration licences may be addressed to:

Director, Petroleum Group	Phone	National	(08) 8463 3204
Office of Minerals and Energy Resources		International	+61 8 8463 3204
Primary Industries and Resources South Australia	Fax	National	(08) 8463 3229
Level 7, 101 Grenfell Street		International	+61 8 8463 3229
Adelaide SA 5000	Web site	www.petroleum.pir.sa.gov.au	
AUSTRALIA	Email	pirsa.petroleum@saugov.sa.gov.au	

The envelope containing your application(s) must be marked 'CONFIDENTIAL — (P)EL APPLICATION'.

The closing date for OT2001-A and B applications is 4.00 p.m. on Thursday 26 July 2001

PRIMARY INDUSTRIES AND RESOURCES SA

OFFICE OF MINERALS AND ENERGY RESOURCES

APPLICATION FOR AN EXPLORATION LICENCE
Petroleum Act 2000 (Section 65)

To the Director, Petroleum Group, Office of Minerals and Energy Resources, PIRSA (as authorised delegate to the Minister for Primary Industries and Resources)

I/We, ...

. . . .

. . . .

hereby make application for the grant of a petroleum exploration licence in respect of the area described hereunder:

DESCRIPTION OF AREA

Block	Tick here	Approximate area (km^2)	(acres)
OT2001-A	☐	1418	350 433
OT2001-B	☐	3371	832 957

Please indicate block(s) under application. Note Blocks OT2001-A and B are offered as separate licences and the application fee is currently A$2362* per licence. Details in support of the application and the application fee of $...................... are attached (see checklist).

* Note that this fee is scheduled to be subject to a consumer price index adjustment on 1 July 2001. Contact PIRSA for the amended fee prior to submitting your application.

. . . .

. . . .

Signature of applicants(s). Where application is made by a consortium including a company(s), the application must be made under the company(s) seal.

Dated this . . . . day of 2001

Closing date 4.00 p.m. on Thursday 26 July 2001

Send applications marked 'Confidential — contains (P)EL application' to:

Director, Petroleum Group
Office of Minerals and Energy Resources
Primary Industries and Resources South Australia
Level 7, 101 Grenfell Street
Adelaide SA 5000
AUSTRALIA

Phone	National	(08) 8463 3204
	International	+61 8 8463 3204
Fax	National	(08) 8463 3229
	International	+61 8 8463 3229

YEAR 1 WORK PROGRAM

Note: All work in Year 1 is guaranteed (Petroleum Act)

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

WELLS YEAR 1 Please identify all test targets for all wells by ticking appropriate boxes

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Tertiary – Upper Sherbrook Group										
Crayfish Group										
Lower Sherbrook Group										
Cost (A$'000)										

SEISMIC YEAR 1

	km/km^2	Cost (A$'000)
2D seismic		
3D seismic		
Seismic reprocessing		

OTHER STUDIES YEAR 1

	Cost (A$'000)	Description
Geological and geophysical studies		
Aeromagnetic surveys		
Geochemical surveys		
Other		

COMMENTS

YEAR 2 WORK PROGRAM

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

Entire Year 2 program: guaranteed ☐
(You must tick a box) non-guaranteed ☐

WELLS YEAR 2 Please identify all test targets for all wells by ticking appropriate boxes

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Tertiary – Upper Sherbrook Group										
Crayfish Group										
Lower Sherbrook Group										
Cost (A$'000)										

SEISMIC YEAR 2

	km/km^2	Cost (A$'000)
2D seismic		
3D seismic		
Seismic reprocessing		

OTHER STUDIES YEAR 2

	Cost (A$'000)	Description
Geological and geophysical studies		
Aeromagnetic surveys		
Geochemical surveys		
Other		

COMMENTS

YEAR 3 WORK PROGRAM

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

Entire Year 3 program: guaranteed ☐
(You must tick a box) non-guaranteed ☐

WELLS YEAR 3 Please identify all test targets for all wells by ticking appropriate boxes

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Tertiary – Upper Sherbrook Group										
Crayfish Group										
Lower Sherbrook Group										
Cost (A$'000)										

SEISMIC YEAR 3

	km/km^2	Cost (A$'000)
2D seismic		
3D seismic		
Seismic reprocessing		

OTHER STUDIES YEAR 3

	Cost (A$'000)	Description
Geological and geophysical studies		
Aeromagnetic surveys		
Geochemical surveys		
Other		

COMMENTS

YEAR 4 WORK PROGRAM

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

Entire Year 4 program: guaranteed ☐
(You must tick a box) non-guaranteed ☐

WELLS YEAR 4 Please identify all test targets for all wells by ticking appropriate boxes

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Tertiary – Upper Sherbrook Group										
Crayfish Group										
Lower Sherbrook Group										
Cost (A$'000)										

SEISMIC YEAR 4

	km/km^2	Cost (A$'000)
2D seismic		
3D seismic		
Seismic reprocessing		

OTHER STUDIES YEAR 4

	Cost (A$'000)	Description
Geological and geophysical studies		
Aeromagnetic surveys		
Geochemical surveys		
Other		

COMMENTS

YEAR 5 WORK PROGRAM

PRIMARY INDUSTRIES AND RESOURCES SA
OFFICE OF MINERALS AND ENERGY RESOURCES

Entire Year 5 program: guaranteed ☐
(You must tick a box) non-guaranteed ☐

WELLS YEAR 5 Please identify all test targets for all wells by ticking appropriate boxes

	Well 1	Well 2	Well 3	Well 4	Well 5	Well 6	Well 7	Well 8	Well 9	Well 10
Tertiary – Upper Sherbrook Group										
Crayfish Group										
Lower Sherbrook Group										
Cost (A$'000)										

SEISMIC YEAR 5

	km/km^2	Cost (A$'000)
2D seismic		
3D seismic		
Seismic reprocessing		

OTHER STUDIES YEAR 5

	Cost (A$'000)	Description
Geological and geophysical studies		
Aeromagnetic surveys		
Geochemical surveys		
Other		

COMMENTS

APPLICATION CHECKLIST

The following information **must** be included in the licence application:

- ❑ complete the application pro forma (use of this form is strongly recommended)
- ❑ application must be signed or executed by the applicant
- ❑ if applicant is a foreign company, the company must be registered as a foreign company under the provisions of the Australian Corporations Law
- ❑ include two copies of a plan of the application area
- ❑ include a summary of the technical qualifications of the applicant (or consultants/agents of the applicant)
- ❑ include evidence of the financial position of the applicant to demonstrate ability to fulfil the proposed work program (i.e. the latest annual report or a verifiable statement from an independent accountant/auditor/ financial institution)
- ❑ using the work program pro formas include a statement of exploratory operations the applicant proposes to carry out in each year of the five-year term of the licence, including an estimate of exploration expenditure to be incurred in each year of the licence in A$
- ❑ include the prescribed fee for each licence applied for (currently A$2362, but scheduled to be subject to a consumer price index adjustment on 1 July 2001), made payable to Primary Industries and Resources South Australia — *it is recommended that you check the current fee with PIRSA prior to sending in your application*
- ❑ ensure the envelope(s) containing your application(s) is marked **'Confidential — contains (P)EL application'**.