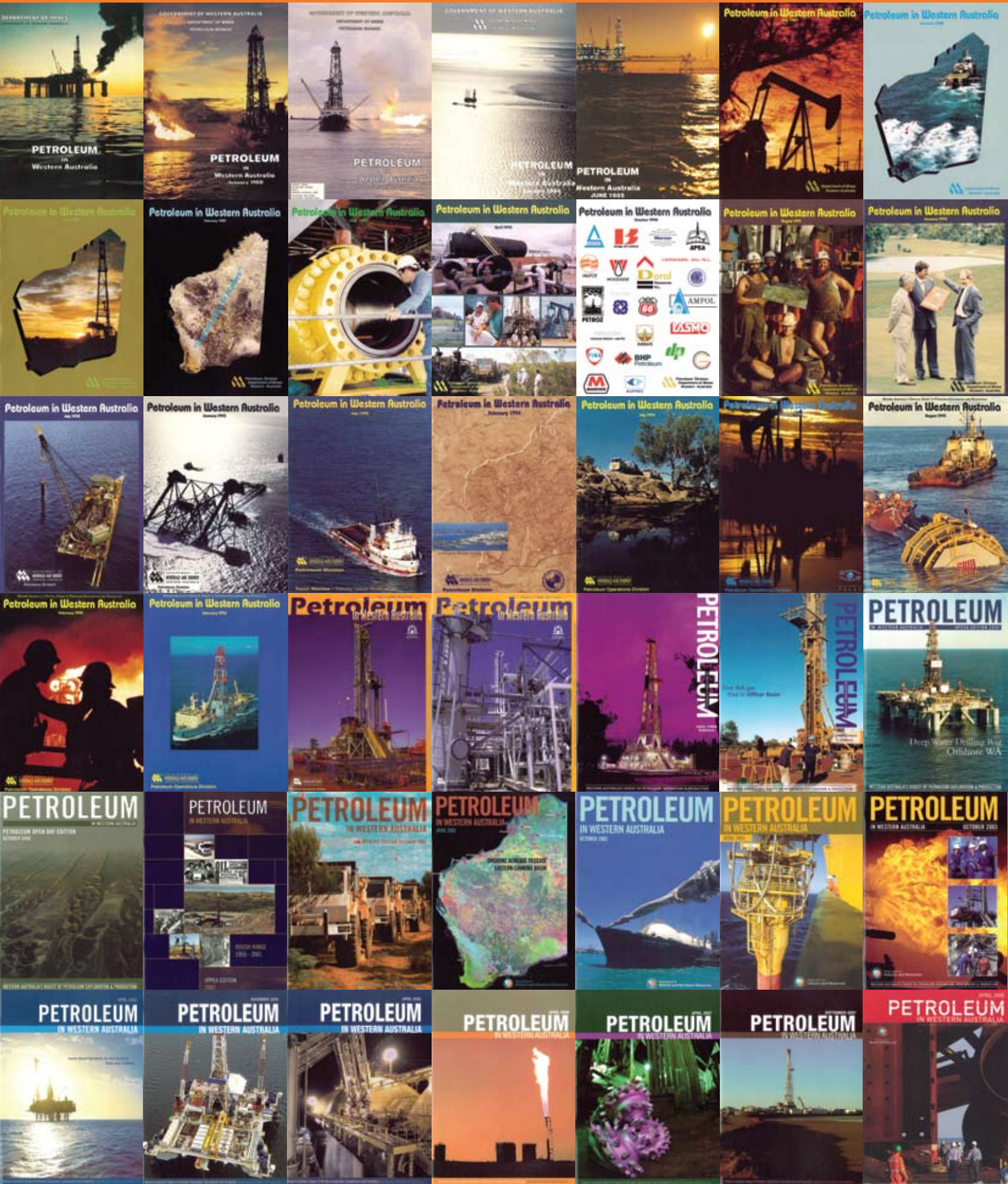


SEPTEMBER 2008

# PETROLEUM IN WESTERN AUSTRALIA



# 30th ANNIVERSARY EDITION



Maersk Ngujima-Yin (Photo courtesy of Woodside Energy)

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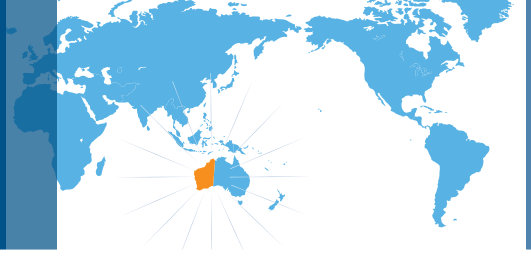
Editor: Karina Jonasson  
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Cover Photo: The front covers of every edition of Petroleum in Western Australia magazine published (1978–2008), marking the 30th anniversary of the publication.

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# All eyes on WA petroleum

Western Australia's economy is powering ahead and the \$19.4 billion petroleum sector is leading the charge as its most lucrative resources investment opportunity.

About 69 per cent of Australia's natural gas production and 70 per cent of crude oil and condensate production are located in Western Australia.

And with 72 per cent of Australia's petroleum exploration expenditure last year, the State's petroleum sector looks set to continue its record run.

The enormous natural wealth of areas such as the North West Shelf has created huge investment opportunities, and the Department of Industry and Resources (DoIR) provides essential support to investors looking to capitalise.

DoIR works with organisations large and small and has played a key role in Western Australia's emergence as a global business hub for oil and gas.

For more information visit [www.doir.wa.gov.au](http://www.doir.wa.gov.au) or phone **(08) 9222 3333**.



**Anne Nolan**  
Director General



Recent gas discovery at Halyard 1  
(Photo courtesy of Apache Energy)

## Director General's Message

**Western Australians know they can not take the continued success of the State's resources industries for granted.**

The disruption to gas supplies as a result of the Varanus Island pipeline explosion, and subsequent effects on the Western Australian economy, show the need to remain alert to potential threats to Western Australia's economic growth.

Western Australia has the most energy intensive economy of all States, with significant resource processing activities underpinning much of the State's employment base. It is therefore important to develop a variety of energy supply options.

The State Government has long realised the need to diversify our energy supply and in recent years has developed a raft of initiatives to achieve this, including approving new domestic gas projects and legislating for geothermal energy.

The Government, industry and community have been working to ensure WA capitalises on its mineral and petroleum wealth and the strong supporting economic conditions.

There are several offshore gas projects that may come on stream in the near future that should help ensure security of energy supply. These include the Reindeer, Macedon and Halyard proposed developments.

The Reindeer field has been given the go-ahead by Apache Energy and Santos, with the construction of a new gas hub southwest of Dampier, and gas delivery around mid 2010, subject to obtaining all the necessary government approvals.

The Macedon field could become a supplier for the domestic gas market with the delivery of up to 150 million terajoules per day, provided BHP Billiton and the State Government can resolve the issue of Macedon's gas heating value with respect to gas

quality specifications for the domestic Dampier to Bunbury natural gas pipeline.

The recent gas discovery at Halyard is expected to be fast-tracked into production by Apache Energy.

In addition, increased interest in the onshore Perth Basin's gasfields by companies such as Latent Petroleum and Warrego Energy could add significant gas for the domestic market.

International conditions, principally the continued growth in China, are expected to continue to deliver benefits to Western Australia's resources industries, possibly for decades.

On the back of strong prices, the value of the State's petroleum resources increased eight per cent in 2007 to \$16.7 billion, while record exploration expenditure of more than \$2 billion for the four quarters to March 2008 should see discoveries of new fields in the future.

Western Australia is the clear leader of the Australian resources industries and I am confident that continued vigilance, hard work and innovation by all will ensure this position is maintained for many years to come. ■

# Petroleum in Western Australia is 30! 1978–2008

**Karina Jonasson**

Editor, PWA

Petroleum and Royalties Division

The Petroleum and Royalties Division is marking the 30th anniversary of the *Petroleum in Western Australia* magazine, colloquially known around the Department as the PWA. This edition is the 43rd in the series.

It is 30 years since the inception of the *Petroleum in Western Australia* magazine, under the direction of John Sharp, the first Director of the division. In its early days it was published every two years as a small 15–30 page A5 publication. Its purpose was to provide information about the state of the petroleum industry in Western Australia, and about the role of the Petroleum Branch in the then Department of Mines.

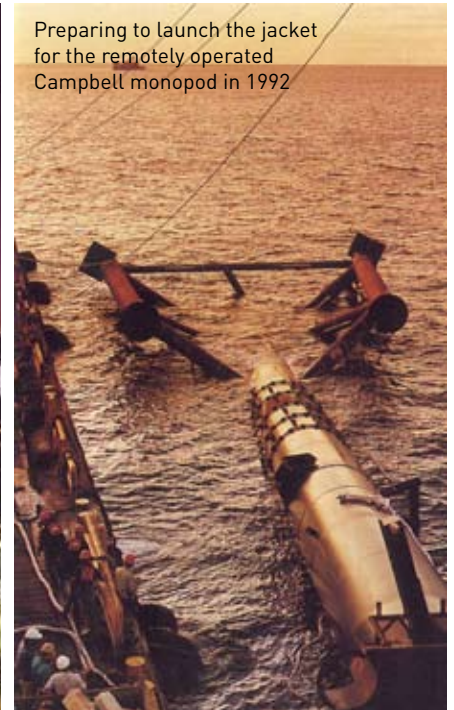
By 1984, the Petroleum Branch became a Division, and the magazine became a glossy A4 sized magazine. It was expanded to include articles written both within the Division and from industry, under Ian Fraser, the next Director (from 1985–1998).

PWA provides a historical record of petroleum statistics and events, and documents the significant changes in the Department and the Petroleum Division. In mid 1992, the Department of Mines became the Department of Minerals and Energy. The Department name changed again to the Department of Mineral and

The South Pepper structure. Western Mining Corporation brought its North Herald–South Pepper fields on production in December 1987



Preparing to launch the jacket for the remotely operated Campbell monopod in 1992



Petroleum Resources in late 2001, with the latest name Department of Industry and Resources (DoIR) coming in about 2003. The Division incorporated the Royalties Branch in early 2004, and was renamed the Petroleum and Royalties Division.

The early editions were edited by the Petroleum Branch's Assistant Director Exploration, Keith Crank, followed by the Division's Senior Production Geologist, Rod Dedman, who performed the role for many years. Dianne Owad-Jones, a former Resource Geologist, edited one issue, as did the Department's Corporate Communications group. Peter Hewitt edited two issues before Karina Jonasson, the Division's Petroleum Resource Geologist, took over the role of editor in February 2000. While Karina was on maternity leave in 2002 and 2004, Geologist Darren Ferdinando edited several issues, with assistance from Lisa Gibbons. Karina resumed the role upon her return to work and is the current editor for the PWA.

PWA highlights the State's petroleum exploration, development and production activities through a broad range of articles of interest to the petroleum industry. Most importantly, it also contains tables on annual production, reserves, drilling and seismic statistics, as well as titles and lease holders.

To date, 43 editions have been published, including this one, because in some years two editions were published, though in others none were published. The Petroleum and Royalties Division holds the complete collection — thanks to the efforts of Rod Dedman, as does the Department's library (except for what seems to be the very rare first issue). The magazine has highlighted the events, advances, discoveries and technological changes in the Western Australian petroleum scene over the years.

Significant events such as jacket launches for the numerous production platforms in the offshore areas, discoveries of oil and gas in what were once considered frontier areas, which now supply the state and the world with oil and LNG cargoes, and plant commissionings are recorded in photographs published in the magazine.

Current divisional Director, Bill Tinapple sees great value in the magazine, resurrecting it after a hiatus between 1997 and 1999, returning it to a twice yearly publication then, and again in 2007 after staffing issues reduced it to a yearly publication for two years. *Petroleum in Western Australia* assists in the division's aim of providing a continuous flow of relevant information to our customers in the petroleum sector. It contains a



The Ron Tappmeyer drilling rig at Wandoo B

broad variety of articles of interest — research articles, petroleum field overviews, environmental issues and changes in legislation.

The *Petroleum in Western Australia* magazine has an extensive mailing list to key industry companies in Western Australia, interstate and overseas. It can also be downloaded from petroleum publications on the department's website.

This year, the Petroleum and Royalties Division took the decision to publish the magazine in-house, and without advertising, with the assistance of designer Jemma Williams in the Communications and Marketing Division. We are very pleased with the "new look" of the magazine.

With contributions from industry and many different areas within the Department over the years, including former groups from the Petroleum Division (eg, the Safety and Environment Branch) and the Geological Survey of Western Australia, the Petroleum and Royalties Division would like to extend their thanks to all those who have contributed to the success of the magazine. We plan that there will be many more editions to come. ■



The Wandoo B platform under tow. Production started in 1997



The Lady Elaine towing the Goodwyn "A" jacket into position for the launch in October 1992



The Maersk Valiant at the Harriet field



Testing at the Talisman 1 well in September 1984. The field had a three year production life and was abandoned and decommissioned in 1992

The *Cossack Pioneer* floating production storage and offtake (FPSO) vessel in dry dock, 1995



Dredging the channel for the Harriet pipeline c.1985



The *Eastern Province* barge under tow carrying four monopod substructures for the Roller-Skate development, c. 1993





**Bill Tinapple**  
Director  
Petroleum and Royalties Division

## Director's Message: You're Going to Have to Live with the Outcome

The petroleum legislation applying to Western Australian areas is in transition. Significant change is happening to both the Commonwealth and the State legislation. Oil and gas companies, industry associations and service organisations can have extensive input through consultative processes. We are all busy; however, if you don't follow the development of the legislation and provide feedback, you will have missed the opportunity. You're going to have to live with the outcome.

Commonwealth legislative changes and potential future changes include:

- The *Offshore Petroleum Act 2006 (OPA)* came into force in July this year. Although it was a "plain English re-write" of the previous *Petroleum (Submerged Lands) Act 1967*, which we had all become familiar with,

some changes were incorporated and other consequential amendments are foreshadowed. The numbering of sections was changed and we all have to learn the new numbering.

- Draft Greenhouse Gas Storage (GGS) amendments to the OPA and draft GGS regulations are being enacted.
- Amendments are in progress to change NOPSA's role to include integrity for unmanned facilities.
- Consolidation of the existing regulations is in progress. The eleven existing regulations will be replaced with only three, Environment, Safety and Resource Management.
- The Productivity Commission is carrying out a review of petroleum regulation. The review extends beyond the Commonwealth regulation to State regulation. An issues paper has been released and submissions requested.

Western Australia legislative changes and potential future changes include:

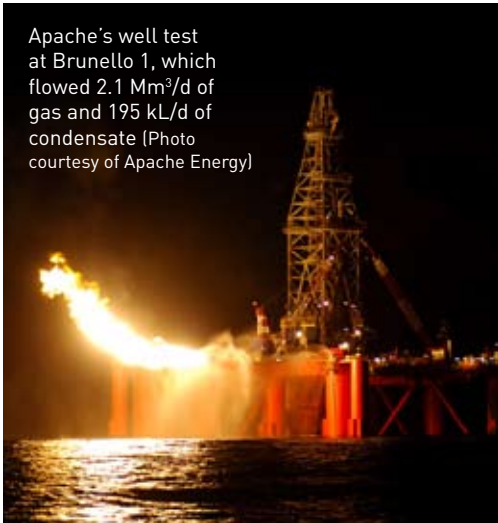
- The Petroleum and Energy Legislation Amendment Bill is nearing entry into Parliament. This is an omnibus bill which contains various 'tidying up' provisions. Of interest to industry will be the expansion of the definition of hydrocarbons in the *Petroleum and Geothermal Energy Resources Act 1967* to include carbon dioxide. This will allow CO<sub>2</sub> sequestration under the act in a similar arrangement to gas storage, however, future amendments are planned to make the process more user friendly.
- Western Australia, under the mirror legislation agreement, is developing objective based regulations based on the Commonwealth model. Occupation Health and Safety (OHS) and Management of Safety Regulations have already been put in place for the *WA Petroleum (Submerged Lands) Act 1982* and amendments enacted to transfer the responsibility for safety regulation to NOPSA through the *Petroleum Amendment and Repeal Act 2005 (PLAR)*.

- Occupation Health and Safety (OHS) and Management of Safety Regulations are about to be put into place for the *Petroleum Pipelines Act 1969*. Of significance is that the Safety Case will now be required by regulation rather than as a condition of licence. It is proposed to proclaim an additional Part of the PLAR and transfer responsibility for safety for pipelines to the WA Department of Consumer and Employment Protection (DoCEP).
- Regulations are also being developed for the *Petroleum and Geothermal Energy Resources Act 1967*. It is also proposed to transfer responsibility for safety for petroleum and geothermal energy operations to DoCEP. DoCEP would then delegate responsibilities to NOPSA for State Inland Waters and for some islands where the islands are hubs for offshore production.
- Additionally, changes to WA legislation will be required to mirror the changes outlined for Commonwealth legislation above, including GGS, integrity and consolidation of regulations.

As can be seen, numerous and significant changes are in progress or planned. Three years from now, the legislation and procedures under the legislation will be quite different from those applying now.

Both, the Commonwealth Department of Resources, Energy and Tourism (RET) and the WA Department of Industry and Resources (DoIR) will be providing opportunities for consultation and feedback. The Productivity Commission has requested submissions in response to the release of its issues paper of July 2008.

It is recommended that you and your organisation allocate time to understand how your part of the petroleum industry will be affected. Make use of your industry association to understand proposals and provide feedback. In the end, you need to take the initiative. You're going to have to live with the outcome. ■



Apache's well test at Brunello 1, which flowed 2.1 Mm<sup>3</sup>/d of gas and 195 kL/d of condensate (Photo courtesy of Apache Energy)

**Karina Jonasson**  
Petroleum Resource Geologist  
Resources Branch

# Petroleum Exploration, Production and Development Activity in Western Australia — Highlights from January to June 2008

The 2007–08 fiscal year saw 33 exploration, 16 appraisal and 44 development wells drilled with a 9 per cent success rate from new field wildcats. This article will highlight the activity for the second half of the financial year. A summary of activity from the 2007 calendar year can be found in the April 2008 edition of the PWA magazine.

In 2007–08, three significant discoveries were made by companies such as BHP Billiton (with Thebe 1), Apache Energy (with Salsa 1) and Hess Exploration (with Glencoe 1) (Figs 1–3). Thebe 1, which was a gas discovery on the Exmouth Plateau in WA-346-P, was BHPB's biggest discovery worldwide at the time and will add significantly to the economic viability of the Scarborough development. Salsa 1 is significant in that it is a new play type in the area.

Glencoe 1 was the first well in a new permit by a new operator in Western Australia, Hess Exploration.

In the Carnarvon Basin, Apache has continued its success in WA-356-P where a string of discoveries was made around the Julimar Complex in late 2007.

Fiscal year statistics for drilling and seismic acquisition can be found in the tables section at the back of the PWA.

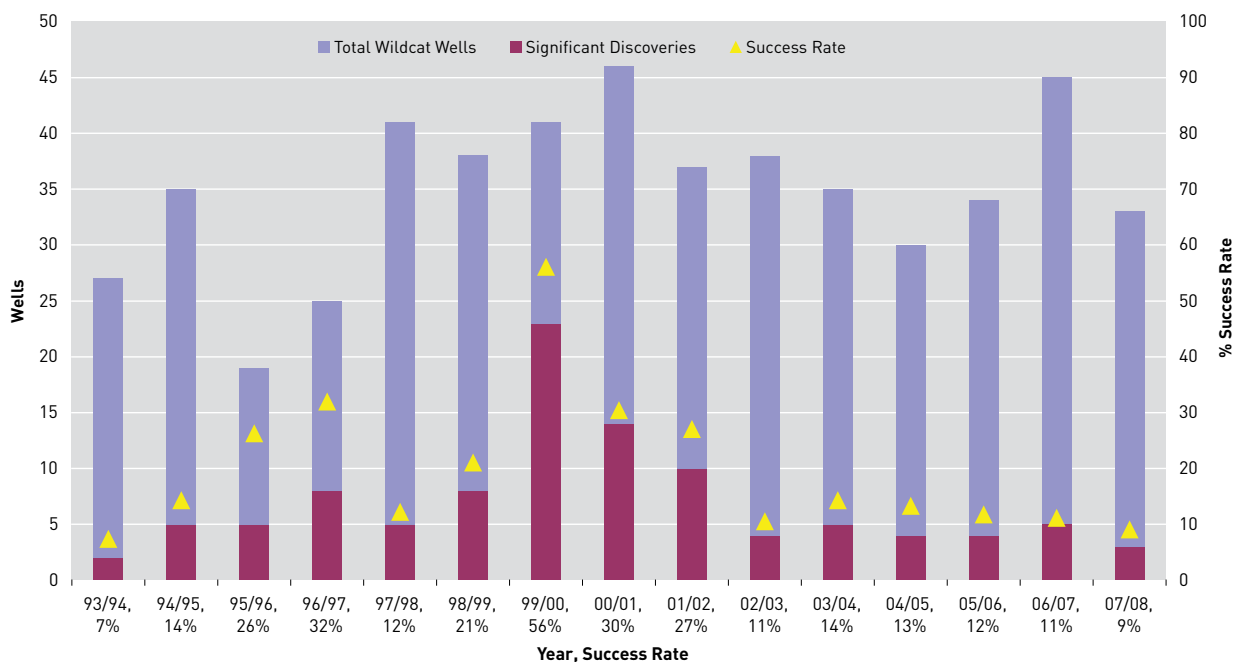


Figure 1 | **NEW FIELD WILDCATS AND SIGNIFICANT DISCOVERIES IN WESTERN AUSTRALIA BY FINANCIAL YEAR**

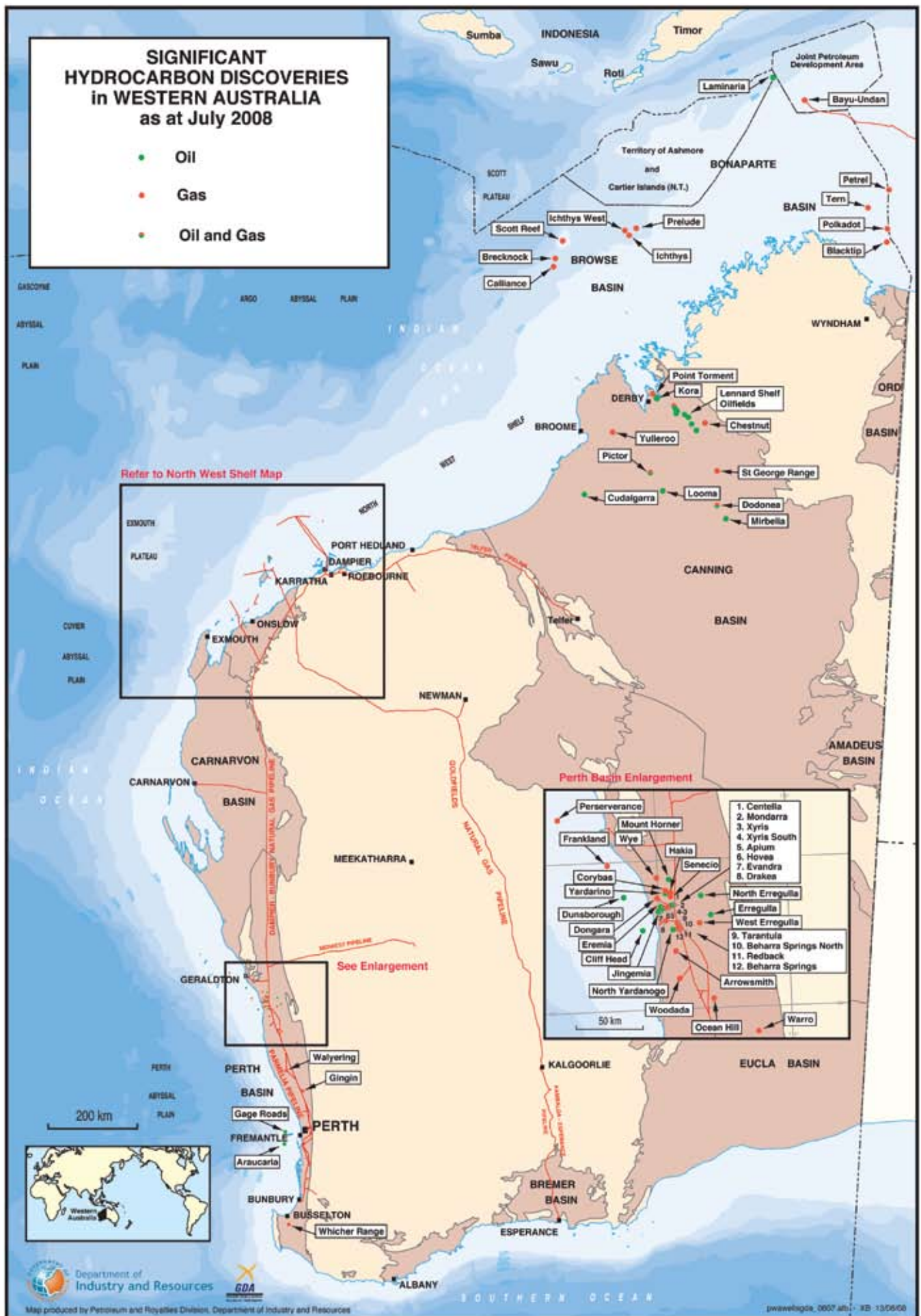


Figure 2 | SIGNIFICANT HYDROCARBON DISCOVERIES IN WESTERN AUSTRALIA

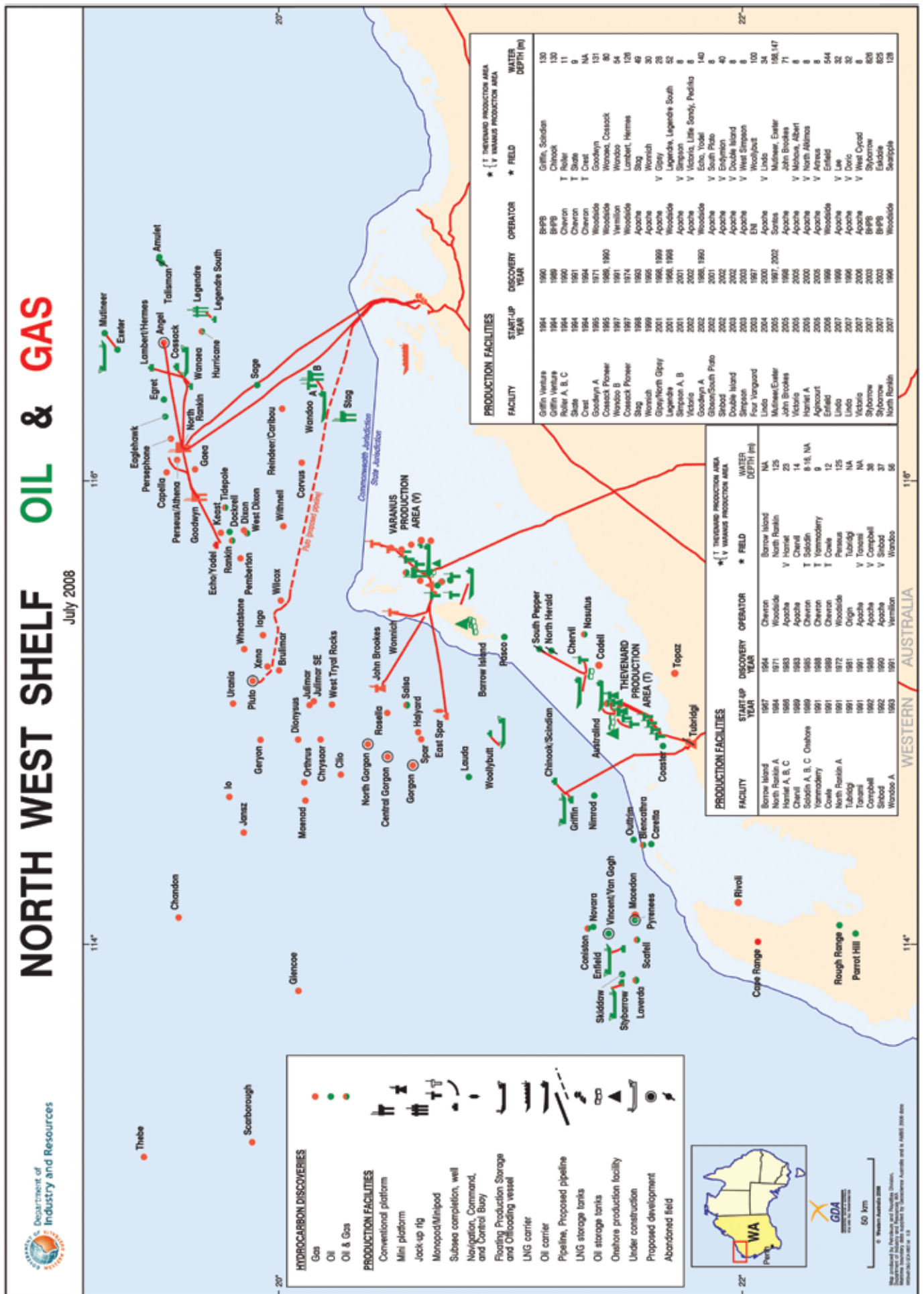


Figure 3 | NORTH WEST SHELF PRODUCTION FACILITIES AND SIGNIFICANT HYDROCARBON DISCOVERIES

Halyard 1 flowed at 1.9 Mm<sup>3</sup> of gas and 149 kL on test (Photo courtesy of Apache Energy)



Julimar 1 flowed at a combined rate of 2.4 Mm<sup>3</sup>/d of gas (Photo courtesy of Apache Energy)



## EXPLORATION ACTIVITY BY BASIN

### Bonaparte Basin

Two offshore 3D seismic surveys were completed in the first half of 2008, with a total of 4,182 km<sup>2</sup> acquired. No wells were drilled in the Western Australian portion of the basin.

### Browse Basin

INPEX, Woodside and BHP Billiton each drilled an offshore exploration well in the Browse Basin. However, only INPEX was successful with Ichthys West 1 in WA-285-P, which discovered gas. Ichthys West 1 is located 8 km northwest of Ichthys 2A and 9 km southwest of Dinichthys 1. Woodside Energy's Torosa 6 appraisal well was spudded in April and was still drilling as at 30 June.

Both 2D and 3D seismic surveys were carried out in the basin in the first half of 2008. The Gigas 2D pilot ocean-bottom-cable marine seismic survey over part of the Torosa field was completed. A total of 81 km of 2D seismic data was recorded in Retention Lease WA-30-R. The data is currently being processed.

### Canning Basin

One new onshore well was drilled by ARC Energy in the basin. The Yulleroo 2 exploration well commenced drilling on 22 January and was suspended with gas shows. This was after ongoing problems with the Century 18 rig and hole conditions prevented a flow test of the well. ARC says the method and timing of this test, which is expected to be with a workover rig or coiled tubing unit, is under review.

The primary objective at Yulleroo 2 — the Tournaisian gas sands — were encountered at approximately 2,850 mMD some 400 m updip from the intersection of the same sands in the Yulleroo 1 well. The sands appear similar to those encountered in Yulleroo 1 but with better developed porosity and with approximately 30 m of potential gas pay.

### Carnarvon Basin

Successful exploration drilling in the Carnarvon Basin in the first half of the year has resulted in eight of thirteen wells encountering hydrocarbons. Two wells that were still drilling at 30 June have since been declared discoveries (Glencoe 1 and Marley 2). In addition, seven extension and 19 development wells were drilled, and 15 2D and 3D seismic surveys were carried out to 30 June 2008.

Hydrocarbon shows were found in Grange 1 (gas), Julimar Northwest 1 (gas), and Totem 1 (oil). Apache Energy's wells, Brulimar 1, Halyard 1, and Julimar Southeast 1, were all suspended for completion as production wells. Exploration permit WA-356-P, where Brulimar 1 and Julimar Southeast 1 were drilled, is located approximately 20 km from Woodside's Pluto field and the Chevron-operated Greater Gorgon area. Apache expect to drill a further four wells on the Julimar–Brunello trend, which is estimated to hold more than 28 Gm<sup>3</sup> (1 Tcf) recoverable.

Targeting gas in early 2008, Brulimar 1 was Apache's fourth successive discovery in the

Julimar–Brunello area in WA-356-P, site of the driller's previous Julimar 1, Julimar East 1 and Brunello 1 discoveries. Brulimar 1 encountered 34.5 m of net pay in the Upper Triassic Mungaroo sandstone. Previously Brunello 1 flowed at 2.1 Mm<sup>3</sup>/d gas and 195 kL/d condensate on test.

In April, Apache announced the discovery of 59.4 m of net gas pay in the Triassic Mungaroo Sandstone in its fifth successful well in permit WA-356-P. In May, Julimar Northwest 1 logged 13 m of net pay in the J-17 Triassic Mungaroo sandstone, bringing the total discoveries to six.

Located in WA-13-L in 111.5 m of water, Apache's Halyard 1 well flowed at up to 1.9 Mm<sup>3</sup> of gas and 149 kL of condensate during testing and was completed as a production well. The well had a 27.7 m net interval of gas pay in the Cretaceous Halyard sandstone. Halyard 1 was the first well drilled in a newly identified play of stratigraphic traps along the front edge of the Barrow Delta. Apache has identified other similar features in the same area. Halyard will likely be fast-tracked for development via a subsea gathering line connected to the existing pipeline at East Spar for processing at Varanus Island.

At the end of the period, Hess was still drilling its tight hole Glencoe 1 located 50 km west-southwest of Jansz-lo, the first of its four-well exploration program in WA-390-P. Glencoe 1 has intersected 28 m of net gas pay in Upper Jurassic sandstones. Apache's Marley 2 well, in TL/5, was

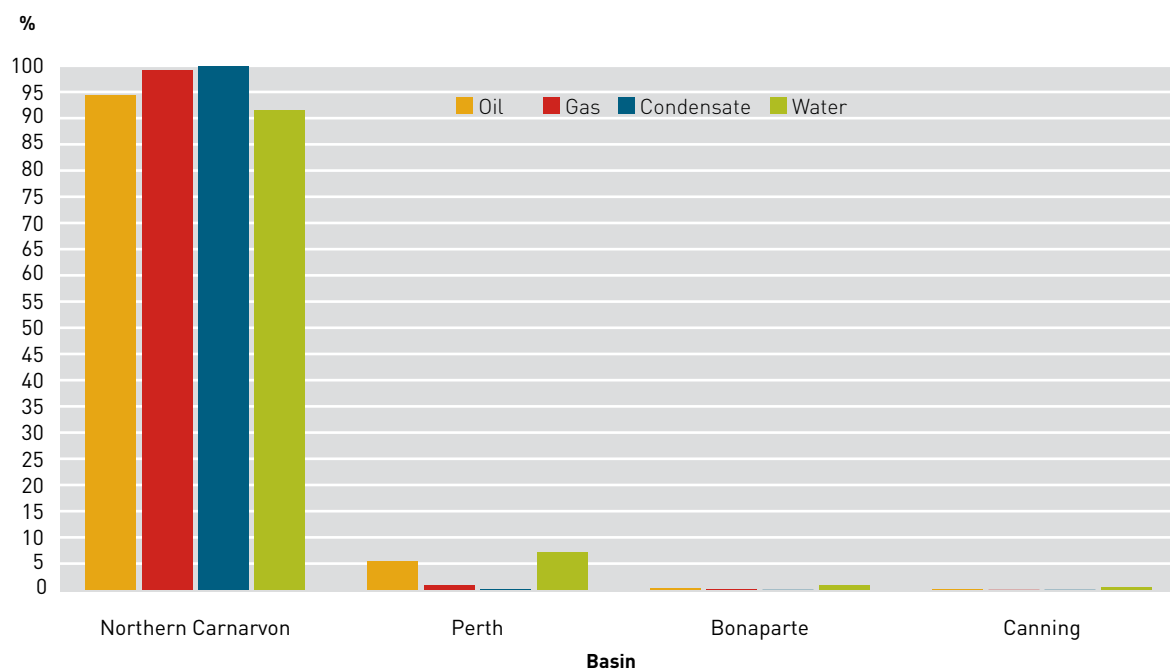


Figure 4 | PETROLEUM PRODUCTION BY BASIN ILLUSTRATED AS A PERCENTAGE OF THE TOTAL

also progressing at 30 June, and has since been declared a gas discovery.

The Xena 2 and Xena 3 appraisal wells were drilled during Q1 2008 and confirmed both the nature of the reservoir and the presence of gas saturated sands in a previously unpenetrated fault block. No further appraisal drilling is required prior to development planning. Xena is to be tied into the Pluto development.

### Perth Basin

Offshore, two exploration wells Lilac 1 (ROC Oil) in WA-286-P and Charon 1 (ENI) in WA-328-P were drilled. Lilac 1 encountered only residual hydrocarbons in the target reservoir and was plugged and abandoned as a dry hole. Charon 1 was also unsuccessful.

Acquisition of the 546 km<sup>2</sup> Diana 3D seismic survey was completed on

12 February 2008. The survey data will further define the 2007 Frankland and Dunsborough discoveries and nearby prospects and leads.

Two appraisal wells were drilled by ROC in WA-386-P which confirmed the presence of hydrocarbons in the accumulations discovered in 2007. Frankland 2 encountered poor quality reservoir significantly deeper than predicted and the Dunsborough 2 well encountered a residual oil column down-dip from the discovery well at Dunsborough 1. The commercial viability of the Frankland gas discovery and the oil discovery at Dunsborough is being reviewed using a detailed interpretation of the recently acquired Diana 3D seismic survey over the area.

### PRODUCTION

Production and reserves information to the end of the 2007 calendar year

for specific fields can be obtained from the tables section at the back of the magazine.

Five of the seven major sedimentary basins in Western Australia have known hydrocarbon accumulations, with 2007–08 production coming from the Carnarvon, Perth, Bonaparte and Canning basins. Sixty-one fields were on production during 2007–08 fiscal year. Four new fields were brought on line: the Apium gasfield in the northern Perth Basin, the Searipple gasfield and the Eskdale and Stybarrow oilfields in the Northern Carnarvon Basin.

Crude oil and condensate production averaged 0.052 GL/d (328,000 bbl/d) and average gas production was 0.079 Gm<sup>3</sup>/d (2.79 Bcf/d). The Northern Carnarvon Basin produced more than 94% of the hydrocarbons in the State (Fig. 4).

Production by basin for the 2007–08 fiscal year was as follows:

Basin	Oil (kL)	Condensate (kL)	Gas (kcm)
Carnarvon	11,591,911	5,849,975	28,702,474
Perth	667,403	2,499	265,611
Bonaparte	29,912	0	1,504
Canning	1,940	0	0
Total	12,291,166	5,852,474	28,969,589

Several factors affected production during the period. BHP Billiton's Stybarrow project reached peak production — its design capacity of 12,700 kL/d — in January 2008. Currently Stybarrow has the greatest oil production in WA. Production at several oil and gas fields on the North West Shelf was lower due to cyclone activity over a 10-day period in February. In addition, oil production from the Woollybutt field decreased as a result of repair work undertaken in January, a gas leak incident in April, and a planned shut in to tie back the Woollybutt 4H well in late May. Gas production was severely affected by an explosion at the Varanus Island facility in early June. In the Perth Basin operations and an unplanned operational shutdown at the Beharra Springs gasfield following a fire in December 2007 affected production. The plant was shut down while the cause of the fire was assessed and the necessary repairs undertaken. The damage was relatively minor and the repairs to the plant were completed in February.

### Varanus Island Incident

Varanus Island, approximately 75 km offshore, is the hub for the Harriet Joint Venture and John Brookes Joint Venture oil, condensate and gas gathering infrastructure. Apache is operator of both joint ventures, and is a 68.5 per cent owner of the Harriet Venture and a 55 per cent owner of the John Brookes Joint Venture. The facilities have a nominal production capacity of 400 TJ/day and produce approximately 365 TJ/day of gas and 1,430 kL/day of oil. Varanus Island handles approximately 30 per cent of Western Australia's domestic natural gas requirements.

On 3 June, Apache Corporation reported a pipeline rupture and fire at its Varanus Island gas processing and transportation hub offshore Western Australia. No one was injured and 153 people were evacuated following the onshore incident involving a pipeline transporting oil and gas from offshore production facilities to the island's processing facilities. The explosion and fire at the plant has affected export pipelines that deliver gas from Varanus Island to the domestic market.

On 23 June, Apache Energy released a media statement that outlined the completion of an initial assessment at its Varanus Island hub. It also outlined a timetable for restoring production.

The Apache Varanus Island facilities are licensed under the *Petroleum Pipelines Act 1969* (PPLA1969) as PL12. The Department of Industry and Resources is responsible for regulating the safety and integrity of facilities on Varanus Island under the *Petroleum Pipelines Act*. The department has been administering these responsibilities with input from the National Offshore Petroleum Safety Authority (NOPSA) under a service level agreement and other sources.

### Regulation

Regulation of the Varanus Island facilities is in accordance with the nationally accepted Safety Case approach, which is risk and objective based. Operators, such as Apache, are required to do risk assessment and develop appropriate safety management systems. Regulation is by assessment and acceptance of safety cases by regulators (DoIR on advice from NOPSA). Safety cases must be revised every five years. Since 2005, NOPSA has conducted six planned inspections on Varanus Island.

### Incident Investigation

The Department has authorised an investigation into the incident which is currently being undertaken by a team consisting of two NOPSA

representatives and one departmental inspector appointed under the *Petroleum Pipelines Act*. The process will take about 10 to 12 weeks before a report is completed and provided to the Minister. Release of that report, or parts of it, will be determined by the Minister.

### Facilitating the Re-start

The Department and NOPSA are also working with Apache to determine the process for early and safe resumption of gas and liquids production. On 13 June, approval was granted for the demolition and removal of the damaged infrastructure and clean up of the site. The Department is also reviewing the company's safety procedures for the demolition phase.

The company said export pipelines and associated valves, two compressors, instrumentation and control facilities are being repaired to meet the timetable of restoring production by mid-August.

### DEVELOPMENT ACTIVITY OFFSHORE

Many offshore developments are progressing on schedule. Some of the new fields discovered and currently in the process of being commercialised by Apache include Halyard, Julimar and Brunello.

### Angel

Float-over installation of the 7,400 tonne topsides was successfully completed on 1 April 2008. Installation of the subsea umbilicals was also completed during the period.



An aerial view of the pipeline incident location on Varanus Island  
(Photo courtesy of Apache Energy)

The project is being commissioned and is on schedule for first gas by September 2008.

### Browse

Appraisal activities and feasibility studies on development options are ongoing with Woodside aiming to achieve a final investment decision (FID) in 2010. Woodside favours either the Kimberley or the Burrup for its gas plant for the Browse gasfields. One of these will be selected in late 2008.

### Gorgon

Development of the Greater Gorgon gasfields involves subsea pipelines to Barrow Island and a gas processing facility on Barrow Island now consisting of three, 5 million tonne per annum (mta) LNG trains, expanding the capacity of the facility to 15 mta. The extra train will require additional environmental approvals.

### North Rankin B

Fabrication contracts were awarded during the period.

### NWS LNG Phase V Expansion

Construction and commissioning activities remain on schedule for the first LNG shipment in Q4 2008.

### Perseus over Goodwyn Project

Four producing wells were completed and will be tied in and commissioned during Q3 2008.

### Pluto

Construction works at the Burrup LNG Park are progressing. Construction of the LNG modules in Thailand commenced. Fabrication of the platform topsides in Malaysia and the platform jacket and piles in China also commenced in the first half of 2008.

Woodside is progressing engineering to be ready for a potential final investment decision for Train 2 in late 2008 subject to gas availability. Foster Wheeler Worley Parsons and Technip Chiyoda Fluor have been engaged to prepare project execution plans for the Train 2 Front End Engineering Design (FEED) phase. Finalisation of FEED will require identification of additional gas for the project.



The newly erected platform on the North West Shelf Venture's Angel gas project  
(Photo courtesy of Woodside Energy)





The Perseus-over-Goodwyn project involves new wells and a new trunkline to the Goodwyn "A" facility to develop southern and western parts of the Perseus and Searipple fields (Photo courtesy of Woodside Energy)

### Pyrenees

The Pyrenees project, an FPSO development scheduled to commence production in the first half of 2010, is operated by BHP Billiton Petroleum with partner, Apache Energy. Oil production is estimated to peak at approximately 13,500 kL/day, with a field life of 25 years.

### Reindeer

Apache Energy Ltd and its joint venture partner Santos Ltd announced the go-ahead for the development of the Reindeer field on 7 April 2008, with a production facility located at Devil Creek. The field has a gross recoverable resource of about 14 Gm<sup>3</sup> of gas.

The Devil Creek Development Project is a green field gas development comprising: an offshore gas production platform; an onshore and 105-km offshore gas supply pipeline; a gas processing plant and sales gas export pipeline tied into the Dampier to Bunbury Natural Gas Pipeline (DBNGP).

The project, currently in the FEED phase, is to be a new gas hub for

Western Australia located 40 km southwest of Dampier and will be operated by Apache. This facility will have a nominal capacity of 110 TJ/day and is expected to commence gas delivery from the Apache-operated Reindeer Field in mid 2010. Customers will include both resource and industrial operations. The development is expected to have a life of 20 to 30 years and, subject to obtaining all the necessary government approvals. Project construction should commence in late 2008 and be in production by mid 2010.

Efforts at Reindeer during the remainder of 2008 will consist of finalising the gas sales contract, drilling three development wells and beginning the detailed engineering phase of the project.

### Van Gogh

The Van Gogh project, which develops the northern section of the Vincent field, is scheduled to commence operations in early 2009. It is an FPSO development that will be operated by Apache on behalf of its partner INPEX. Oil production from the

Van Gogh development is estimated to peak at 10,000 kL/day, with a field life of 12 to 15 years.

### Vincent

The project is progressing towards an August 2008 start-up. Construction of the subsea infrastructure is now complete and the FPSO *Ngujima-Yin* is moored on location. All four production wells required for start-up are now completed.

### Wheatstone

Chevron announced that Wheatstone is to be a stand-alone LNG development, with a facility on the northwest coast of WA having an initial capacity of at least one 5 mtpa liquefaction train. Initially 127 Gm<sup>3</sup> of gas from the field will be used to feedstock for a new LNG processing plant to be located near Woodside's Pluto LNG site. The Wheatstone field was discovered in 2004, and has had two successful appraisal wells drilled (October 2007 and March 2008). The Wheatstone 1 well encountered 53 m of net gas sands and flowed at an equipment-constrained 1.5 Mm<sup>3</sup>/d on test. Water depth at the location is 200 m.

### Cossack, Wanaea, Lambert, Hermes and Egret

Woodside has paid \$398.5 million for Shell's North West Shelf interests in the Cossack, Wanaea, Lambert and Hermes (CWLH) oilfields as well as the Egret discovery. Woodside will now hold a 50 per cent interest in Egret, and a third share of the CWLH fields.

### ONSHORE

#### ARC Energy – AWE merger

In late April the Boards of ARC and Australian Worldwide Exploration (AWE) announced that they have unanimously agreed to merge to create Australia's leading mid-tier oil and gas company.

#### Barrow Island

A 13-well infill program (eight water injectors and five producers) was completed in February 2008 — to improve production and extend the life of the field, with most of the output coming from the Windalia sand member of the Muderong Shale. ■



Work is progressing at the onshore gas plant construction site for the Pluto LNG project, May 2008. (Photo courtesy of Woodside Energy)



The *Maersk Ngujima-Yin* FPSO will produce the Vincent oilfield (Photo courtesy of Keppel Offshore & Marine Limited)



Permian outcrop in the core of the Poole Range anticline. Massive sandstone cliffs of the upper Grant Group in the middle distance are disconformably overlain by the Poole Sandstone. The historic exploration well, Poole Range 3, was spudded in the foreground valley in 1927 (Photo courtesy of Peter Haines, GSWA)

**Richard Bruce**  
Exploration Geologist  
Resources Branch

## State Areas Released for Petroleum Exploration September 2008

DoIR continues to promote the petroleum potential of Western Australia's vast sedimentary basins using a specific area release system for both State Waters and onshore areas. A CD package accompanies the acreage release and contains information about the prospectivity of release areas, available data listings, land access and how to make a valid application for an Exploration Permit.

In September 2008, DoIR released three blocks in the Canning Basin (Fig. 1) and three blocks in the Officer Basin (Fig. 2).

Interest in the Canning Basin has increased in recent times, particularly with ARC Energy taking up an extensive acreage holding, drilling wells and acquiring 2D seismic. The three Canning Basin blocks range in size from 4,982 km<sup>2</sup> to 11,016 km<sup>2</sup>.

Basin fill for the Canning is essentially Paleozoic. Petroleum systems in the Kidson Sub-basin and surroundings can be subdivided into the sub-salt and supra-salt plays based on widespread salt seals in the Late Ordovician to Silurian Carribuddy Group.

Possible supra-salt targets include Permian sandstones and Devonian sandstones. The sub-salt play is characterised by the Carribuddy Group regional seal overlying Ordovician reservoirs, which in turn overlie an excellent source rock in the Goldwyer Formation.

All three areas have limited hydrocarbon exploration, however, the L08-8 and L08-10 areas do have wells within them, one of which has shown indications of hydrocarbons in the sub-salt sections and two nearby wells have had indications of oil and gas in the supra-salt section.

L08-9 has only three seismic lines and aeromagnetic covering the Waukarlyarly Embayment; these indicate a possible graben setting



Exploration well Empress 1/1A in the Officer Basin, WA  
(Photo courtesy of Mark K Stevens, PRD)

with depths to basement of up to three kilometres and the presence of a Paleozoic section overlain by the Grant Group. Trap types likely to be encountered include structural traps associated with rift faults and growth faulting and stratigraphic traps associated with carbonate platform build ups.

The three Officer Basin blocks range in size from 9,643 km<sup>2</sup> to 14,058 km<sup>2</sup>. Quality source, reservoir and seal have been found in this Neoproterozoic basin, and hydrocarbon shows have been found throughout the basin. Salt movement during the Areyonga Movement (750 Ma) produced two laterally persistent zones: salt-ruptured and thrust zones.

After Shell and Eagle Corporation surrendered their Officer Basin permits in the mid 1980s the area lay fallow for a decade until the GSWA did a major study of the basin from 1994 until 2005. This program included the drilling of stratigraphic core holes

Trainer 1, Empress 1/1A, Vines 1 and Lancer 1, as well as conducting new seismic and other geophysical surveys.

The main results from these GSWA studies were reported in two publications;

SIMEONOVA, A. P., and IASKY, R. P., 2005, Seismic mapping, salt deformation, and hydrocarbon potential of the central western Officer Basin, Western Australia: Western Australia Geological Survey, Report 98, 51p.

GREY, K., HOCKING, R. M., STEVENS, M. K., BAGAS, L., CARLSEN, G. M., IRIMIES, F., PIRAJNO, F., HAINES, P. W., and APAK, S. N., 2005, Lithostratigraphic nomenclature of the Officer Basin and correlative parts of the Paterson Orogen, Western Australia: Western Australia Geological Survey, Report 93, 89p.

Although the Officer Basin is remote from infrastructure, Simeonova and Iasky (2005) were able to

identify numerous structural leads from the existing seismic data. The stratigraphic framework of Neoproterozoic, and in particular the Buldya Group, has been significantly revised in Grey *et al.* (2005). Several reservoir–seal pairs are recognised within the Buldya Group and the regionally extensive salt beds within the Browne Formation provide the best possible seal. Thick source rocks have not been identified in any of the wells, but widespread shows, including oil bleeding from cores, suggest the presence of a viable petroleum system.

Work program bids for all six release areas close at 4pm on Thursday 5 March 2009.

Should you require any further information or assistance, please contact Richard Bruce (08 9222 3314) of DoIR's Petroleum and Royalties Division or Jeff Haworth (08 9222 3214) of the Geological Survey of Western Australia. All enquiries will be dealt with in strictest confidence. ■

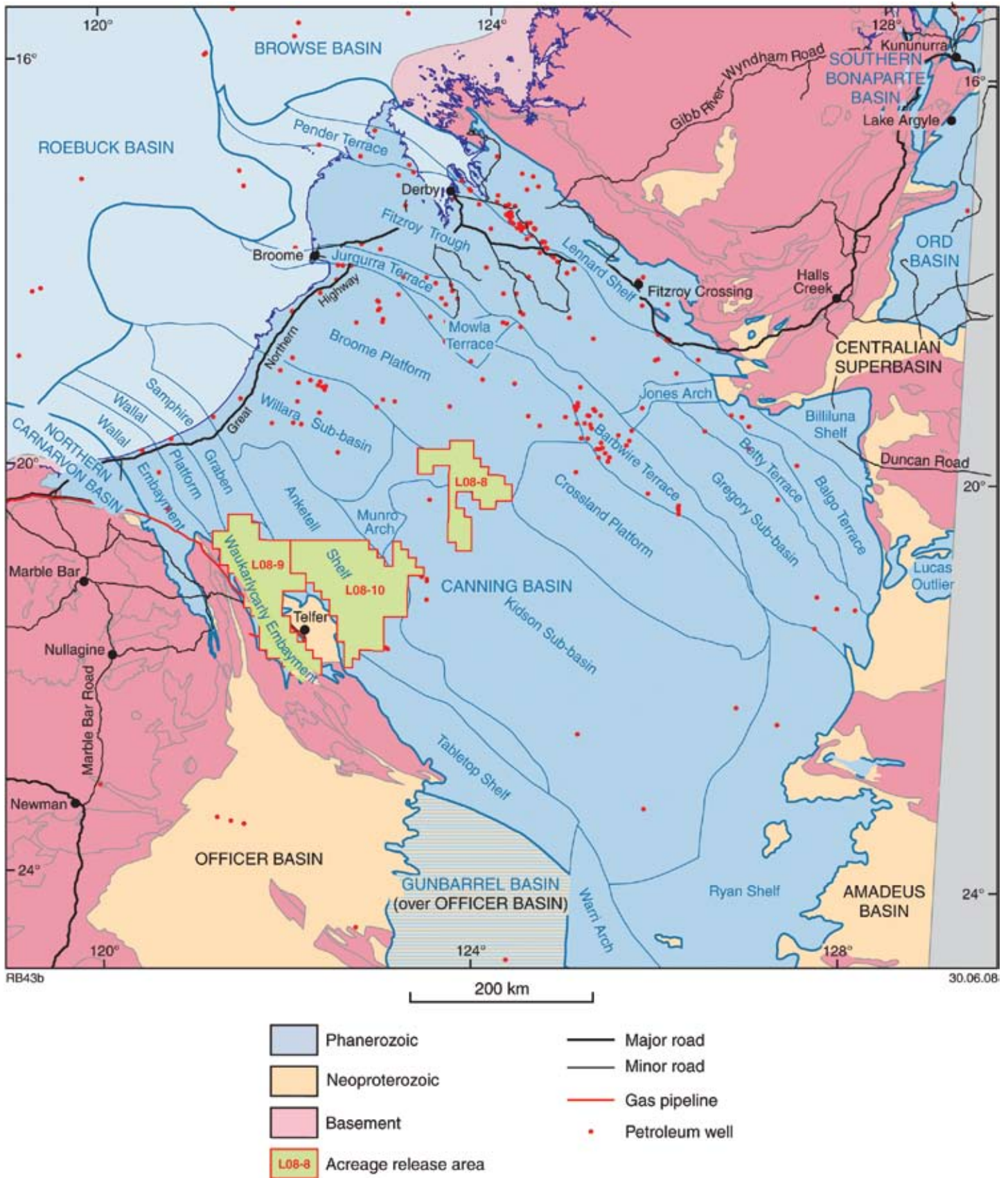


Figure 1 | SEPTEMBER 2008 CANNING BASIN RELEASE AREAS

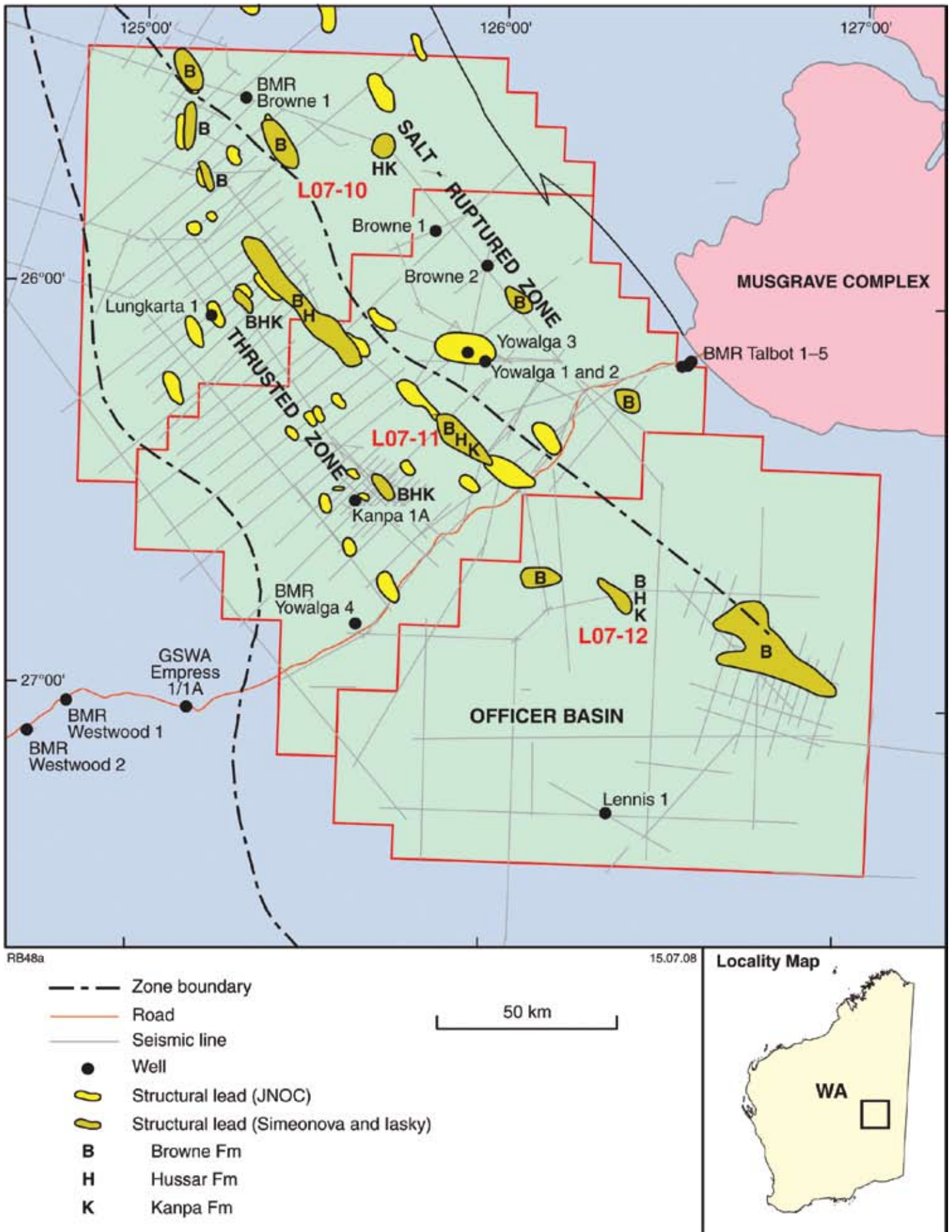
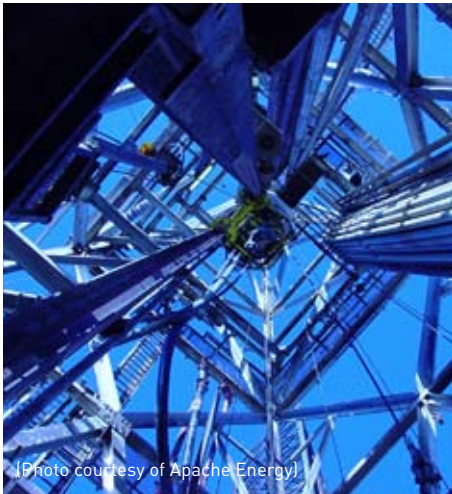


Figure 2 | SEPTEMBER 2008 OFFICER BASIN RELEASE AREAS SHOWING STRUCTURAL LEADS



(Photo courtesy of Apache Energy)

### Richard Bruce

Exploration Geologist  
Resources Branch

## Awards of Exploration Permits

### Commonwealth Release Closing 18 October 2007

There was a reasonable level of bidding for offshore exploration permits in Commonwealth waters in October 2007.

Round 1 of 2007 included Western Australian areas from the gas-rich Bonaparte Basin (W07-4), Browse Basin (W07-5, 6, 7) and Exmouth Plateau (W07-16, 17). Two areas in the Perth Basin were re-released (W06-19, 20). Five permits were granted.

In April 2008 permits granted were WA-408-P and WA-409-P.

**Permit WA-408-P** (released as W07-6) in the Browse Basin was granted to Total E & P Australia. The company proposed a guaranteed work program of 1,300-km<sup>2</sup> of new 3D seismic data, interpretation, studies and one well at an estimated cost of \$94 million. The secondary work program consists of studies at an estimated cost of \$6 million. There were three other bids for this area.

**Permit WA-409-P** (released as W07-16) in the Exmouth Plateau was granted to Cue Exploration Pty Ltd and Gascorp Pty Ltd. The companies proposed a guaranteed work program of 1,400-km<sup>2</sup> of new 2D seismic and studies

at an estimated cost of \$3 million. The secondary work program consists of one well and studies at an estimated cost of \$25.5 million. There were no other bids for this area.

In May 2008 permits granted were WA-410-P and WA-411-P.

**Permit WA-410-P** (released as W07-5) in the Browse Basin was granted to Chevron Australia Pty Ltd, Inpex Browse Ltd and Santos Offshore Pty Ltd. The companies proposed a guaranteed work program of purchase of 375-km<sup>2</sup> of 3D seismic data, and interpretation and studies at an estimated cost of \$760,000. The secondary work program consists of one well and studies at an estimated cost of \$30.5 million. There were no other bids for this area.

**Permit WA-411-P** (released as W07-7) in the Browse Basin was granted to Beach Petroleum Ltd, Inpex Browse Pty Ltd and Santos Offshore Pty Ltd. The companies proposed a guaranteed work program of purchase of 1425-km<sup>2</sup> of 3D seismic data, and interpretation and studies at an estimated cost of \$1.46 million. The secondary work program consists of one well and studies at an estimated cost of \$30.5 million. There were no other bids for this area.

In June 2008 the permit granted was WA-412-P.

**Permit WA-412-P** (released as W07-17) on the Exmouth Plateau was granted to Japan Energy Corporation. The company proposed a guaranteed work program of one well, 500-km<sup>2</sup> of new 3D seismic data, and reprocessing of 700-km of 2D seismic data at an estimated cost of \$44.6 million. The secondary work program consists of 200-km<sup>2</sup> 3D seismic acquisition and studies at an estimated cost of \$33.95 million. There were no other bids for this area.

The total investment commitment on these permits is \$270.27 million.

### State Release Closing 31 January 2008

This was a special release of one application area after interest was expressed by industry. This area was considered to have tight gas potential. There were two bids for application area L07-13 in the northern Perth Basin.

Warrego Energy was recommended for award of this area. The firm two-year period program includes core testing, a 250-km 2D seismic survey and drilling of West Erregulla 2 and West Erregulla 3, at an estimated cost of \$3.9 million. The secondary program includes a 250-km<sup>2</sup> 3D seismic survey, drilling of West Erregulla 4 and West Erregulla 5 and provides for gas pipeline connection, at an estimated cost of \$37.2 million.

### State Release Closing 6 March 2008

This release comprised three areas in the Canning Basin, three areas in the Officer Basin and one combined area in the Northern Carnarvon Basin.

There were two bids for application area L07-7, two bids for application area L07-8, and one bid for application area L07-9 in the Canning Basin. There were no bids for application areas in the Officer Basin and Northern Carnarvon Basin.

New Standard Exploration has been recommended for award of L07-7. For L07-7, the firm two-year period program includes 150-km 2D seismic survey, seismic reprocessing and two wells, at an estimated cost of \$6.6 million. The secondary program includes one well and a 200-km 2D seismic survey, at an estimated cost of \$11.25 million.

A joint venture comprising Backreef Oil and Chino Resources has been recommended for award of L07-8. For L07-8, the firm two-year period program includes 200-km 2D seismic survey, 500-km 2D seismic reprocessing and two wells, at an estimated cost of \$5.54 million. The secondary program includes three wells and a 200-km seismic survey, at an estimated cost of \$13.14 million.

ARC Energy has been recommended for award of L07-9. For L07-9, the firm two-year period program consists of 400-km 2D seismic survey, seismic reprocessing and two wells, at an estimated cost of \$11.25 million. The secondary program includes one well and a 200-km 2D seismic survey, at an estimated cost of \$5.7 million.

All successful applicants have been notified and the companies are actively negotiating Native Title agreements. Once this has been completed offers will be made. ■



# Western Australia OPPORTUNITIES TO EXPLORE

## BID FOR ACREAGE

(Bids close 5 March 2009)

Acreage release CD packages are available from the Department of Industry and Resources and a web version is also available:

[www.doir.wa.gov.au/acreage\\_release](http://www.doir.wa.gov.au/acreage_release)

The acreage release package contains information about the release areas, land access and how to make a valid application for an exploration permit.

### Canning Basin

There are three release areas in the essentially Paleozoic Canning Basin. The sizes of the release blocks range from 4,982 km<sup>2</sup> to 11,016 km<sup>2</sup>.

Across the world there are more than 130 giant and super-giant oil and gas fields with Paleozoic sources and reservoirs that are similar to those in the Canning Basin. The Canning Basin may be the least explored of the known Paleozoic basins with proven petroleum

systems. Current production is limited but proves the existence of petroleum systems.

Petroleum systems in the Kidson Sub-basin and surroundings can be subdivided into the sub-salt and supra-salt plays based on widespread salt seals in the late Ordovician to Silurian Carribuddy Group. Possible supra-salt targets include Permian sandstones and Devonian sandstones. The sub-salt play is characterised by the Carribuddy

Group regional seal overlying Ordovician reservoirs, which in turn overlie an excellent source rock in the Goldwyer Formation.

### Officer Basin

There are three release areas in the Officer Basin. The sizes of the release blocks range from 9,643 km<sup>2</sup> to 14,058 km<sup>2</sup>.

Quality source, reservoir and seal have been found in this Neoproterozoic basin, and hydrocarbon shows have

been found throughout the basin.

Salt movement during the Areyonga Movement (750 Ma) produced two laterally persistent zones: salt-ruptured and thrust zones. Numerous structural leads have been mapped by the Japan National Oil Company and the Geological Survey of Western Australia.

[www.doir.wa.gov.au](http://www.doir.wa.gov.au)

[www.doir.wa.gov.au/acreage\\_release](http://www.doir.wa.gov.au/acreage_release)

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# Petroleum Production in Western Australia — Past, Present and Future

## Reza Malek

General Manager Resources Petroleum and Royalties Division



The *Nganhurra* FPSO produces from the Enfield oilfield (Photo courtesy of Woodside Energy)

## Introduction

Over the past decade, Perth has become the centre of petroleum activities in Australia. Western Australia is currently the nation's largest petroleum producer and holds approximately 57 per cent of Australia's oil, 71 per cent of its condensate and 78 per cent of its gas reserves. The petroleum industry was the fastest growing economic sector in Western Australia during the 1990s and both national and international companies are being attracted to Perth.

Since the 1980s, petroleum production has increased substantially with the development of the North West Shelf (NWS) project. The primary focus of petroleum exploration continues to be the offshore Northern Carnarvon Basin.

The value of upstream and downstream petroleum projects being planned amounts to more than \$80 billion over the next few years. This will boost liquid production in the

foreseeable future. Most of the future oil developments come from Exmouth Sub-basin fields, containing heavy oil, and as such, will decline rapidly. The current boom in the liquefied natural gas (LNG) market underpins a number of LNG developments, such as Gorgon, Jansz-10 and Ichthys, and it is expected that the industry will apply to develop other LNG projects in the near future. The majority of these oil and LNG developments are expected to come on stream during the coming decade.

These petroleum development projects will benefit Western Australians through an increase in royalty revenue for the Government, new employment, regional development, and infrastructure development. These projects are crucial to both State and nation as they provide Australia with a greater degree of self-sufficiency in liquid production, as well as additional security of supply.

However, there are challenges ahead. Both liquid production and the associated royalties from producing fields are declining fast. Australia's major producing basins have matured and to maintain oil production in

Western Australia there is an urgent need to promote and facilitate exploration activities in the Canning Basin and facilitate and encourage industry's efforts for exploration in other frontier basins.

Australia needs to grow its domestic reserves base, particularly its liquids. Unless there are increased industry efforts, along with government assistance in this respect, Australia's self-sufficiency in liquid hydrocarbon production will drop from 75 per cent to 25 per cent by the year 2020, according to the Australian Bureau of Agricultural and Resource Economics (ABARE). This will have a significant impact on Australia's balance of payments and on Government taxation revenue.

In this current booming environment for the petroleum industry, more than ever, DoIR's Petroleum and Royalties Division is conscious of the priorities of companies undertaking exploration activities. The Division, therefore, endeavours to undertake approval processes with definite timelines in mind so as to maximise potential development opportunities presented to this key sector of the Western Australian economy.

## Background

Petroleum operations in Western Australia began more than 90 years ago when several shallow wells were drilled near the south coast. Large scale exploration did not begin until 1952. Western Australia's first significant crude oil flowed at a rate of 87 kL/d (550 bbl/d) at Rough Range near Exmouth in 1953. However, production stopped after producing 1,412 kL (8,881 bbl) and follow-up wells were dry. The first commercial discovery was made in 1964 when WAPET found oil at Barrow Island. In 1971, the Scott Reef gasfield was the first offshore gas condensate discovery in Western Australia.

Western Australia is the nation's largest oil and gas producer. Oil production has grown approximately 12.5 per cent per annum since 1990. Resource royalties play a major role for government revenues and this underlines the importance of petroleum to the resources sector.

Since the 1990s there has been an increase in the value of petroleum produced in Western Australia from around \$2.2 billion to nearly \$16.4 billion in 2006–07. Petroleum production is the second most valuable resource commodity produced in Western Australia after iron ore, and royalties from petroleum production are the second most important revenue source for the Western Australian Government. In the 2006–07 year, the value of petroleum receipts was \$714 million, or around 34 per cent of the resources sector royalty receipts.

## Major Sedimentary Basins

There are seven sedimentary basins which cover an estimated 2.1 million km<sup>2</sup> (including the continental shelf) and in five there have been hydrocarbon shows. Economic production comes only from the offshore Northern Carnarvon Basin, the northern Perth Basin, and the onshore Canning Basin.

Western Australia is one of the least explored territories in the world with one exploration well per 3,124 km<sup>2</sup> offshore and one well per 2,647 km<sup>2</sup> onshore. On the NWS, well density is one well per 100 km<sup>2</sup>. This vast resource region is one of the most attractive exploration targets in the world. Fifty to seventy per cent of the Australia's exploration expenditure was spent in Western Australia during the past decade.

The Northern Carnarvon Basin is the most productive basin in Western Australia and has been the focus of much exploration activity over the past 30 years. Presently 98 per cent of hydrocarbon production comes from the fields in the Northern Carnarvon Basin and this is likely to increase considerably in the near future with several fields to be brought on stream including Vincent, Van Gogh, Angel and Gorgon.

The offshore Perth Basin is a relatively old play fairway that is being revisited as of late by several companies with some excellent results. There are a number of oil and gas fields in production onshore and one offshore. The Browse and Bonaparte basins are relatively under-explored. Recently, activity has increased significantly in the offshore Browse Basin, and despite the Bonaparte only having one producing field it is believed there is significant potential in these northern offshore basins.

## Production and Reserves

Due to a combination of factors, including the State's oil and gas endowment and comprehensive infrastructure, the petroleum industry was the fastest growing economic sector during the 1990s. The number of developed and producing fields has almost doubled over the past decade. In 2007 there were 68 producing fields. During that year seven new fields came on stream: Apium, Doric, Eskdale, Lee, Searipple, Stybarrow, and West Cycad.

Western Australia's total P50 estimated liquid and gas petroleum resources at the end of December 2007 were 455 GL (2.86 Bstb) and 3704 Gm<sup>3</sup> (131 Tscf), respectively. Average liquid petroleum and gas production during 2007 were 52.2 ML/d (328,000 bbl/d) and 80 Mm<sup>3</sup>/d (2.8 Bscf/d), respectively. A cumulative total of 228 Mm<sup>3</sup> (1,435 MMstb) crude, 92.5 Mm<sup>3</sup> (582 MMstb) condensate and 448 Gm<sup>3</sup> (15.8 Tscf) gas had been produced from Western Australian oil- and gasfields, to 31 December 2007 (Table 1).

Currently, the State's gas and petroleum liquid production exceeds that of Victoria's Gippsland Basin. Figure 1 shows daily liquid production from Western Australia, Victoria and combined other States, for the period 1984 to 2007.

Hydrocarbon forecasts for Western Australia are depicted in Figures 2 and 3 and include upcoming projects (see next section). A peak in oil production is expected around 2008–09 mainly attributable to the development of heavy oilfields in the Exmouth Sub-basin and there is a sharp decline after this point (Fig. 2). Between 2010 and 2020, condensate production from gas condensate fields will play a key role in maintaining liquid hydrocarbon production in the future (Fig. 3). Since condensate production comes principally from LNG developments, the forecast decline in condensate production is much slower than the decline in oil production.

## Current and Future Developments

A number of significant oil and gas projects are to be developed in the next decade in Western Australia. Some of the most important new oil discoveries from the last five years are located in the Exmouth Sub-basin and include Enfield, Vincent, Pyrenees, Van Gogh, and Stybarrow fields, which contain more than 48 GL (300 MMbbl) of heavy crude reserves combined.

**Table 1. Western Australia's Petroleum Production and Resources Summary**

Metric Units	Category	Oil	Condensate	Gas
		(GL)	(GL)	(Gm <sup>3</sup> )
Initial Reserves	P90	316.168	273.967	2,908.832
	P50	389.386	386.138	4,152.235
2007 Production		12.960	6.090	29.230
Cumulative Production at 31 December 2007		228.170	92.510	447.670
Remaining Resources	P90	87.998	181.457	2,461.162
	P50	161.216	293.628	3,704.565

Field Units	Category	Oil	Condensate	Gas
		(MMstb)	(MMstb)	(Tscf)
Initial Reserves	P90	1,988.633	1,723.198	102,724.529
	P50	2,449.160	2,428.731	146,634.933
2007 Production		81.516	38.305	1,032.249
Cumulative Production at 31 December 2007		1,435.144	581.869	15.809
Remaining Resources	P90	553.490	1,141.328	86,915.198
	P50	1,014.016	1,846.861	130,825.602

These fields are expected to come on stream before the end of this decade and their combined initial production is estimated at nearly 40,000 kL/d (250,000 bbl/d). However, the development of these fields faces a number of technical challenges. The oil is heavy (17–22° API) with relatively high viscosity (7–11 cp), and some of the fields have thin oil legs. As such, their production will decline very rapidly.

Western Australia has estimated natural gas resources of more than 3,168 Gm<sup>3</sup> (130 Tcf). Australia is strategically located to supply LNG throughout the Asia Pacific region with LNG exports playing an increasingly important role in the Western Australian energy scene.

In the next decade several significant gas discoveries on the North West Shelf such as Greater Gorgon, Jansz–Io, and Scott Reef–Brecknock, each in excess of 560 Gm<sup>3</sup> (20 Tcf), will be brought on stream supplying export LNG. These forthcoming developments include fields that were regarded as stranded gas when they were discovered 20 to 30 years ago.

While some of these gasfields contain significant condensate reserves, producing this condensate would depend on the timeframe of the LNG contracts.

Fields with a low condensate-gas ratio (CGR), i.e. less than 56 m<sup>3</sup>/Mm<sup>3</sup> (10 bbl/MMscf), such as Gorgon, Jansz–Io, and Scarborough, would not have a significant contribution to condensate production.

The Browse Basin contains the Brecknock, Brecknock South, Torosa and Ichthys gas-condensate discoveries. Combined, these fields represent substantial undeveloped resources. For Ichthys, with a CGR of over 280 m<sup>3</sup>/Mm<sup>3</sup> (50 bbl/MMscf), and the Brecknock fields, which are expected to have a combined daily condensate production of 12.7 ML/d (80,000 bbl/d) sustainable for more than 20 years, the contribution is much more significant. However, the development of the 10–14 per cent CO<sub>2</sub> Browse Basin fields must overcome a major challenge of how and where to sequester CO<sub>2</sub> in the current environmental climate.

### Future Production and Self-Sufficiency

The upstream petroleum industry faces major challenges during the next two decades such as increased oil price and self-sufficiency, a widening gap between domestic supply and demand, maturity of current producing basins which requires enhanced onshore exploration, finding new frontier

basins, diversification of Australian consumption, enhancing production from current fields and Government regulatory reforms to introduce a more competitive regulatory regime in Australia.

Disruption of energy supplies can have a profound impact on Australians and Australian industry. During the next ten years Australia will be facing declining domestic production and increasing reliance on oil imports, particularly imports from the Middle East. The costs from short-term disruptions to supply can be substantial. With increasing reliance on Middle Eastern and other imported oil, the risk of such disruptions will also increase.

Figure 4 shows how much of Australia's liquid hydrocarbons demand has been, and is expected to be, met by imports. While total domestic oil and condensate production has remained approximately on a plateau over the past decade, consumption of liquid hydrocarbons has been increasing (at an average rate of 1.9 per cent per annum). Consequently, the percentage of consumption met by imports has also increased from around 5 per cent in 1990 to more than 20 per cent in the latter part of the 1990s.

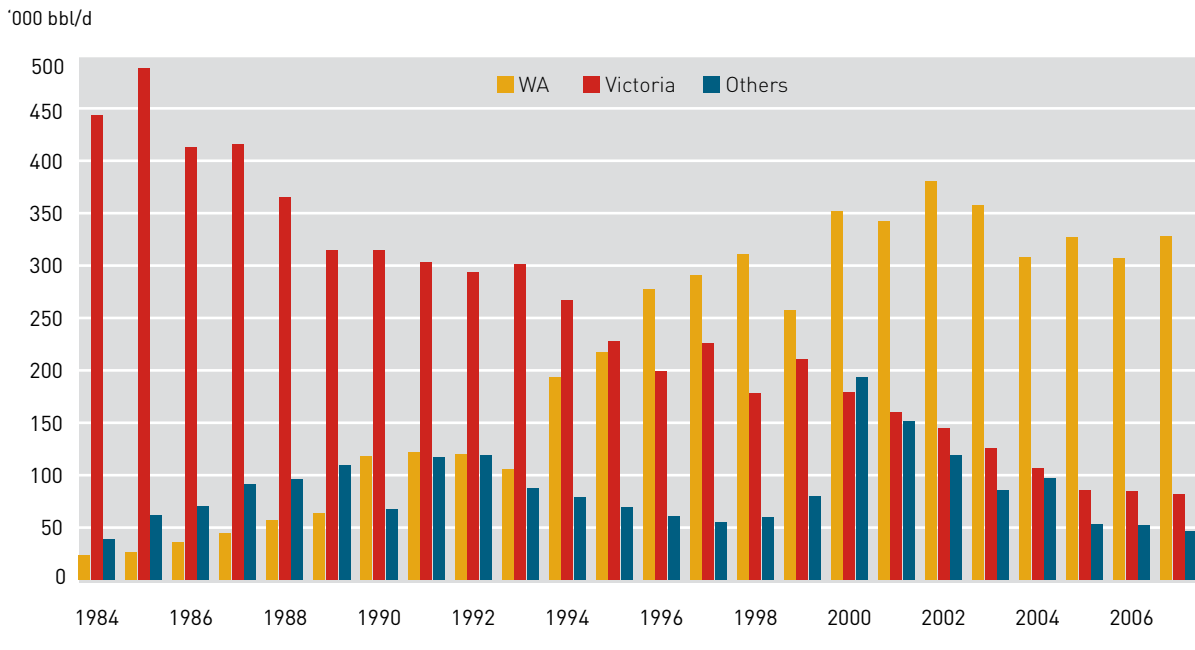


Figure 1 | AUSTRALIAN CRUDE AND CONDENSATE PRODUCTION COMPARISON

As shown in Figure 4 Australian liquid hydrocarbon production (crude oil and condensate) is currently 65 per cent of its domestic demand and if no action is taken, it will drop to 45 per cent by 2020.

On the basis of the current consumption and production projections, Australia has been consuming oil three times faster than it has been discovering it. In 2004–05, oil was imported at rates greater than 24 GL/yr (150 MMbbl/yr). The projection is that oil will need to be imported at a rate of more than 32 GL/yr (200 MMbbl/yr) in 2009–10.

Oil imports of this magnitude will have a significant impact on Australia's balance of payments and exchange rate with consequential effects on Australia's international competitiveness and standard of living. Another important consequence is the impact on Government taxation revenue. Governments are major beneficiaries of a healthy upstream oil and gas industry.

According to the same projection performed in 2005, the approximate halving of oil and condensate production over the next decade would reduce Commonwealth tax collections from the upstream

petroleum industry by at least \$1 billion a year. However, if the current oil prices prevail the projected losses would be substantially higher.

### Australia's Global Attractiveness

According to a recent Wood Mackenzie study, relative to other oil and gas producing countries, Australia has a very attractive fiscal regime, presenting a relatively low financial burden on oil and gas production. Australia is likewise ranked extremely highly in regard to the extent of its fiscal stability and therefore, ranked extremely highly in terms of very low sovereign risk.

However, Australia's crude and condensate reserves are less than one per cent of world reserves and industry's perception is it is very unlikely that oilfields larger than 80 GL (500 MMbbl) can still be found. This explains why Australian majors are moving overseas to the US and Africa.

Australia is regarded as maturing and lacking prospectivity. The challenge is how to make Australia more attractive for exploration and development by providing more technical data for frontier basins and reviewing Australia's regulatory and taxation regimes.

### Way Forward

To maintain Western Australia's current level of C+C production, new basins need to be discovered. The Canning Basin is a vast frontier basin with difficult geology, uncertain prospectivity, and remoteness from infrastructure which explorers find daunting. Political risk in Australia is perceived by overseas corporations to be low, but native title and environmental issues could change that perception if not properly handled.

A long-term strategy for the Canning Basin is required to attract companies which have the resources to take on substantial exploration risk, a willingness to fulfil permit obligations, and the tenacity to resolve native title claims. The objective of a longer-term approach is to attract exploration programs that are extensive, operator-funded, and more likely to lead to hydrocarbon production and royalty sustainability.

One option to sustain indigenous oil production is to increase the ultimate recovery from existing fields. Therefore, enhanced production from Barrow Island oilfield, which still contains around 111–127 GL (700–800 MMbbl) of oil in-place, can play a major role in the sustainability

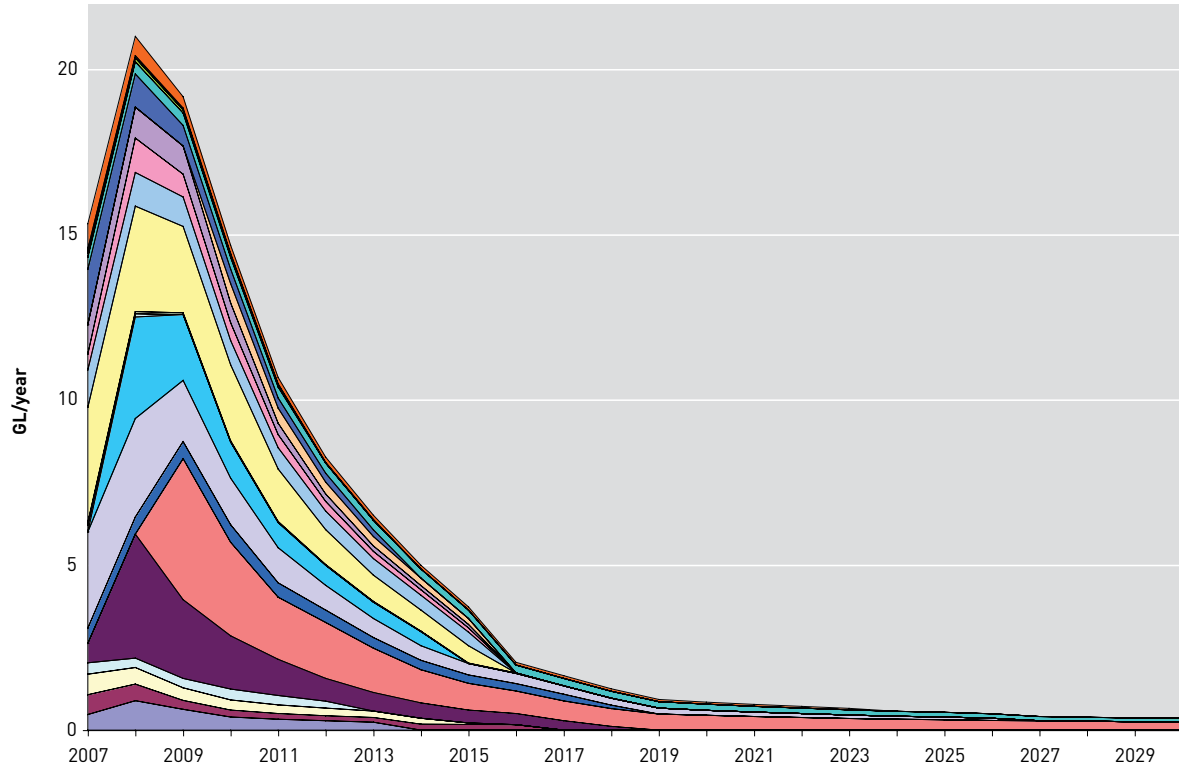


Figure 2 | **CRUDE OIL PRODUCTION FORECAST FOR WESTERN AUSTRALIA, SHOWING THE OIL PEAK OCCURRING AROUND 2008–2009, AND DECLINING SHARPLY AFTER THAT**

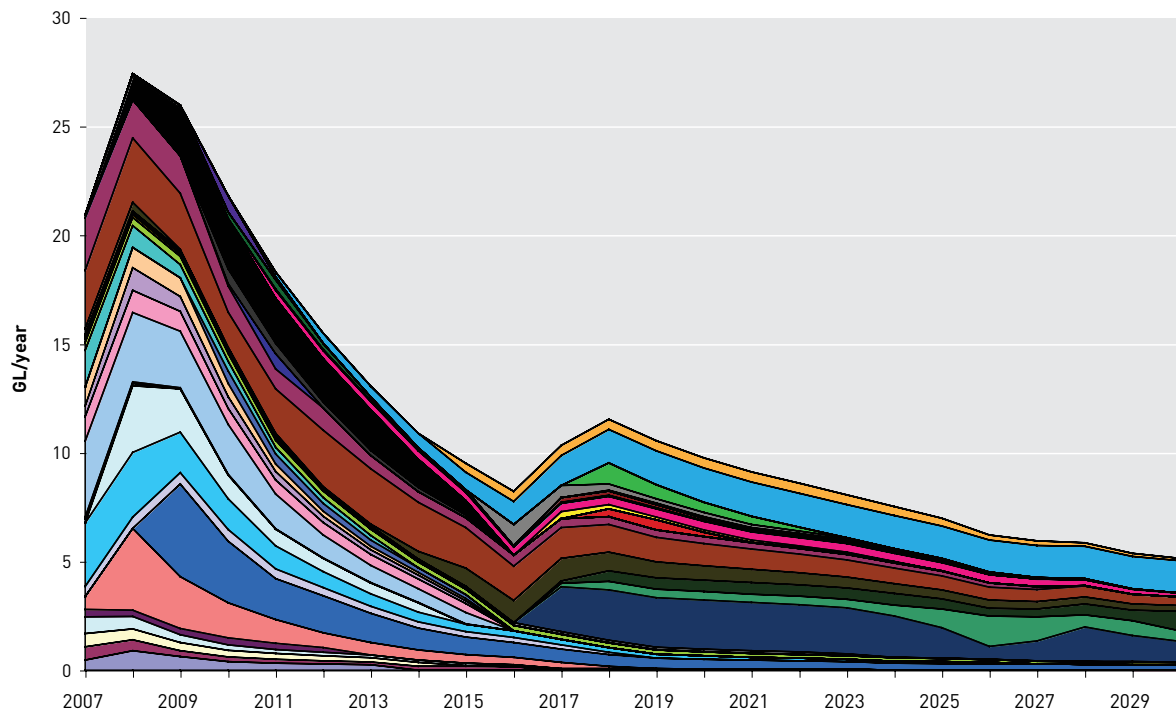


Figure 3 | **CRUDE OIL AND CONDENSATE PRODUCTION FORECAST FOR WESTERN AUSTRALIA, SHOWING THE SLOWER DECLINE FOR CONDENSATE COMPARED TO OIL.**

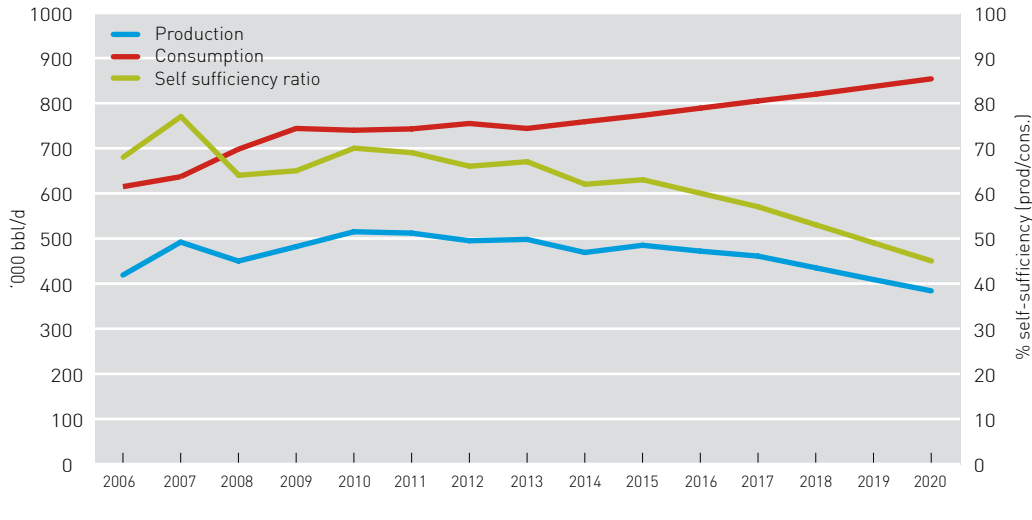


Figure 4 | **AUSTRALIA'S PRODUCTION AND DEMAND FOR CRUDE OIL AND CONDENSATE TO 2025, SHOWING AUSTRALIA'S SELF-SUFFICIENCY RATIO**

Source: ABARE, 2004, 2008

of Australia's oil production if correct technical measures are taken to enhance recovery.

There is scope for recovery of over 159–318 GL (100–200 MMbbl) if appropriate enhanced oil recovery methods are employed and further exploration and appraisal activities are carried out on Barrow Island. At a current oil price of A\$140/bbl this translates into potential royalties of over \$4 billion for the Governments.

Oil shales are found in Western Australia with the potential to produce significant amounts of oil and associated royalties to the State. Oil shales are found in the Eucla, Officer and Carnarvon basins. These areas are covered by a network of wide, low relief elongated depressions filled with Tertiary to Recent sediments and commonly characterised by chains of saline lakes. In 1989, the Resources Branch of the Petroleum and Royalties Division conducted a preliminary study of the oil shales

within Western Australia. This study identified a significant hydrocarbon accumulation within Exploration Permit 147 known as Gilmore Lake. The volumetric estimates of the oil shales at Gilmore Lake, based on the isopach map and core analysis results suggest original oil in place as 150 GL (940 MMbbl) or higher. Recoverable reserves are estimated at 64 GL (400 MMbbl) or higher.

In recent years, the Resources Branch performed a series of studies on the impact of regional aquifer depletion on oil loss. This is another area that needs to be taken more seriously.

More Commonwealth areas were released last year for exploration. The Federal Government funded \$60 million for Geoscience Australia to carry out pre-competitive research. It is going to introduce new terms for exploration in frontier areas. Also, the Commonwealth made significant changes to the regulatory scene in the last ten years replacing

inflexible regulations with a set of objective-based regulations.

The Western Australian Government has helped to ensure that the State is at the cutting edge of new technological developments. It announced \$13 million funding for a new centre of excellence in oil and gas training, \$20 million towards the WA Energy Alliance in cooperation with industry and \$12 million for the Geological Survey of Western Australia for pre-competitive research. In addition, the Government spent \$183 million for the provision of common user infrastructure on the Burrup Peninsula, and \$103 million for the deepening of Geraldton Port.

The Government made a new commitment for the next four years to spend \$400 million on upgrading ports and \$1.8 billion on energy infrastructure, but more needs to be done to invigorate the Western Australian petroleum industry. ■

# The Petroleum and Royalties Division — Going the Extra Mile

## History of the Petroleum Division of Western Australia

### Bill Mason

Retired Manager of the Policy, Legislation and Titles Branch, PRD

I have been asked to write an article focusing on the role and identities, past and present, of the Petroleum and Royalties Division which perhaps should now be called the Petroleum and Geothermal Energy Resources and Royalties Division. Regardless, I will simply refer to it as the Division so as not to offend anyone's sensibilities.

Having been involved with the administration of the petroleum legislation in Western Australia since 1967, I believe I'm well able to contribute to this article. Indeed I am proud to do so, as it is a Division which has always gone 'the extra mile'. However, I must confess, after some 40 years of excitement, the dates and perhaps individuals may have slipped my mind. Certainly, if I refer to a date, which I must on occasion, it will be a mere approximation. I must also acknowledge the help of Steve Walsh who is now the longest serving member of the Division. His memory — while more reliable than mine — may also be suspect.

With these caveats in mind dear reader, press on.

In the beginning, (not in the biblical sense, but in the 1960s) when the Commonwealth realised that the States had been granting petroleum titles which covered large areas of the continental shelf, it thought it should also be involved, especially

as it was a signatory to the Geneva Convention on the Continental Shelf. The Commonwealth initiated deep and meaningful discussions with the States and eventually devised an Act which would apply to petroleum exploration and exploitation in the Nations' submerged lands.

Developing a suitable petroleum code was fairly straight forward and achieved by borrowing bits from other successful systems around the world. Western Australia's representative on the working group was the Principal Registrar of the day — Wallace Yeo Reed Gannon or the "bear" as he was affectionately known. Wally (although I wouldn't have dared called him anything than Mr Gannon or Sir in my younger days) was a straight forward, jovial and enthusiastic man, who worked tirelessly to ensure that Western Australia's special circumstances were taken into account.

At that stage the States and the Commonwealth were still uncertain (or more accurately, could not agree) as to who had sovereignty over the Nation's offshore waters and the decision was made to enact mirror legislation and grant petroleum titles under Acts of both the States and the Commonwealth.

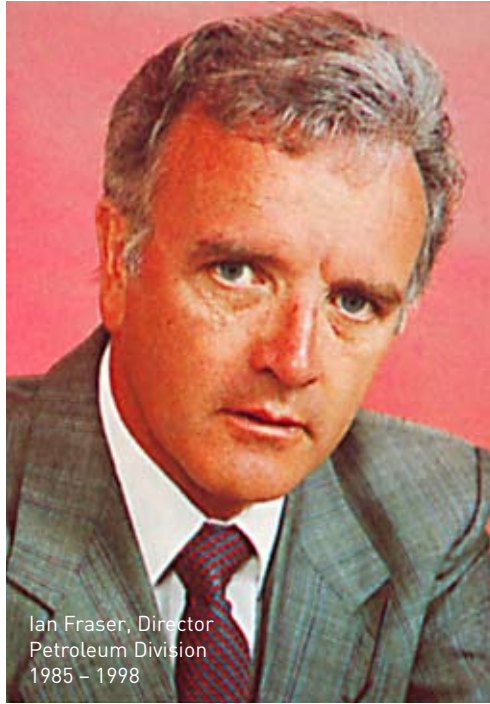
While the Act was primarily involved in managing titles, obviously some expertise in petroleum operations

was necessary and so WA created a Petroleum Engineer's position to oversee such matters. That engineer was to be located in the State Mining Engineers Branch. Advertisements were made worldwide and resulted in an Englishman, John Sharp, being appointed in September 1968. John, who had considerable experience in the petroleum industry in fairly remote and inhospitable parts of the world, was keen to settle in Perth, which although still remote was hospitable. John quickly realised that he was somewhat an anomaly in the State Mining Engineer's Branch which was more concerned with digging big holes, crushing things and creating mullock dumps. Petroleum people were more sophisticated than that and John lobbied to have a separate Petroleum Branch created. The Department recognised the sense of this and in 1977 (or there abouts) appointed him as the Director of the Petroleum Division. He was quickly joined by other technocrats — Peter Hammet, Tony Pippett and Rod Cope, to name but a few.

Title matters were handled by the Department's Mineral Titles Division (or Mining Registration Branch as it was then known) usually on a part time basis. However, it was realised that at least one person should be dedicated to petroleum matters and Stephen Hill was the man. Stephen was nicknamed 'Sol' after a popular "oils ain't oils" advertisement for



John Sharp, Petroleum Engineer, and first Director of the Petroleum Branch/Division (1968 – 1985)



Ian Fraser, Director Petroleum Division 1985 – 1998



Bill Tinapple, Director Petroleum and Royalties Division 1998 – present

Castrol and that may be the reason he got the job. Regardless, Stephen did the job well and remained loyal to the petroleum effort for the rest of his career.

The upstream petroleum industry continued to flourish with Barrow Island oil under-pinning interest in the region. Gas had also been discovered at Dongara in the 1970s and the *Petroleum Pipelines Act 1969* for onshore pipelines was enacted to enable the Parmelia pipeline to be constructed.

Offshore, the discovery of gas at North Rankin in 1971 gave rise to the multi-billion dollar North West Shelf Development, which would provide for the export of LNG and the creation of a domestic gas network, via the Dampier to Bunbury Gas Pipeline. It was a far-sighted plan championed by Sir Charles Court and one which was to consolidate the State's economic development.

Other technologists has joined the Division, as their expertise was needed — Peter Willmott – Reservoir Engineer, David Schonhutt – Construction Engineer, Keith Crank and Rod Dedman – Explorationists.

In 1981, Steve Walsh joined the Division. Steve had gained much practical experience in petroleum exploration as well as an appreciation for conducting business safely, and he and Peter Hammett were responsible

for ensuring that operations were conducted safely, didn't harm the environment and that the field was produced appropriately. In short, they knew what was meant by good oil field practice. Talk about multi-skilled! Steve Walsh is still there and still providing practical advice. He may even give you his recipe for fig jam, if you ask nicely.

On the retirement of John Sharp in 1985, the Director's position was taken up by Ian Fraser, a geophysicist from Canada who much preferred to be regarded as a Scotsman. Ian had been poached from the Victorian Government, and he was very much aware that Perth was soon to become Australia's oil capital.

Ian was a charismatic fellow who, with his wide experience was quick to try new ideas to stimulate exploration, particularly onshore. While Ian's entrepreneurial flair was good for the Division it was only made possible by the hard work and reliability of the Petroleum Division Officers.

At about that time the Commonwealth has decided that it did have sovereignty over all offshore waters, other than historic waters of the States and enacted the *Seas and Submerged Lands Act 1973*. While the Act was challenged by all the States in the High Court, that challenge failed and as a concession, the States were given jurisdiction over their

three nautical mile territorial sea (provided they observed the common mining code. The States were also given an involvement, by way of a Joint Authority, in the administration of the petroleum resources of the Continental Shelf, beyond the territorial sea, as Designated Authority.

As you can imagine the conversion of existing titles, particularly those that straddled the jurisdictional zones, created a great deal of work and it was about this time that petroleum titles people, working in the Mining Registration Branch were absorbed into the Petroleum Division. The Titles Branch had also grown and there was myself, Stephen Hill, a young Stephen Collyer and the newly recruited Colin Harvey. Both Stephen and Colin are still in the Division and are regarded as key assets — Colin, for his in-depth understanding of the legislation and his patient and calm attitude and Stephen, for his knowledge of Registry matters.

Before moving on to other significant events which have shaped the Division, I will augment my earlier caveat by saying that the following isn't necessarily in correct chronological order and I'm claiming poetic licence or Alzheimer's.

During Ian's reign, the Division was confronted by the workers sit-in on the North Rankin platform which



according to Ian was solved by him, over a lunch. However, another significant event which was to shape the way safety was dealt with, was the 1988 Piper Alpha disaster in the North Sea. The remedies flowing from that disaster included the development of the safety case system, which relied less on general prescription and more on individual plans for the mitigation of risk and a tailored emergency response.

At that time, or as near as I can recall, the Division created a Safety and Environment Branch which was initially headed by Peter Coghlan and subsequently by Richard Craddock.

The Division also recognised the value of having an electronic register, especially as Canberra needed to have immediate access to titles data. It is appropriate that I mention the support and enthusiasm of Loek Haarman in developing the electronic register. Although not a member of the Division, Loek, together with Stephen Hill, was largely responsible for designing the PETMAN registry system. That system has since been redeveloped into PGR (Petroleum and Geothermal Register) and Loek has contributed significantly to that, along with Stephen Collyer, Hazel Harnwell, Henrietta Wong and others. I'm proud to say that the Division's petroleum register is regarded as the best in Australia.

Other significant events were the construction of the Goldfields Gas Pipeline and numerous laterals to the pipelines, all of which were carried out under the watchful eye of Khalil Ihdahid, the Division's long-standing and well-respected pipeline engineer.

Also of significant impact was the advent of the Commonwealth's *Native Title Act* (NTA) in 1993, (I'm sure of that date at least) which was destined to have a profound effect on the resources industry. The impact on the petroleum industry was somewhat over-shadowed by the problems being experienced by the minerals industry and with the thousands of applications it needed to submit to the NTA process. Fortunately, the Division was eventually able to secure the services of Maryie Platt who has worked tirelessly to reduce the

backlog of petroleum applications struggling through the *Native Title Act* processes.

On the retirement of Keith Crank as Exploration Manager, that position was taken up by Peter Baillie. Peter, who had been coaxed away from the Tasmanian Government, was a talented geologist with an eccentric taste in neck ties. It was always fascinating to match his mood to his tie. Eventually Peter realised that the Division had too many eccentrics and jumped ship to Industry.

In about 1996, the Division acquired its own cartographer unit. Prior to that, all cartographic work for the Department had been undertaken by the Surveys and Mapping Branch. Mapping plays a major role in titles management and the old adage that a picture is worth a thousand words is certainly true for petroleum titles. The Division is fortunate in having a talented group of cartographers ably led by Neil Sadlier.

On Ian Fraser's retirement in May 1998, Bill Tinapple was recruited from the Northern Territory in June. Certainly their loss has been Western Australia's gain. Bill, with his worldwide experience as a Petroleum Engineer and optimism, has assisted in a renewed interest in the State's onshore basins and the development of tight gas reservoirs.

During Bill's stewardship of the Division, there have been many significant events, namely the creation of the National Offshore Petroleum Safety Authority which took over the responsibility for safety in the offshore petroleum industry all around the Nation; the revitalisation of interest in the Perth Basin both onshore and offshore; and the relocation of the Division's Safety officers to the Department of Consumer and Employee Protection.

Adopting the Royalties Branch in 2005 proved to be a positive and agreeable acquisition for the Division, in contrast to the separation of the Safety Officers, which was a somewhat acrimonious event.

More recently, provision has been in the *Petroleum Act* for the exploration for a production of geothermal energy

and now the commencement of the *Offshore Petroleum Act 2006* which is the plain English replacement of the Commonwealth's *Petroleum (Submerged Lands) Act 1967*.

Many of these events occurred during a time when the Department was experiencing considerable change and being amalgamated and re-amalgamated into a super Department which, or so it seemed, changed its name, vision and mission statement every other month.

Fortunately, Bill has had the assistance of some very good people, including his personable PA (or Business Support Officer), Kaye Smith, who is indeed a treasure; Mark Gabrielson, who has, in a very adept manner handled the Division's budget and management programs; David Norris, the calm and reliable Royalties Manager; Beverley Bower, who has recently taken charge of the Titles and Land Access Branch; and finally, the enthusiastic and energetic Reza Malek, the General Manager of the Resources Branch.

I have named but a few of the people who work or have worked in the Division. Regretfully, to mention all of them is beyond the scope of this article. Of course, the contribution made by all who have worked in the Division is responsible for its success. One day I hope to write a more comprehensive and chronologically accurate history. In the meantime, the "unsung heroes" will have to be content in the knowledge they have all contributed to the economic well-being of Western Australia and indeed to all the Country.

It only remains to wish the Division all the best in continuing the good work and perhaps remind them of Matthew 5, 41 "and whoever shall compel thee to go a mile, go with him twain." As you will recall from your bible classes, the reference was likely about tax collectors. What I'm suggesting, however, is that the Division goes the extra mile for the tax payer — in this case, the rightful owners of the petroleum resources, the Western Australian public. ■

## Proclamation of the *Offshore Petroleum Act 2006*

### Eric Cormack

Project Officer, Business Support  
Strategic Business Development Branch



The *Commonwealth Offshore Petroleum Act 2006 (OPA)* and associated Acts commenced by proclamation on 1 July 2008 and this means that, from this date, the *Petroleum (Submerged Lands) Act 1967 (PSLA)* and associated Acts were repealed.

The new OPA and associated Acts are:

- *Offshore Petroleum Act 2006*;
- *Offshore Petroleum (Annual Fees) Act 2006*;
- *Offshore Petroleum (Registration Fees) Act 2006*; and
- *Offshore Petroleum (Royalty) Act 2006*.

The repealed PSLA and associated Acts are:

- *Petroleum (Submerged Lands) Act 1967*;
- *Petroleum (Submerged Lands) Fees Act 1994*;
- *Petroleum (Submerged Lands) (Registration Fees) Act 1967*; and
- *Petroleum (Submerged Lands) (Royalty) Act 1967*.

The Commonwealth Department of Resources, Energy and Tourism consulted extensively with industry, regulators and other stakeholders during the re-write of the PSLA to bring its language, style and structure up to modern standards. The PSLA was rewritten to simplify the presentation of the legislation after many years of operation and amendments to make the Act easier to understand and reduce compliance and administrative costs to government and industry, without changing any major policies or the current management regime.

The OPA provides conspicuous changes to the structure and style of the legislation but implements only a modest number of minor policy changes from the framework set out in the PSLA. These deal with anomalies and past drafting errors that were detected in rewriting the PSLA or update provisions that, on account of their age, were out of line with current Australian Government legislative drafting principles. These minor policy changes are spelt out in detail in the Explanatory Memorandum that was prepared at the time the *Offshore Petroleum Bill* was introduced into the Parliament in 2005.

To assist with the transition from the PSLA to OPA, the *Act* and the Explanatory Memorandum have been placed on the COMLAW website [www.comlaw.gov.au](http://www.comlaw.gov.au)

The Explanatory Memorandum contains notes on each individual clause, followed by an endnote titled "Equivalent provision in the *PSL Act*", indicating the relevant section of the PSLA that corresponds to the provision of the Bill. If the clause in question contained any technical changes from the text of the PSLA, the nature of the changes were summarised under the abovementioned endnote. If the clause contained any policy changes from the provisions of the PSLA, these were likewise noted and the nature of the changes again summarised. The Explanatory Memorandum also includes a concordance table which enables a quick comparison of equivalent provisions of the OPA and PSLA.

It is worthwhile noting that Section 15AC of the *Commonwealth Acts Interpretation Act 1901* provides that unless a note in the explanatory memorandum indicates that a policy change was intended in relation to a particular clause, any difference in



Photo courtesy of Woodside Energy

language between the provision in the OPA and the relevant provision of the PSLA that it replaces should not be seen as reflecting an intention to change the policy set out in the original provision and therefore allows for the continuity of the provision.

In addition, the OPA includes, in Schedule 6 (section 4), transitional provisions to ensure that old titles, eligible instruments (including regulations, offers of title or delegations of Joint/Designated Authority powers under the PSLA), certain acts or things done before commencement (such as applications

for titles under the PSLA), conditions of old titles, and references in documents under the PSLA continue to have effect under the OPA.

Lastly, further amendments to the OPA to provide for a regulatory regime to authorise the transportation by pipeline and injection and storage of greenhouse gas substances in geological formations under the seabed were introduced into the Parliament in July 2008. The *Offshore Petroleum (Greenhouse Gas Storage) Amendment Bill 2008*, when enacted, will result in significant amendment to the OPA, renaming to the

*Offshore Petroleum and Greenhouse Gas Storage Act (OPGGSA)* and renumbering the existing sections of the OPA. This renumbering exercise is expected to occur in the next five to ten months and, when complete, the Department of Resources Energy and Tourism will revise the Concordance Table for stakeholders.

For further enquires, please contact Peter Livingston, Manager Legislation Review and Timor Sea Section in the Department of Resources, Energy and Tourism on telephone 02 6213 7974 or e-mail [peter.livingston@ret.gov.au](mailto:peter.livingston@ret.gov.au) ■



Photo courtesy of Woodside Energy.

Table 1. 2007 Production and Reserves for Developed Fields as at 31 December 2007

Field	Operator	2007 Production by Field			Cumulative Production		
		Oil	Condensate	Gas	Oil	Condensate	Gas
		kL	kL	10 <sup>3</sup> m <sup>3</sup>	kL	kL	10 <sup>3</sup> m <sup>3</sup>
Agincourt	Apache	0	0	0	525,068	3,980	27,909
Albert	Apache	11,912	6	768	47,221	21	3,465
Apium	ARC Energy	0	96	7,170	0	96	7,170
Artreus	Apache	1	0	34	32,614	14	3,707
Bambra	Apache	69,378	29,929	49,160	74,058	58,549	247,593
Barrow Island	Chevron	371,070	0	64,943	49,322,858	0	5,169,707
Beharra Springs	Origin	0	15	1,763	0	22,971	2,141,362
Beharra Springs N	Origin	0	18	1,841	0	1,719	171,879
Blina	ARC Energy	995	0	0	293,549	0	0
Boundary	ARC Energy	0	0	0	20,275	0	0
Chinook/Scindian	BHP Billiton	97,278	0	95,706	4,692,825	0	1,763,251
Cliff Head	Roc Oil	501,980	0	2,306	821,432	0	3,468
Cossack	Woodside	521,002	0	12,679	11,745,775	0	356,378
Cowle	Chevron	2,198	0	1,169	520,486	1,748	84,597
Crest	Chevron	1,063	0	4,641	273,659	108	59,321
Dongara	ARC Energy	1,020	283	60,817	189,682	49,297	12,810,810
Doric	Apache	0	12,617	103,202	0	12,617	103,202
Double Island	Apache	17,179	28	4,198	653,634	2,757	40,539
East Spar	Apache	0	0	0	0	2,256,305	6,860,744
Echo/Yodel	Woodside	0	1,179,492	1,286,219	0	9,719,773	12,411,836
Endymion	Apache	0	0	0	0	71,314	592,597
Enfield	Woodside	2,717,911	0	199,855	3,887,997	0	271,280
Eremia	ARC Energy	52,401	0	1,989	212,285	0	8,733
Eskdale	BHP Billiton	25,120	0	11,961	25,120	0	11,961
Evandra	ARC Energy	0	0	0	274	0	0
Exeter	Santos	380,503	0	677	2,180,525	0	3,881
Gipsy	Apache	1,033	64	2,633	363,623	2,502	79,180
Goodwyn	Woodside	0	1,638,185	7,128,850	0	40,005,315	107,690,450
Griffin	BHP Billiton	206,055	0	15,904	21,386,490	0	1,780,854
Gudrun	Apache	7,748	10	1,044	117,155	75	7,656
Harriet	Apache	21,761	235	11,425	8,166,341	60,034	1,479,093
Hermes	Woodside	1,037,441	0	66,531	9,169,631	0	605,169
Hovea	ARC Energy	101,301	8	8,333	1,047,584	247	88,655
Jingemia	Origin	128,512	0	5,729	599,527	0	27,350
John Brookes	Apache	0	160,245	2,229,814	0	311,856	4,820,644
Lambert	Woodside	505,832	0	25,406	2,688,061	0	140,224
Lee	Apache	0	55,840	318,621	0	55,840	318,621
Legendre North	Apache	245,936	0	121,335	6,290,313	0	1,354,955
Legendre South	Apache	21,337	0	154,625	795,372	0	609,167
Linda	Apache	0	1,326	5,629	0	285,065	1,110,907

2007 Reserves						Permit
Oil		Condensate		Gas		
GL		GL		Gm <sup>3</sup>		
P90	P50	P90	P50	P90	P50	
0.030	0.048	0.000	0.000	0.000	0.000	TL/1
0.060	0.065	0.000	0.000	0.000	0.000	TL/6
0.000	0.000	0.001	0.001	0.063	0.077	L1
0.000	0.008	0.000	0.000	0.000	0.000	TL/6
0.954	1.192	0.018	0.032	0.104	0.200	TL/1
2.898	7.171	0.000	0.000	0.000	0.000	L1H
0.000	0.000	0.000	0.002	0.025	0.100	L11
0.000	0.000	0.000	0.000	0.000	0.000	L11
0.000	0.000	0.000	0.000	0.000	0.000	L6
0.000	0.000	0.000	0.000	0.000	0.000	L6
0.589	1.399	0.000	0.000	0.158	0.549	WA-10-L
0.890	1.680	0.000	0.000	0.000	0.000	WA-31-L
1.749	3.180	0.016	0.032	0.085	0.141	WA-9-L
0.008	0.017	0.000	0.000	0.000	0.000	TL/4
0.002	0.004	0.000	0.000	0.000	0.000	L12,L13
0.000	0.000	0.001	0.002	0.045	0.166	L1,L2
0.000	0.000	0.032	0.048	0.000	0.000	TL/1
0.054	0.130	0.000	0.000	0.003	0.006	TP/8
0.000	0.000	0.000	0.010	0.000	0.020	WA-13-L
0.000	0.000	0.000	0.000	0.000	0.000	WA-23/24-L
0.000	0.000	0.000	0.000	0.045	0.100	TL/1, TL/5
4.700	10.400	0.000	0.000	0.000	0.000	WA-28-L
0.011	0.040	0.000	0.000	0.000	0.000	L1
0.541	0.620	0.000	0.000	0.000	0.000	WA-255-P
0.000	0.000	0.000	0.000	0.000	0.000	L1
0.109	0.493	0.000	0.000	0.000	0.000	WA-27-L
0.008	0.033	0.000	0.000	0.011	0.014	TL/1
0.000	0.000	8.077	18.029	54.500	93.700	WA-5-L
1.446	2.401	0.000	0.000	0.088	0.149	WA-10-L
0.003	0.010	0.000	0.000	0.000	0.000	TL/1
0.070	0.083	0.000	0.000	0.000	0.006	TL/1
2.000	3.400	0.032	0.048	0.100	0.200	WA-16-L
0.051	0.153	0.000	0.000	0.000	0.000	L1
0.106	0.238	0.000	0.000	0.000	0.000	L14
0.000	0.000	1.680	1.970	28.780	33.700	WA-29-L
1.733	2.846	0.016	0.032	0.113	0.169	WA-16-L
0.000	0.000	0.207	0.270	0.820	1.113	TL/1
0.493	0.684	0.000	0.000	0.000	0.000	WA-20-L
Reserves for Legendre North and South are now reported together						WA-20-L
0.000	0.000	0.050	0.066	0.177	0.300	TL/1

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Field	Operator	2007 Production by Field			Cumulative Production		
		Oil	Condensate	Gas	Oil	Condensate	Gas
		kL	kL	10 <sup>3</sup> m <sup>3</sup>	kL	kL	10 <sup>3</sup> m <sup>3</sup>
Little Sandy	Apache	5,343	8	1,851	82,357	435	10,380
Lloyd	ARC Energy	0	0	0	29,830	0	0
Mohave	Apache	2,162	10	1,309	140,849	106	17,995
Mount Horner	ARC Energy	3,699	0	0	290,859	0	0
Mutineer	Santos	1,384,789	0	2,466	5,009,098	0	8,919
North Alkimos	Apache	0	0	105	6,739	89	12,931
North Rankin	Woodside	0	309,704	2,949,556	0	23,960,593	186,478,757
Pedirka	Apache	17,318	29	4,679	297,835	1,188	25,788
Perseus	Woodside	0	2,584,776	12,813,361	0	14,311,988	70,932,604
Roller	Chevron	66,035	0	18,110	6,956,283	0	708,413
Rose	Apache	0	31,406	149,883	0	175,631	820,791
Rough Range	Empire	434	0	0	15,402	0	0
Saladin	Chevron	101,697	0	30,094	15,243,003	0	1,662,704
Searipple	Woodside	0	55,267	54,282	0	55,267	54,282
Simpson	Apache	2,361	69	7,828	821,313	6,230	76,085
Skate	Chevron	7	0	27,976	266,913	8,873	120,852
South Plato	Apache	14,920	86	5,918	688,072	851	46,187
Stag	Apache	541,182	0	22,729	7,432,810	0	373,045
Stybarrow	BHP Billiton	298,199	0	29,723	298,199	0	29,723
Sundown	ARC Energy	281	0	0	64,914	0	0
Tanami	Apache	165	0	2	491,254	13,140	86,479
Tarantula	Origin	0	1,085	95,099	0	3,159	230,001
Victoria	Apache	2,472	8	762	47,274	364	6,581
Wanaea	Woodside	2,429,862	0	524,257	36,357,389	0	7,768,949
Wandoo	Vermillion	435,474	0	37,475	11,350,568	0	893,257
West Cycad	Apache	165,589	148	13,809	165,589	148	13,809
West Terrace	ARC Energy	830	0	0	37,266	0	0
Wonnich	Apache	0	29,761	327,508	0	343,761	3,278,596
Woodada	ARC Energy	0	80	17,539	0	10,501	1,470,227
Woollybutt*	Eni	391,428	0	12,498	4,617,239	0	131,448
Xyris	ARC Energy	0	1,081	69,069	0	2,453	171,029
Xyris South	ARC Energy	0	1	132	0	62	3,167
Yammaderry	Chevron	0	0	0	857,361	0	97,413
Zephyrus	Apache	18,964	10	716	51,027	17	2,481
Developed fields currently not producing					8,913,131	620,426	8,748,225
<b>Total</b>		<b>12,967,898</b>	<b>6,091,927</b>	<b>29,227,558</b>	<b>228,170,389</b>	<b>92,508,111</b>	<b>447,671,858</b>

\* includes Woollybutt South

2007 Reserves						Permit
Oil		Condensate		Gas		
GL		GL		Gm <sup>3</sup>		
P90	P50	P90	P50	P90	P50	
0.016	0.019	0.000	0.000	0.000	0.000	TL/6
0.000	0.000	0.000	0.000	0.000	0.000	L8
0.003	0.006	0.000	0.000	0.000	0.000	TL/6
0.026	0.035	0.000	0.000	0.000	0.000	L7
0.113	1.828	0.000	0.000	0.000	0.000	WA-26-L
0.000	0.000	0.000	0.000	0.000	0.000	TL/6
0.000	0.000	8.600	9.400	154.000	162.500	WA-1-L
0.083	0.094	0.000	0.000	0.003	0.003	TL/6
0.000	0.000	25.899	30.891	197.600	232.400	WA-1-L
0.108	0.245	0.000	0.000	0.000	0.000	TL/7
0.000	0.000	0.032	0.048	0.144	0.300	TL/1
0.000	0.000	0.000	0.000	0.000	0.000	EP 41
0.151	0.423	0.000	0.000	0.000	0.000	TL/4
0.000	0.000	0.461	0.684	0.700	0.900	WA-1-L
0.056	0.103	0.000	0.000	0.003	0.003	TL/1
0.000	0.000	0.000	0.000	0.000	0.000	TL/7
0.013	0.029	0.000	0.000	0.000	0.000	TL/6
1.431	2.448	0.000	0.000	0.000	0.000	WA-15-L
9.400	11.600	0.000	0.000	0.000	0.000	WA-255-P
0.000	0.000	0.000	0.000	0.000	0.000	L8
0.006	0.011	0.001	0.001	0.000	0.003	TL/1
0.000	0.000	0.001	0.002	0.076	0.200	L11
0.006	0.008	0.000	0.000	0.000	0.000	TL/6
5.278	9.253	0.207	0.334	1.100	2.000	WA-11-L
2.700	3.700	0.000	0.000	0.000	0.000	WA-14-L
0.017	0.068	0.000	0.000	0.000	0.000	TL/9
0.000	0.000	0.000	0.000	0.000	0.000	L8
0.000	0.000	0.095	0.127	0.941	1.200	TL/8
0.000	0.000	0.000	0.000	0.010	0.021	L4, L5
0.840	1.990	0.000	0.000	0.000	0.000	WA-25-L
0.000	0.000	0.002	0.004	0.111	0.216	L1
0.000	0.000	0.000	0.000	0.000	0.000	L1
0.000	0.000	0.000	0.000	0.000	0.000	TL/4
0.025	0.027	0.000	0.000	0.000	0.000	TL/6
<b>38.777</b>	<b>68.182</b>	<b>45.428</b>	<b>62.033</b>	<b>439.805</b>	<b>530.456</b>	



Table 2. Contingent Resources Held Under Retention Lease as at 31 December 2007

			Oil		Condensate		Gas	
			GL		GL		Gm <sup>3</sup>	
Field	Permit	Operator	P90	P50	P90	P50	P90	P50
Australind	TR/4	Chevron	0.000	0.000	0.000	0.000	0.000	0.206
Blencathra	TR/3	Apache	0.400	0.700	0.000	0.000	0.000	0.000
Brecknock	WA-29/32-R	Woodside	0.000	0.000	8.728	17.400	104.244	149.300
Calliance [Brecknock S]	WA-28/31-R	Woodside	0.000	0.000	9.539	13.800	78.605	111.900
Chrysaor	WA-14/15-R	Chevron	0.000	0.000	1.560	2.552	32.428	53.100
Crosby	WA-12-R	BHP	6.598	9.189	0.000	0.000	0.000	0.000
Dionysus	WA-14/15-R	Chevron	0.000	0.000	1.453	1.848	33.583	42.700
Dixon	WA-9-R	Woodside	0.318	0.954	0.318	0.600	2.367	3.800
Egret	WA-10-R	Woodside	1.129	1.956	0.048	0.100	0.310	0.600
Eurytion	WA-25-R	Chevron	0.000	0.000	0.087	0.223	8.625	15.200
Flinders Shoal	TR/1	Apache	0.000	0.000	0.000	0.000	0.500	0.500
Geryon/Callirhoe	WA-20/22-R	Chevron	0.000	0.000	0.628	1.401	46.335	67.600
Gorgon	WA-2/3-R	Chevron	0.000	0.000	11.988	19.237	301.597	487.000
Harrison	WA-12-R	BHP	0.366	0.636	0.000	0.000	0.000	0.000
Iago	WA-16/17-R	Chevron	0.000	0.000	0.159	1.730	2.789	30.200
Io	WA-25/26-R	Chevron	0.000	0.000	0.779	1.500	83.113	103.100
Jansz	WA-18-R	Mobil	0.000	0.000	0.000	0.000	279.000	392.000
Macedon	WA-12-R	BHP	0.000	0.000	0.000	0.000	11.298	18.463
Maenad	WA-19-20/24-R	Chevron	0.000	0.000	0.032	0.136	2.113	6.909
Maitland	WA-33-R	Apache	0.000	0.000	0.140	0.300	1.189	2.509
Moodyne	WA-12-R	BHP	0.604	1.224	0.000	0.000	0.000	0.000
Orthrus	WA-19-20/24-R	Chevron	0.000	0.000	0.100	0.353	5.297	24.126
Petrel	WA-6-R	Santos	0.000	0.000	0.000	0.000	7.738	9.087
Prometheus/Rubicon	WA-34-R	ENI	0.000	0.000	0.000	0.000	4.121	5.578
Rankin/Sculptor	WA-11-R	Woodside	0.000	0.000	0.000	0.500	0.000	2.292
Scarborough	WA-1-R	Mobil	0.000	0.000	0.000	0.000	125.000	147.000
Spar	WA-4-R	Chevron	0.000	0.000	0.239	1.034	4.536	7.051
Stickle	WA-12-R	BHP	3.673	5.565	0.000	0.000	0.000	0.000
Tern	WA-27-R	Santos	0.000	0.000	0.355	0.899	10.195	13.254
Torosa [Scott Reef]	WA-30-R	Woodside	0.000	0.000	10.016	19.240	171.861	324.000
Turtle	WA-13-R	Drillsearch	0.830	1.230	0.000	0.000	0.000	0.000
Urania	WA-21/23-R	Chevron	0.000	0.000	0.014	0.034	4.401	5.567
West Tryal Rocks	WA-5-R	Chevron	0.000	0.000	3.816	6.042	46.910	72.500
Wheatstone	WA-16-R	Chevron	0.000	0.000	2.544	4.134	78.352	111.900
Wilcox	WA-7-R	Woodside	0.000	0.000	2.115	3.100	6.200	9.300
<b>Total</b>			<b>13.918</b>	<b>21.454</b>	<b>54.658</b>	<b>96.163</b>	<b>1,452.707</b>	<b>2,216.742</b>

Table 3. Contingent Resources Not Held Under Retention Lease as at 31 December 2007

			Oil		Condensate		Gas	
			GL		GL		Gm <sup>3</sup>	
Field	Permit	Operator	P90	P50	P90	P50	P90	P50
Angel	WA-3-L	Woodside	0.000	0.000	9.380	13.434	38.800	52.400
Bambra East	TL/1	Apache	0.000	0.000	0.111	0.143	0.992	1.271
Blacktip	WA-279-P	ENI	0.000	0.000	0.000	0.000	11.030	27.105
Brunello	WA-356-P	Apache	0.000	0.000	0.827	1.226	5.846	8.562
Caribou	WA-209-P	Apache	0.000	0.000	0.010	0.030	0.100	0.250
Chamois	WA-261-P	Apache	0.210	0.370	0.000	0.000	0.000	0.010
Chandon	WA-268-P	Chevron	0.000	0.000	1.024	1.751	31.611	60.884
Clio	WA-205-P	Chevron	0.000	0.000	1.590	3.180	44.059	89.061
Corvus	WA-246-P	Apache	0.000	0.000	0.010	0.030	0.240	0.710
Dockrell	WA-5-L	Woodside	0.000	0.000	0.429	0.890	3.400	7.000
Elegans	L1	ARC	0.000	0.000	0.000	0.000	0.000	0.116
Gaea	WA-1-L	Woodside	0.000	0.000	0.302	0.541	2.000	3.300
Goodwyn S	WA-5-L	Woodside	0.048	0.382	0.525	1.526	1.972	5.804
Gungurru	WA-202-P	Apache	0.100	0.190	0.000	0.000	0.170	0.210
Ichthys Brewster	WA-285-P	Inpex	0.000	0.000	50.717	75.360	188.732	270.470
Ichthys Plover	WA-285-P	Inpex	0.000	0.000	4.929	8.426	59.165	90.157
Julimar	WA-356-P	Apache	0.000	0.000	0.776	1.059	7.973	10.348
Julimar East	WA-356-P	Apache	0.000	0.000	0.730	1.018	7.654	10.430
Keast	WA-6-L	Woodside	0.000	0.000	0.064	0.334	0.700	3.800
Kultaar	WA-334-P	Apache	0.000	0.000	0.049	0.061	0.600	0.750
Lady Nora	WA-28-P	Woodside	0.000	0.000	1.033	1.987	6.367	11.720
Lambert Deep	WA-16-L	Woodside	0.000	0.000	0.239	0.366	5.700	7.400
Laverda	WA-271-P	Woodside	4.100	4.800	0.000	0.000	0.000	0.000
Narvik	TP/8	Apache	0.000	0.000	0.000	0.000	0.513	0.685
Nasutus	EP409	Apache	0.100	0.400	0.000	0.000	0.150	0.240
Oryx	WA-202-P	Apache	0.340	0.510	0.000	0.000	0.010	0.010
Pemberton	WA-28-P	Woodside	0.000	0.000	0.541	0.906	3.240	6.452
Persephone	WA-1-L	Woodside	0.000	0.000	1.749	2.766	14.989	21.694
Pluto	WA-350-P	Woodside	0.000	0.000	0.004	0.005	81.600	130.800
Pueblo	WA-28-P	Woodside	0.000	0.000	0.048	0.477	0.733	2.338
Ravensworth	WA-155-P	BHP	6.503	8.665	0.000	0.000	0.000	0.000
Reindeer	WA-209-P	Apache	0.000	0.000	0.310	0.360	10.980	12.670
Sage	WA-254-P	Apache	0.510	0.740	0.000	0.000	0.000	0.000
Skiddaw	WA-155-P	BHP	0.318	0.636	0.000	0.000	0.000	0.000
South Chervil	TL/2	Apache	0.030	0.090	0.000	0.000	0.220	0.270
Taunton	TL/2	Apache	0.350	0.530	0.006	0.008	0.060	0.080
Tidepole	WA-5-L	Woodside	0.000	0.000	0.986	2.544	6.200	14.700
Tusk	WA-246-P	Apache	0.160	0.290	0.000	0.000	0.000	0.010
Van Gogh	WA-155-P	Apache	6.836	8.903	0.000	0.000	0.000	0.000
Vincent	WA-28-L	Woodside	6.360	11.606	0.000	0.000	0.000	0.000
Xena	WA-350-P	Woodside	0.000	0.000	0.400	0.800	6.600	13.820
<b>Total</b>			<b>25.964</b>	<b>38.112</b>	<b>76.787</b>	<b>119.227</b>	<b>542.405</b>	<b>865.527</b>

Table 4. Other Contingent Resources and Total WA Resources

	Oil		Condensate		Gas	
	GL		GL		Gm <sup>3</sup>	
	P90	P50	P90	P50	P90	P50
Other contingent resources*	9.339	33.622	4.584	16.205	25.948	91.983
Total WA Resources**	87.998	161.216	181.457	293.628	2461.162	3704.565

\*These resources constitute less than 1% of WA reserves. For the sake of consistency the above reserves are estimated by DoIR and are only indicative.

\*\*Includes reserves, contingent resources and scope for recovery

Table 5. Seismic Surveys in Western Australia 2007–08 Fiscal Year — Statistical Summary

		2D (line km)	3D (sq km)
Bonaparte Basin	Onshore		
	Offshore		4,182
Browse Basin	Onshore		
	Offshore	7,225(a)	3,533
Canning Basin	Onshore	868	
	Offshore		
Carnarvon Basin	Onshore		
	Offshore	15,011	17,971
Perth Basin	Onshore	137	80
	Offshore		543
Subtotal	Onshore	1,005	80
	Offshore	22,236	26,299
<b>Total</b>		<b>23,241</b>	<b>26,379</b>

The above table lists the quantity of 2D seismic (line km) 3D seismic (km<sup>2</sup>) acquired during the fiscal year. For surveys that commenced before 1 July 2007, only acquisition after this date is included. Non-seismic acquisition amounts to 8285 km for an airborne survey and two geochemical surveys.

(a) Includes Deep Water Northwest Shelf MC2D MSS acquired in the Browse Basin.

The attached listing of surveys operating in the fiscal year includes all data gathered prior to 30 June 2008.

Table 6. Petroleum Wells in Western Australia 2007–08 Fiscal Year — Statistical Summary

		NFW		EXT		DEV		Subtotal		Total	
		Wells	Metres	Wells	Metres	Wells	Metres	Wells	Metres	Wells	Metres
Bonaparte Basin	Onshore										
	Offshore	1	2,261					1	2,261	1	2,261
Browse Basin	Onshore										
	Offshore	6	21,542(a)	1	5,604(b)			7	27,146	7	27,146
Canning Basin	Onshore	4	12,388					4	12,388		
	Offshore									4	12,388
Carnarvon Basin	Onshore					13	9,918	13	9,918		
	Offshore	18	62,626(c)	11	32,232(d)	31(e)	104,533(f)	60	199,391	73	209,309
Perth Basin	Onshore	2	4,407	2	3,943		31(g)	4	8,381		
	Offshore	2	4,584		3,868			4	8,452	8	16,833
Subtotal	Onshore	6	16,795	2	3,943	13	9,918	21	30,687		
	Offshore	27	91,013	14	41,704	31	104,564	72	237,250	93	267,937
<b>Total</b>		<b>33</b>	<b>107,808</b>	<b>16</b>	<b>45,647</b>	<b>44</b>	<b>114,482</b>	<b>93</b>	<b>267,937</b>		

The above table lists the number of wells spudded and metres drilled (subsurface) during the 2007–08 fiscal year. For wells spudded before 1 July 2007, only metres drilled during the fiscal year are included.

(a) Includes Dinichthys North 1, Snarf 1 & Rondo 1 spudded prior to 1 July 2007.

(b) Includes Torosa 4 spudded prior to 1 July 2007.

(c) Includes Dinichthys 1, Belicoso 1, Calthorpe 1/1A, Ixion 1 & Julimar East 1 spudded prior to 1 July 2007.

(d) Includes Hurricane 2 spudded prior to 1 July 2007.

(e) Includes ENA 01 ST1 and ENA 02 ST1—Sidetracks from producing wells.

(f) Includes Bamba 8, PER 01, 02, 04, Stybarrow 11H and Stybarrow 9 spudded prior to 1 July 2007.

(g) Mondarra 5 spudded prior to 1 July 2007.

Table 7. Seismic Surveys in Western Australia Operating 2007–08 Fiscal Year

Survey Name	Class	On Off	Title	Operator	Commenced	Completed	2D Line km @ 30/06/2008	3D Sq km @ 30/06/2008
<b>Amadeus Basin</b>								
Amadeus West Aeromagnetic Survey	AEROMAG	On	SPA 7/04-5 AO	Merlin West	3/06/2008		8,160	
<b>Bonaparte Basin</b>								
Malita West 3D M.S.S.	3D	Off	WA-402-P, WA-403-P	Total E&P	3/03/2008	17/05/2008		2,927
Tiger 3D M.S.S.	3D	Off	WA-406-P	CNOOC	22/02/2008	27/04/2008		1,255
<b>Browse Basin</b>								
B08A Bernier 2D M.S.S.	2D	Off	WA-318-P	ESSO	19/05/2008	13/06/2008	1,845	
Gigas 2D OBC M.S.S.	2D	Off	WA-30-R	Woodside Energy	8/05/2008	1/06/2008	80	
Calliance 3D M.S.S.	3D	Off	WA-25-R, WA-28-R, WA-29-R, WA-31-R, WA-32-R, WA-397-P	Woodside Energy	18/11/2007			1,292
Endurance 3D M.S.S.	3D	Off	WA-398-P	Conoco Phillips	6/01/2008	23/03/2008		1,798
Maxima 3D M.S.S.	3D	Off	TR/5, WA-30-R	Woodside Energy	11/09/2007	17/11/2007		344
Rosewall 3D M.S.S.	3D	Off	WA-396-P, WA-397-P	Woodside Energy	11/09/2007			99
<b>Canning Basin</b>								
Paradise 2D S.S.	2D	On	EP 371, EP 428	ARC Energy	19/09/2007	30/10/2007	495	
Yulleroo 2D S.S.	2D	On	EP 391, EP 428, EP 436	ARC Energy	29/10/2007	3/12/2007	373	
<b>Canarvon Basin</b>								
Armagnac 2D M.S.S.	2D	Off	WA-347, WA-348, WA-353-P	Woodside Energy	24/06/2008		785	
CVSN08 2D OBC M.S.S.	2D	Off	WA-264-P	Santos Limited	6/03/2008	24/03/2008	88	
Deep Water Northwest Shelf MC2D M.S.S.	2D	Off	SPA 5SL/06-7	PGS	12/03/2007	7/06/2008	18,800	
Exmouth West 2D M.S.S.	2D	Off	4SL/07-8	Gardline	24/06/2008		272	
Klimt 2D M.S.S.	2D	Off	WA-362-P, WA-363-P, WA-386-P, WA-387-P	OMV Australia	17/01/2008	29/04/2008	7,407	
MEO Northwest Shelf 2D M.S.S.	2D	Off	WA-359-P	MEO	28/12/2007	8/04/2008	250	
Colombard 3D M.S.S.	3D	Off	WA-404-P	Woodside Energy	19/03/2008			1,519
Centaur 3D M.S.S.	3D	Off	WA-268-P	Chevron Australia	28/08/2007	10/11/2007		2,624
Charon 2007 3D M.S.S.	3D	Off	WA-392-P	Chevron Australia	17/07/2007	27/08/2007		1,799
Draeck 3D M.S.S.	3D	Off	WA-205-P	Chevron Australia	17/12/2006	20/08/2007		1,311
Enfield M3 4D M.S.S.	3D	Off	WA-28-L	Woodside Energy	21/05/2008	9/06/2008		46
Glencoe 3D M.S.S.	3D	Off	WA-390-P	Hess	3/12/2007	19/03/2008		4,485
HEX07B 3D M.S.S.	3D	Off	WA-346-P	BHP Billiton	2/09/2007	25/10/2007		1,210
Keystone MC3D 3D M.S.S.	3D	Off	SPA 2SL/07-8	Western Geco	2/05/2008			5,436
MEO Northwest Shelf 3D M.S.S.	3D	Off	WA-360-P, WA-361-P	MEO	13/12/2007	27/12/2007		258
Stag OBC 3D M.S.S.	3D	Off	WA-15-L, WA-202-P	Apache Energy	15/10/2007	21/02/2008		160
Tidepole MA 3D M.S.S.	3D	Off	WA-5-L	Woodside Energy	23/12/2007	19/01/2008		206
Venture 4C OBC 3D M.S.S.	3D	Off	WA-356-P	Apache Energy	24/05/2008			43
Vincent 4D M.S.S.	3D	Off	WA-28-L	Woodside Energy	12/05/2008	9/06/2008		105
Parker Airborne Geophysical Survey	AEROMAG	Off	WA-323-P, WA-330-P	Octanex NL	31/03/2008	31/03/2008	125	
Bullara Geochemical Survey	GEOCHEM	On	EP 359	Rough Range Oil	28/08/2007	29/08/2007		
Sandalwood Geochemical Survey	GEOCHEM	On	EP 412	Rough Range Oil	30/08/2007	30/08/2007		
<b>Perth Basin</b>								
Irwin 2007 2D S.S.	2D	On	SPA 5/05-6 AO	Dynasty Metals	27/05/2007	19/10/2007	101	
Warner Glen 2D S.S.	2D	On	EP 446	Red Mountain Energy	8/02/2008		9	
Wellesley 2D S.S.	2D	On	EP 416	Empire Oil	30/03/2008	4/04/2008	42	
Dianna 3D M.S.S.	3D	Off	WA-286-P	ROC Oil	7/01/2008	13/02/2008		543
Gingin West 3D S.S.	3D	On	EP 389	Empire Oil	27/04/2008	3/05/2008		26
Mullering 3D S.S.	3D	On	EP 432	Gulliver	8/04/2008	24/04/2008		54

Class - Classification:

2D - 2D Reflection, 3D - 3D Reflection, GEOCHEM - Geochemical, AEROMAG - Aeromagnetic

Table 8. Petroleum Wells in Western Australia Operating 2007–08 Fiscal Year

Well Name	Class	On Off	Title	Operator	Latitude			Longitude		
<b>Bonaparte Basin</b>										
Marina 1	NFW	OFF	WA-318-P	Drillsearch	13	47	48.46	127	58	18.23
<b>Browse Basin</b>										
Torosa 4	EXT	OFF	WA-30-R	Woodside Energy	13	55	53.23	122	0	57.83
Torosa 6	EXT	OFF	WA-30-R	Woodside Energy	14	2	30.46	121	54	1.16
Dinichthys North 1	NFW	OFF	WA-285-P R1	INPEX	13	46	56.90	123	13	48.58
Fortissimo 1	NFW	OFF	WA-371-P	Shell	13	47	2.70	123	24	37.11
Fossetmaker 1	NFW	OFF	WA-377-P	Shell	13	43	39.26	123	47	1.50
Ichthys West 1	NFW	OFF	WA-285-P R1	INPEX	13	51	48.85	123	6	57.34
Rondo 1	NFW	OFF	WA-371-P	Shell	13	31	42.35	123	24	14.73
Snarf 1	NFW	OFF	WA-275-P R1	Woodside Energy	14	20	2.31	121	29	40.27
Tocatta 1	NFW	OFF	WA-371-P	Shell	13	47	16.76	123	16	55.86
Trio 1	NFW	OFF	WA-371-P	Shell	13	30	19.95	123	29	47.68
Warrabkook 1	NFW	OFF	WA-303-P	BHP Billiton	14	38	20.24	120	25	0.77
<b>Canning Basin</b>										
Stokes Bay 1	NFW	ON	R 1	ARC Energy	17	8	23.67	123	42	32.41
Valentine 1	NFW	ON	R 1	ARC Energy	17	8	23.67	123	42	32.41
Valhalla 1	NFW	ON	EP 371 R1	ARC Energy	18	4	3.69	124	46	4.25
Yulleroo 2	NFW	ON	EP 391 R1	ARC Energy	17	51	36.33	122	55	59.29
<b>Canarvon Basin</b>										
Bambra 8H/8HL1	DEV	OFF	TL/1	Apache Energy	20	34	30.82	115	38	15.26
Bambra East 3	DEV	OFF	TL/1	Apache Energy	20	34	30.80	115	38	15.32
ENA 01 ST1	DEV	OFF	WA-28-L	Woodside Energy	21	28	54.06	113	59	21.67
ENA 02 ST1	DEV	OFF	WA-28-L	Woodside Energy	21	28	53.56	113	59	21.24
Johnson 1	DEV	OFF	WA-358-P	OMV Barrow	21	1	35.84	114	41	14.84
Legendre North 6H	DEV	OFF	WA-20-L	Woodside Energy	19	42	14.15	116	42	31.39
Mutineer 13	DEV	OFF	WA-26-L	Santos Limited	19	15	33.28	116	38	15.29
PEN 09 ST1 ST2	DEV	OFF	WA-1-L R1	Woodside Energy	19	35	7.20	116	8	16.89
PER 01	DEV	OFF	WA-1-L R1	Woodside Energy	19	33	22.46	116	2	6.80
PER 02 ST1	DEV	OFF	WA-1-L R1	Woodside Energy	19	31	11.70	116	6	39.35
PER 04	DEV	OFF	WA-1-L R1	Woodside Energy	19	31	26.50	116	5	53.64
Stag 33H ST1 ST2 BHC1 BHC2	DEV	OFF	WA-15-L	Apache Energy	20	17	23.97	116	16	31.09
Stybarrow 10H	DEV	OFF	WA-255-P R2	BHP Billiton	21	28	29.15	113	49	30.07
Stybarrow 11H	DEV	OFF	WA-255-P R2	BHP Billiton	21	28	26.20	113	49	30.85
VGA 2H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	52.11	114	4	4.54
VGA 3H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	52.12	114	4	4.89
VGA 4H ST1	DEV	OFF	WA-155-P R4	Apache Energy	21	23	52.11	114	4	4.20
VGA 5H ST1 L1	DEV	OFF	WA-155-P R4	Apache Energy	21	23	50.50	114	4	5.27
VGA 6H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	50.49	114	4	4.58
VGA 7H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	50.49	114	4	4.92
VGB 10H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	13.68	114	4	36.54

Gnd Elev/ Water Depth	RT KB	Spud Date	TD Date	Rig Rel Date	Depth @ 30/06/2008	Metres Drilled Subsurf	Status @ 30/06/2008
66	32	18/09/2007	30/09/2007	6/10/2007	2,359	2,261	P&A GS
467	28	22/06/2007	5/11/2007	5/12/2007	4,500	4,063	P&A G
44	35	22/04/2008			4,703	4,624	DRILLING
266	25	26/04/2007	20/07/2007	9/08/2007	4,926	4,635	P&A GS
241	22	23/10/2007	9/12/2007	7/03/2008	4,647	4,384	P&A G
190	22	6/08/2007	31/08/2007	8/09/2007	3,822	3,610	P&A GS
280	25	3/04/2008	30/05/2008	7/06/2008	4,836	4,532	P&A GS
306	22	9/09/2007	1/10/2007	6/10/2007	3,566	3,238	P&A
1,433	28	2/06/2007	7/05/2008	15/05/2008	3,748	2,321	P&A
250	22	9/06/2007	26/07/2007	4/08/2007	4,623	4,351	P&A GS
272	22	7/10/2007	16/10/2007	21/10/2007	2,177	1,883	P&A
1,517	22	12/12/2007	26/01/2008	22/02/2008	3,488	1,949	P&A
12	18	3/10/2007	17/10/2007	5/11/2007	2,755	1,780	SUSP G
12	18	12/08/2007	25/09/2007	5/11/2007	3,430	3,424	P&A GS
114	120	15/11/2007	18/12/2007	29/12/2007	3,466	3,460	SUSP OGS
57	63	22/01/2008	16/04/2008	10/05/2008	3,730	3,724	SUSP GS
24	43	25/06/2007	26/07/2007	25/08/2007	6,606	7,317	O&G
24	44	7/08/2007	20/08/2007	25/08/2007	4,701	3,973	SUSP OG
516	26	9/04/2008	25/04/2008	7/06/2008	3,126	1,741	O
514	29	22/06/2008			2,940	1,415	DRILLING
219	22	1/04/2008	22/04/2008	27/04/2008	3,110	2,868	P&A
51	45	30/03/2008	13/04/2008	18/04/2008	3,549	2,698	O
162	22	17/09/2007	26/10/2007	7/11/2007	5,126	4,942	SUSP
125	47	25/03/2008	30/05/2008	25/06/2008	4,914	4,871	G&C
131	25	19/11/2006	14/11/2007	4/12/2007	3,227	3,071	SUSP G
127	25	25/11/2006	17/07/2007	4/12/2007	3,734	4,894	G&C
128	25	22/11/2006	13/08/2007	4/12/2007	3,452	3,299	G&C
49	61	17/01/2008	5/02/2008	9/02/2008	2,025	4,066	O
836	22	21/09/2007	3/11/2007	22/11/2007	3,041	1,169	O
836	22	18/03/2007	6/10/2007	22/11/2007	3,058	2,200	O
395	25	8/01/2008			1,983	1,563	SUSP
375	25	6/01/2008			1,822	1,422	SUSP
375	25	12/01/2008			1,655	1,255	SUSP
367	25	20/01/2008			3,044	4,341	DRILLING
367	25	14/01/2008			1,825	1,433	SUSP
375	25	18/01/2008			1,884	1,484	SUSP
375	22	11/06/2008			2,062	1,665	SUSP

Table 8. Petroleum Wells in Western Australia Operating 2007–08 Fiscal Year

Well Name	Class	On Off	Title	Operator	Latitude			Longitude		
<b>Carnarvon Basin cont.</b>										
VGB 11H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	12.05	114	4	36.57
VGB 8H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	13.66	114	4	35.84
VGB 9H	DEV	OFF	WA-155-P R4	Apache Energy	21	23	13.67	114	4	36.19
VN-A 1H L1	DEV	OFF	WA-28-L	Woodside Energy	21	26	22.63	114	2	47.68
VN-A 2H L1	DEV	OFF	WA-28-L	Woodside Energy	21	26	22.75	114	2	48.27
VN-A 3H ST1 ST2 L1	DEV	OFF	WA-28-L	Woodside Energy	21	26	22.19	114	2	48.16
VN-A 4H L1	DEV	OFF	WA-28-L	Woodside Energy	21	26	22.87	114	2	48.86
VN-B 1H	DEV	OFF	WA-28-L	Woodside Energy	21	26	2.27	114	1	59.18
VN-B 2H L1	DEV	OFF	WA-28-L	Woodside Energy	21	26	1.79	114	1	58.32
VN-B 3H	DEV	OFF	WA-28-L	Woodside Energy	21	26	1.25	114	1	58.66
VN-B 4H	DEV	OFF	WA-28-L	Woodside Energy	21	26	1.74	114	1	59.52
Woollybutt 4H	DEV	OFF	WA-25-L	ENI Australia	20	57	16.17	114	52	6.14
Woollybutt 6H ST1	DEV	OFF	WA-25-L	ENI Australia	20	58	48.74	114	52	28.18
Fletcher 2	EXT	OFF	WA-191-P R4	Santos Limited	19	15	39.46	116	46	29.87
Hurricane 2	EXT	OFF	WA-208-P R2	Woodside Energy	19	39	37.02	116	38	7.11
Iago 2	EXT	OFF	WA-16-R	Chevron Australia	19	57	19.42	115	19	19.42
Iago 3	EXT	OFF	WA-17-R	Chevron Australia	19	54	7.16	115	20	35.89
Iago 4	EXT	OFF	WA-17-R	Chevron Australia	19	54	7.16	115	20	35.89
Maitland 2 CH1	EXT	OFF	WA-33-R	Apache Energy	20	32	34.59	115	9	47.19
Maitland 3H	EXT	OFF	WA-33-R	Apache Energy	20	32	34.59	115	9	47.19
Thebe 2 CH1	EXT	OFF	WA-346-P	BHP Billiton	19	15	36.18	113	7	52.57
Wheatstone 2 BCH1 ST1	EXT	OFF	WA-253-P R1	Chevron Australia	19	48	49.36	115	18	26.46
Wheatstone 3	EXT	OFF	WA-17-R	Chevron Australia	19	53	24.89	115	16	46.57
Xena 2 CH1	EXT	OFF	WA-350-P	Woodside Energy	19	58	41.03	115	11	11.31
Xena 3	EXT	OFF	WA-350-P	Woodside Energy	19	58	33.71	115	11	4.85
Adams 1	NFW	OFF	WA-26-L	Santos Limited	19	12	50.62	116	39	17.16
Beg 1	NFW	OFF	WA-357-P	Apache Energy	21	12	25.24	114	12	30.17
Belicoso 1	NFW	OFF	WA-347-P	Woodside Energy	18	49	54.85	113	50	15.80
Brulimar 1	NFW	OFF	WA-356-P	Apache Energy	20	0	18.23	115	11	5.04
Brunello 1 ST1	NFW	OFF	WA-356-P	Apache Energy	20	3	2.01	115	10	25.31
Calthorpe 1 1A	NFW	OFF	WA-271-P R1	Woodside Energy	21	33	56.10	113	50	15.18
Fletcher 1	NFW	OFF	WA-191-P R4	Santos Limited	19	15	39.46	116	46	29.87
Glencoe 1 CH1	NFW	OFF	WA-390-P	Hess	20	5	33.12	113	48	22.15
Grange 1	NFW	OFF	WA-356-P	Apache Energy	20	5	8.30	115	5	40.74
Halyard 1	NFW	OFF	WA-13-L	Apache Energy	20	36	18.74	114	55	8.41
Ixion 1	NFW	OFF	WA-370-P	Woodside Energy	19	40	47.31	114	55	28.54
Julimar East 1	NFW	OFF	WA-356-P	Apache Energy	20	6	23.18	115	5	7.95
Julimar Northwest 1	NFW	OFF	WA-356-P	Apache Energy	20	6	59.11	115	1	25.57
Julimar Southeast 1	NFW	OFF	WA-356-P	Apache Energy	20	9	7.00	115	3	58.85
Lady Nora 1	NFW	OFF	WA-28-P R6	Woodside Energy	19	49	43.58	115	39	23.55
Marley 2	NFW	OFF	TL/5	Apache Energy	20	25	24.00	115	41	25.01

Gnd Elev/ Water Depth	RT KB	Spud Date	TD Date	Rig Rel Date	Depth @ 30/06/2008	Metres Drilled Subsurf	Status @ 30/06/2008
375	22	14/06/2008			1,755	1,358	SUSP
375	25	3/06/2008			955	555	DRILLING
375	25	6/06/2008			955	555	SUSP
363	23	15/08/2007	24/11/2007		4,278	6,134	SUSP O
365	23	2/07/2007	22/10/2007		4,200	5,944	SUSP O
363	23	18/08/2007			4,205	6,488	SUSP O
386	23	21/08/2007	4/09/2007		3,414	4,445	SUSP O
392	23	23/12/2007			2,018	1,603	SUSP
392	23	27/12/2007			1,921	1,506	DRILLING
416	23	4/01/2008			1,925	1,486	SUSP
392	23	8/01/2008			1,861	1,446	DRILLING
106	25	9/09/2007	22/09/2007	5/10/2007	3,328	1,422	SUSP O
106	26	7/10/2007	8/11/2007	14/11/2007	2,973	3,717	SUSP
173	22	19/08/2007	28/08/2007	9/09/2007	3,160	1,020	P&A OS
56	31	24/06/2007	17/07/2007	24/07/2007	3,253	3,166	P&A OS
116	25	29/03/2008	19/04/2008	7/05/2008	3,625	3,484	P&A OGS
126	25	24/05/2008	5/06/2008		3,410	3,259	P&A OGS
126	25	13/06/2008	18/06/2008		4,107	2,891	DRILLING
55	36	6/09/2007	16/09/2007	23/10/2007	1,381	1,498	P&A GS
55	36	22/09/2007	24/09/2007	23/10/2007	1,972	1,074	P&A G
1,325	22	29/02/2008	16/03/2008	11/05/2008	2,550	1,679	P&A GS
212	15	15/08/2007	10/10/2007	20/10/2007	3,615	7,094	SUSP G
187	26	27/02/2008	18/03/2008	28/03/2008	3,510	3,297	P&A GS
193	25	17/12/2007	10/01/2008	23/02/2008	3,572	3,523	P&A GS
193	25	31/01/2008	4/02/2008	23/02/2008	3,522	1,065	P&A GS
183	22	30/04/2008	16/05/2008	21/05/2008	3,280	3,074	P&A
346	25	3/07/2007	27/07/2007	6/08/2007	3,936	3,565	P&A GS
1,454	28	12/06/2007	15/11/2007	23/11/2007	2,573	1,091	P&A
169	25	14/12/2007	9/01/2008	19/01/2008	3,295	3,101	SUSP GS
148	25	9/08/2007	29/08/2007	14/09/2007	3,771	3,839	SUSP G
825	29	16/06/2007	16/04/2008	23/04/2008	2,080	2,853	P&A
173	22	24/07/2007	14/08/2007	9/09/2007	2,970	2,775	P&A OS
1,121	29	22/05/2008	8/06/2008		3,410	2,359	DRILLING
174	25	7/05/2008	24/05/2008	31/05/2008	3,890	3,691	P&A GS
112	25	28/02/2008	12/03/2008	9/04/2008	2,882	2,746	SUSP G
1,335	28	8/04/2007	8/03/2008	24/03/2008	3,145	2,007	P&A
167	25	11/06/2007	8/07/2007	14/07/2007	5,202	5,010	SUSP G
223	25	14/04/2008	27/04/2008	5/05/2008	3,816	2,290	P&A GS
153	22	13/03/2008	27/03/2008	3/04/2008	3,976	3,800	SUSP GS
108	30	12/08/2007	31/08/2007	10/09/2007	3,558	3,420	P&A GS
43	45	22/04/2008			4,023	3,935	DRILLING



Table 8. Petroleum Wells in Western Australia Operating 2007–08 Fiscal Year

Well Name	Class	On Off	Title	Operator	Latitude			Longitude		
<b>Carnarvon Basin cont.</b>										
Norbil 1	NFW	OFF	WA-1-P R6	Woodside Energy	20	3	57.34	116	6	45.31
Rosella 1 ST1 ST2	NFW	OFF	WA-29-L	Apache Energy	20	28	8.99	115	0	54.08
Salsa 1	NFW	OFF	WA-355-P	Apache Energy	20	33	43.31	115	2	31.01
Thebe 1 CH1	NFW	OFF	WA-346-P	BHP Billiton	19	25	24.53	113	5	19.21
Totem 1	NFW	OFF	WA-191-P R4	Santos Limited	19	28	7.18	117	0	27.17
Zulimar 1	NFW	OFF	WA-356-P	Apache Energy	20	6	59.11	115	1	25.57
ENC 04	WIW	OFF	WA-28-L	Woodside Energy	21	29	14.93	113	58	30.01
Stag 32H	WIW	OFF	WA-15-L	Apache Energy	20	17	24.30	116	14	46.00
Stybarrow 9	WIW	OFF	WA-255-P R2	BHP Billiton	21	28	29.20	113	49	32.30
VGA 12W	WIW	OFF	WA-155-P R4	Apache Energy	21	23	50.83	114	4	5.61
VGA 13W	WIW	OFF	WA-155-P R4	Apache Energy	21	23	30.84	114	4	5.96
VNC W 3	WIW	OFF	WA-28-L	Woodside Energy	21	27	31.07	114	2	33.69
Barrow E33A	DEV	ON	L 1H R1	ARC Energy	20	50	12.79	115	24	36.82
Barrow G72A	DEV	ON	L 1H R1	Chevron Australia	20	51	0.79	115	20	39.83
Barrow H78A	DEV	ON	L 1H R1	Chevron Australia	20	50	58.22	115	20	20.45
Barrow S88	DEV	ON	L 1H R1	Chevron Australia	20	46	6.17	115	23	3.70
Barrow T81	DEV	ON	L 1H R1	Chevron Australia	20	46	6.67	115	23	19.08
Barrow B17C	WIW	ON	L 1H R1	Chevron Australia	20	51	37.90	115	21	58.34
Barrow B35B	WIW	ON	L 1H R1	Chevron Australia	20	51	53.92	115	21	26.54
Barrow B36A	WIW	ON	L 1H R1	Chevron Australia	20	51	47.57	115	21	40.00
Barrow B41C	WIW	ON	L 1H R1	Chevron Australia	20	52	7.10	115	20	30.52
Barrow C11A	WIW	ON	L 1H R1	Chevron Australia	20	51	30.32	115	22	21.87
Barrow E23A	WIW	ON	L 1H R1	Chevron Australia	20	50	7.65	115	24	47.32
Barrow F54A	WIW	ON	L 1H R1	Chevron Australia	20	50	37.33	115	23	4.82
Barrow F82A	WIW	ON	L 1H R1	Chevron Australia	20	51	24.54	115	22	30.41
<b>Perth Basin</b>										
Dunsborough 2	EXT	OFF	WA-286-P R1	ROC Oil	29	2	21.45	114	37	41.43
Frankland 2	EXT	OFF	WA-286-P R1	ROC Oil	29	14	48.66	114	44	36.47
Charon 1	NFW	OFF	WA-328-P	ENI Australia	28	6	35.02	112	58	33.54
Lilac 1	NFW	OFF	WA-286-P R1	ROC Oil	29	1	11.30	114	39	8.35
Mondarra 5/ 5ST1	DEV	ON	L 1 R1	APT Parmelia	29	18	43.26	115	7	2.97
Apium 2	EXT	ON	L 1 R1	ARC Energy	29	18	57.47	115	4	15.70
Beharra Springs 4	EXT	ON	L 11	Origin Energy	29	26	41.00	115	9	1.94
Freshwater Point 1	NFW	ON	EP 413 R2	Origin Energy	29	33	34.09	114	59	56.84
Moriary 1	NFW	ON	EP 426	Empire Oil	29	17	1.47	115	20	19.08

**Classification**

DEV Development Well  
EXT Extension Well  
NFW New Field Wildcat  
WIW Water Injector Well

**Status**

DRILLING Drilling  
G&C Producing Gas & Condensate Well  
O Producing Oil Well  
G Producing Gas Well  
O&G Producing Oil & Gas Well  
P&A Plugged & Abandoned Dry/Non-producing, No Shows  
P&A G Plugged & Abandoned Gas Producer  
P&A GS Plugged & Abandoned Dry/Non-producing Gas Shows

Gnd Elev/ Water Depth	RT KB	Spud Date	TD Date	Rig Rel Date	Depth @ 30/06/2008	Metres Drilled Subsurf	Status @ 30/06/2008
62	36	25/10/2007	14/11/2007	18/11/2007	3,774	3,676	P&A
91	25	15/07/2007	2/10/2007	18/10/2007	3,614	6,094	SUSP G
82	36	24/11/2007	13/12/2007	12/01/2008	3,535	3,417	SUSP OGS
1,173	22	7/07/2007	15/07/2007	8/08/2007	2,510	1,803	P&A GS
94	34	26/07/2007	5/08/2007	10/08/2008	1,950	1,821	P&A OS
220	25	20/10/2007	14/03/2008	22/03/2008	4,172	3,930	P&A
577	28	9/07/2007	5/10/2007	29/10/2007	2,665	2,060	SUSP
49	36	25/02/2008	14/03/2008	22/03/2008	2,350	2,265	SERVICE
836	22	16/03/2007	20/08/2007	22/11/2007	2,484	1,626	SERVICE
367	25	22/01/2008	2/02/2008		2,465	2,073	SUSP
367	25	26/01/2008	19/04/2008		2,794	3,850	SUSP
347	23	16/01/2008	8/02/2008		1,835	1,465	SUSP
14	19	26/09/2007	2/10/2007	12/02/2008	740	736	O
26	31	19/11/2007	23/11/2007	12/02/2008	802	798	O
32	36	10/11/2007	15/11/2007	12/02/2008	823	819	O
44	49	24/10/2007	3/11/2007	12/02/2008	830	826	O
36	41	10/10/2007	18/10/2007	12/02/2008	820	816	O
6	10	11/01/2008	14/01/2008	12/02/2008	711	707	SERVICE
3	8	5/01/2008	9/01/2008	12/02/2008	719	715	SERVICE
3	8	22/12/2007	2/01/2008	12/02/2008	721	717	SERVICE
2	7	29/11/2007	7/12/2007	12/02/2008	913	909	SERVICE
5	10	17/01/2008	20/01/2007	12/02/2008	711	707	SERVICE
14	19	15/09/2007	22/09/2007	12/02/2008	749	745	SERVICE
24	29	24/01/2008	27/01/2008	12/02/2008	691	687	SERVICE
6	10	12/12/2007	7/02/2008	12/02/2008	740	736	SERVICE
40	31	21/03/2008	29/03/2008	4/04/2008	1,680	1,609	P&A OS
41	30	12/02/2008	28/02/2008	20/03/2008	2,330	2,259	P&A GS
725	22	19/05/2008	15/06/2008	24/06/2008	3,940	3,193	P&A
34	30	3/02/2008	7/02/2008	11/02/2008	1,455	1,391	P&A
81	8	18/11/2006	28/07/2007	31/07/2007	2,723	2,740	G
107	113	9/07/2007	13/07/2007	21/07/2007	2,793	589	G
53	59	28/03/2007	2/10/2007	22/10/2007	3,338	3,354	G
22	26	10/05/2008	25/05/2008	29/05/2008	1,817	1,813	P&A GS
178	182	12/02/2008	9/03/2008	14/03/2008	2,598	2,594	P&A

**Status**

P&A OS	Plugged & Abandoned Dry/Non-producing Well, Oil Shows
P&A OGS	Plugged & Abandoned Dry/Non-producing Well, Oil & Gas Shows
Service	Service Well
SUSP	Shut In/Suspended Non-producing Well, No Shows
SUSP O	Shut In/Suspended Oil Well
SUSP G	Shut In/Suspended Gas Well
SUSP GS	Shut In/Suspended Non-producing Well, Gas Show
SUSP OGS	Shut In/Suspended Non-producing Well, Oil & Gas Shows

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

PETROLEUM (SUBMERGED LANDS) ACT, 1967 – Exploration Permit			
Title	Registered Holders (* denotes Nominee)		
WA-1-P R6	Apache Northwest Pty Ltd Santos Limited * Woodside Energy Ltd	WA-257-P R1	Apache Northwest Pty Ltd Kufpec Australia Pty Ltd Sun Resources NL
WA-18-P R6	Bonaparte Gas & Oil Pty Limited Santos Offshore Pty Ltd * Santos Limited	WA-261-P R2	Apache Northwest Pty Ltd Bow Energy Ltd Strike Oil Limited Tap (Shelfal) Pty Ltd
WA-28-P R6	BHP Billiton Petroleum (North West Shelf) Pty Ltd BP Developments Australia Pty Ltd CNOOC NWS Private Limited Chevron Australia Pty Ltd Japan Australia LNG (MIMI) Pty Ltd Shell Development (Australia) Proprietary Limited Woodside Energy Ltd	WA-264-P R1	Beach Petroleum Limited Kufpec Australia Pty Ltd * Santos Offshore Pty Ltd
WA-155-P R4	Apache Northwest Pty Ltd Inpex Alpha Ltd * BHP Billiton Petroleum (Australia) Pty Ltd	WA-268-P R1	Chevron (TAPL) Pty Ltd
WA-191-P R4	Kufpec Australia Pty Ltd Nippon Oil Exploration (Dampier) Pty Ltd Woodside Energy Ltd * Santos Limited	WA-269-P R1	Japan Australia LNG (MIMI) Pty Ltd Total E & P Australia Woodside Energy Ltd
WA-192-P R4	Apache Northwest Pty Ltd Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd	WA-271-P R1	Mitsui E&P Australia Pty Limited * Woodside Energy Ltd
WA-202-P R3	Apache Northwest Pty Ltd	WA-274-P R1	Chevron Australia (WA-274-P) Pty Ltd Inpex Browse Ltd * Coveyork Pty Limited
WA-205-P R3	Chevron (TAPL) Pty Ltd Shell Development (Australia) Proprietary Limited * Chevron Australia Pty Ltd	WA-275-P R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd BP Developments Australia Pty Ltd Chevron Australia Pty Ltd Shell Development (Australia) Proprietary Limited Woodside Energy Ltd
WA-208-P R2	Beach Petroleum Limited Eni Australia Limited Mosaic Oil NL Santos Limited Woodside Energy Ltd * Santos Offshore Pty Ltd	WA-279-P R1	Eni Australia B.V.
WA-209-P R3	Santos Offshore Pty Ltd * Apache Northwest Pty Ltd	WA-280-P R1	Eni Australia B.V.
WA-214-P R3	Santos (BOL) Pty Ltd * Apache Northwest Pty Ltd	WA-281-P R1	Beach Petroleum Limited Chevron Australia (WA-281-P) Pty Ltd Inpex Browse Ltd * Santos Offshore Pty Ltd
WA-226-P R2	ARC (Offshore PB) Limited Mitsui E&P Australia Pty Limited	WA-285-P R1	Inpex Browse Ltd Total E & P Australia
WA-246-P R2	Kufpec Australia Pty Ltd Pan Pacific Petroleum (South Aust) Pty Ltd Santos Offshore Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd	WA-286-P R1	ARC (Offshore PB) Limited AWE Oil (Western Australia) Pty Ltd Cieco Energy Australia Pty Ltd ROC Oil (WA) Pty Limited
WA-253-P R2	Chevron (TAPL) Pty Ltd * Chevron Australia Pty Ltd	WA-290-P R1	Nippon Oil Exploration (Dampier) Pty Ltd Santos Offshore Pty Ltd Tap (Shelfal) Pty Ltd * OMV Barrow Pty Ltd
WA-254-P R2	First Australian Resources Limited Pan Pacific Petroleum NL Sun Resources NL Victoria Petroleum NL Woodside Energy Ltd * Apache Northwest Pty Ltd	WA-291-P R1	Rialto Energy Limited Tap (Shelfal) Pty Ltd
WA-255-P R2	Woodside Energy Ltd * BHP Billiton Petroleum (Australia) Pty Ltd	WA-294-P R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd Japan Australia LNG (MIMI) Pty Ltd Woodside Energy Ltd
WA-256-P R1	Apache Northwest Pty Ltd ARC (Wandoo) Pty Ltd	WA-297-P R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd Japan Australia LNG (MIMI) Pty Ltd Total E & P Australia Woodside Energy Ltd
		WA-302-P	BHP Billiton Petroleum (North West Shelf) Pty Ltd
		WA-306-P R1	Antrim Energy Australia Pty Limited
		WA-313-P R1	Eni Australia B.V.
		WA-314-P	ConocoPhillips (Browse Basin) Pty Ltd Karoon Gas Browse Basin Pty Ltd
		WA-315-P	ConocoPhillips (Browse Basin) Pty Ltd Karoon Gas Browse Basin Pty Ltd
		WA-318-P	Drillsearch Energy Limited Esso Ventures Pty Ltd
		WA-320-P	OMV Australia Pty Ltd Tap (Shelfal) Pty Ltd

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

	* OMV Timor Sea Pty Ltd	WA-358-P	Nippon Oil Exploration (Dampier) Pty Ltd
WA-321-P	Strata Resources N.L.		OMV Barrow Pty Ltd
	* Octanex N.L.		Tap (Shelfal) Pty Ltd
WA-322-P	United Oil and Gas Pty Ltd		* Santos Offshore Pty Ltd
WA-323-P	Strata Resources N.L.	WA-359-P	Cue Exploration Pty Ltd
	* Octanex N.L.		Exoil Limited
WA-324-P	Bounty Oil & Gas NL		North West Shelf Exploration Pty Ltd
WA-326-P	Eni Australia B.V.	WA-360-P	Cue Exploration Pty Ltd
WA-328-P	Santos Offshore Pty Ltd		Gascorp Australia Ltd
	* Eni Australia B.V.		North West Shelf Exploration Pty Ltd
WA-329-P	United Oil and Gas Pty Ltd	WA-361-P	Cue Exploration Pty Ltd
WA-330-P	Strata Resources N.L.		Gascorp Australia Ltd
	* Octanex N.L.		North West Shelf Exploration Pty Ltd
WA-332-P	Alpha Oil & Natural Gas Pty Ltd	WA-362-P	Eni Australia Limited
	Goldsborough Energy Pty Ltd		Gascorp Australia Ltd
	Hawkestone Oil Pty Ltd		Octanex N.L.
	* Batavia Oil & Gas Pty Ltd		Strata Resources N.L.
WA-333-P	Alpha Oil & Natural Gas Pty Ltd		* OMV Australia Pty Ltd
	Goldsborough Energy Pty Ltd	WA-363-P	Eni Australia Limited
	Hawkestone Oil Pty Ltd		Gascorp Australia Ltd
	* Batavia Oil & Gas Pty Ltd		Octanex N.L.
WA-334-P	Tap (Harriet) Pty Ltd		Strata Resources N.L.
	* Apache Northwest Pty Ltd		* OMV Australia Pty Ltd
WA-335-P	Kufpec Australia Pty Ltd	WA-364-P	Chevron Australia (WA-364-P) Pty Ltd
	* Apache Northwest Pty Ltd		Shell Development (Australia) Proprietary Limited
WA-337-P	Santos Offshore Pty Ltd	WA-365-P	Chevron Australia (WA-365-P) Pty Ltd
WA-339-P	Santos Offshore Pty Ltd		Shell Development (Australia) Proprietary Limited
WA-341-P	Inpex Browse Ltd	WA-366-P	Chevron Australia (WA-366-P) Pty Ltd
	Total E & P Australia		Shell Development (Australia) Proprietary Limited
WA-342-P	Alpha Oil & Natural Gas Pty Ltd	WA-367-P	Chevron Australia (WA-367-P) Pty Ltd
	Batavia Oil & Gas Pty Ltd		Shell Development (Australia) Proprietary Limited
	Goldsborough Energy Pty Ltd	WA-368-P	ARC (Offshore PB) Limited
	* Hawkestone Oil Pty Ltd		Nexus Energy Australia NL
WA-343-P	Inpex Browse Ltd	WA-369-P	Japan Australia LNG (MIMI) Pty Ltd
	Total E & P Australia		Total E & P Australia
WA-344-P	Inpex Browse Ltd		* Woodside Energy Ltd
	Total E & P Australia	WA-370-P	Japan Australia LNG (MIMI) Pty Ltd
WA-345-P	OMV Australia Pty Ltd		Total E & P Australia
	Tap (Shelfal) Pty Ltd		* Woodside Energy Ltd
	* OMV Timor Sea Pty Ltd	WA-371-P	Shell Development (Australia) Proprietary Limited
WA-346-P	BHP Billiton Petroleum (North West Shelf) Pty Ltd	WA-372-P	Holloman Oil & Gas Ltd
WA-347-P	Kansai Electric Power Australia Pty Ltd	WA-373-P	Holloman Oil & Gas Ltd
	Tokyo Gas Pluto Pty Ltd	WA-374-P	Chevron Australia (WA-374-P) Pty Ltd
	Woodside Burrup Pty Ltd		Mobil Australia Resources Company Pty Limited
WA-348-P	Woodside Burrup Pty Ltd		Shell Development (Australia) Proprietary Limited
WA-350-P	Kansai Electric Power Australia Pty Ltd	WA-375-P	Goldsborough Energy Pty Ltd
	Tokyo Gas Pluto Pty Ltd	WA-376-P	Goldsborough Energy Pty Ltd
	Woodside Burrup Pty Ltd	WA-377-P	Shell Development (Australia) Proprietary Limited
WA-351-P	BHP Billiton Petroleum (North West Shelf) Pty Ltd		* Nexus Energy WA377P Pty Ltd
	ROC Oil (WA) Pty Limited	WA-378-P	Mitsui E&P Australia Pty Limited
	Tap (Shelfal) Pty Ltd		Toyota Tsusho Gas E&P Browse Pty Ltd
WA-352-P	Drillsearch Energy Limited		Woodside Energy Ltd
WA-353-P	Woodside Burrup Pty Ltd	WA-379-P	Plectrum Petroleum Plc
WA-354-P	BHP Billiton Petroleum Pty Ltd	WA-380-P	Plectrum Petroleum Plc
	* Apache Northwest Pty Ltd	WA-381-P	Emphazise Pty Ltd
WA-355-P	Apache Northwest Pty Ltd		Lempika Pty Ltd
WA-356-P	Kufpec Australia Pty Ltd		Westralian Petroleum Limited
	* Apache Northwest Pty Ltd		* ROC Oil (WA) Pty Limited
WA-357-P	Inpex Alpha Ltd		
	* Apache Northwest Pty Ltd		

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

WA-382-P	Emphazise Pty Ltd
	Lempika Pty Ltd
	Westralian Petroleum Limited
	* ROC Oil (WA) Pty Limited
WA-383-P	Shell Development (Australia) Proprietary Limited
	* Chevron Australia (W05-13) Pty Ltd
WA-384-P	Shell Development (Australia) Proprietary Limited
WA-385-P	Shell Development (Australia) Proprietary Limited
WA-386-P	Eni Australia Limited
	Gascorp Australia Ltd
	* OMV Australia Pty Ltd
WA-387-P	Eni Australia Limited
	Gascorp Australia Ltd
	* OMV Australia Pty Ltd
WA-388-P	Bharat Petroleum Corporation Limited
	Gujarat State Petroleum Corporation Limited
	Hindustan Petroleum Corporation Ltd
	Oilex NL
	Videocon Industries Ltd
WA-389-P	Cue Exploration Pty Ltd
WA-390-P	Hess Exploration Australia Pty Limited
WA-391-P	OMV Australia Pty Ltd
WA-392-P	Chevron Australia (W06-12) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Shell Development (Australia) Proprietary Limited
WA-393-P	Sweetpea Petroleum Pty Ltd
WA-394-P	Shell Development (Australia) Proprietary Limited
WA-395-P	Holloman Corporation
WA-396-P	Mitsui E&P Australia Pty Limited
	Toyota Tsusho Gas E&P Browse Pty Ltd
	Woodside Energy Ltd
WA-397-P	Mitsui E&P Australia Pty Limited
	Toyota Tsusho Gas E&P Browse Pty Ltd
	Woodside Energy Ltd
WA-398-P	ConocoPhillips (Browse Basin) Pty Ltd
	Karoon Gas Browse Basin Pty Ltd
WA-399-P	Carnarvon Petroleum Limited
	Rialto Energy Limited
WA-400-P	Gerald Nelson
WA-401-P	Gerald Nelson
WA-402-P	Total E & P Australia
WA-403-P	Total E & P Australia
WA-404-P	Hess Exploration (Carnarvon) Pty Limited
	* Woodside Energy Ltd
WA-405-P	Reliance Exploration & Production DMCC
WA-406-P	CNOOC Australia E&P Pty Ltd
WA-407-P	Goldsborough Energy Pty Ltd
WA-408-P	Total E & P Australia
WA-409-P	Cue Exploration Pty Ltd
	Gascorp Australia Pty Ltd
WA-410-P	Chevron Australia (W07-5) Pty Ltd
	Inpex Browse Ltd
	Santos Offshore Pty Ltd
WA-411-P	Beach Petroleum Limited
	Inpex Browse Ltd
	Santos Offshore Pty Ltd
WA-412-P	Japan Energy Corporation

**PETROLEUM (SUBMERGED LANDS) ACT, 1967 –  
Infrastructure Licence**

Title	Registered Holders (* denotes Nominee)
WA-1-IL	Kansai Electric Power Australia Pty Ltd
	Tokyo Gas Pluto Pty Ltd
	Woodside Burrup Pty Ltd

**PETROLEUM (SUBMERGED LANDS) ACT, 1967 –  
Pipeline Licence**

Title	Registered Holders (* denotes Nominee)
WA-1-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd
WA-2-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd
WA-3-PL	Inpex Alpha Ltd
	Mobil Exploration & Producing Australia Pty Ltd
	* BHP Billiton Petroleum (Australia) Pty Ltd
WA-4-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd
WA-5-PL	Apache East Spar Pty Limited
	Apache Kersail Pty Limited
	Santos (BOL) Pty Ltd
	* Apache Oil Australia Pty Ltd
WA-6-PL	Apache Northwest Pty Ltd
	Santos (GLOBE) Pty. Ltd.
	Santos Offshore Pty Ltd
WA-7-PL	Apache Northwest Pty Ltd
	Woodside Energy Ltd
	* Santos Limited
WA-8-PL	ConocoPhillips Pipeline Australia Pty Ltd
	Eni Gas & Power LNG Australia B.V.
	Inpex DLNGPL Pty Ltd
	Santos Timor Sea Pipeline Pty Ltd
	TEPCO Darwin LNG Pty Ltd
	Tokyo Gas Darwin LNG Pty Ltd
WA-9-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd
WA-10-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

WA-11-PL	Apache Northwest Pty Ltd		Shell Development (Australia) Proprietary Limited
	Santos (BOL) Pty Ltd		Woodside Energy Ltd
WA-12-PL	ARC (Offshore PB) Limited	WA-6-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	AWE Oil (Western Australia) Pty Ltd		BP Developments Australia Pty Ltd
	Cieco Energy Australia Pty Ltd		CNOOC NWS Private Limited
	ROC Oil (WA) Pty Limited		Chevron Australia Pty Ltd
WA-13-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd		Japan Australia LNG (MIMI) Pty Ltd
	BP Developments Australia Pty Ltd		Shell Development (Australia) Proprietary Limited
	Chevron Australia Pty Ltd		Woodside Energy Ltd
	Japan Australia LNG (MIMI) Pty Ltd	WA-7-L	Chevron (TAPL) Pty Ltd
	Shell Development (Australia) Proprietary Limited		Mobil Australia Resources Company Pty Limited
	Woodside Energy Ltd		Santos Offshore Pty Ltd
WA-14-PL	BHP Billiton Petroleum (North West Shelf) Pty Ltd		* Chevron Australia Pty Ltd
	BP Developments Australia Pty Ltd	WA-8-L	Kufpec Australia Pty Ltd
	Chevron Australia Holdings Pty Ltd		Tap (Shelfal) Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd		* Santos Limited
	Shell Development (Australia) Proprietary Limited	WA-9-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	Woodside Energy Ltd		BP Developments Australia Pty Ltd
WA-15-PL	Eni Australia B.V.		CNOOC NWS Private Limited
WA-16-PL	Woodside Burrup Pty Ltd		Chevron Australia Pty Ltd
WA-17-PL	Woodside Burrup Pty Ltd		Japan Australia LNG (MIMI) Pty Ltd
			Shell Development (Australia) Proprietary Limited
			Woodside Energy Ltd
		WA-10-L	Inpex Alpha Ltd
			Mobil Exploration & Producing Australia Pty Ltd
			* BHP Billiton Petroleum (Australia) Pty Ltd
		WA-11-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd
			BP Developments Australia Pty Ltd
			CNOOC NWS Private Limited
			Chevron Australia Pty Ltd
			Japan Australia LNG (MIMI) Pty Ltd
			Shell Development (Australia) Proprietary Limited
			Woodside Energy Ltd
		WA-12-L	Mobil Australia Resources Company Pty Limited
			* BHP Billiton Petroleum (Australia) Pty Ltd
		WA-13-L	Apache East Spar Pty Limited
			Apache Kersail Pty Limited
			Santos (BOL) Pty Ltd
			* Apache Oil Australia Pty Ltd
		WA-14-L	Vermilion Oil & Gas Pty Ltd
		WA-15-L	Santos Offshore Pty Ltd
			* Apache Northwest Pty Ltd
		WA-16-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd
			BP Developments Australia Pty Ltd
			CNOOC NWS Private Limited
			Chevron Australia Pty Ltd
			Japan Australia LNG (MIMI) Pty Ltd
			Shell Development (Australia) Proprietary Limited
			Woodside Energy Ltd
		WA-17-L	ConocoPhillips Australia Gas Holdings Pty Ltd
			* Mobil Australia Resources Company Pty Limited
		WA-18-L	Talisman Oil & Gas (Australia) Pty Ltd
		WA-20-L	Apache Northwest Pty Ltd
			Santos Limited
			* Woodside Energy Ltd
		WA-22-L	Mobil Australia Resources Company Pty Limited
			Tap West Pty Ltd
			* Eni Australia Limited

**PETROLEUM (SUBMERGED LANDS) ACT, 1967 –  
Production Licence**

Title	Registered Holders (* denotes Nominee)
WA-1-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	CNOOC NWS Private Limited
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd
WA-2-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	CNOOC NWS Private Limited
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd
WA-3-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	CNOOC NWS Private Limited
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd
WA-4-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	CNOOC NWS Private Limited
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd
	Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd
WA-5-L R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	CNOOC NWS Private Limited
	Chevron Australia Pty Ltd
	Japan Australia LNG (MIMI) Pty Ltd

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

WA-23-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd		* Chevron Australia Pty Ltd
	BP Developments Australia Pty Ltd	WA-4-R R2	Chevron (TAPL) Pty Ltd
	CNOOC NWS Private Limited		Mobil Australia Resources Company Pty Limited
	Chevron Australia Pty Ltd		Shell Development (Australia) Proprietary Limited
	Japan Australia LNG (MIMI) Pty Ltd		* Chevron Australia Pty Ltd
	Shell Development (Australia) Proprietary Limited	WA-5-R R2	Chevron (TAPL) Pty Ltd
	Woodside Energy Ltd		Mobil Australia Resources Company Pty Limited
WA-24-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd		Shell Development (Australia) Proprietary Limited
	BP Developments Australia Pty Ltd		* Chevron Australia Pty Ltd
	CNOOC NWS Private Limited	WA-6-R R2	Bonaparte Gas & Oil Pty Limited
	Chevron Australia Pty Ltd		Origin Energy Bonaparte Pty Limited
	Japan Australia LNG (MIMI) Pty Ltd		Santos Offshore Pty Ltd
	Shell Development (Australia) Proprietary Limited		* Santos Limited
	Woodside Energy Ltd	WA-7-R R2	BHP Billiton Petroleum (North West Shelf) Pty Ltd
WA-25-L	Mobil Australia Resources Company Pty Limited		BP Developments Australia Pty Ltd
	Tap West Pty Ltd		CNOOC NWS Private Limited
	* Eni Australia Limited		Chevron Australia Pty Ltd
WA-26-L	Kufpec Australia Pty Ltd		Japan Australia LNG (MIMI) Pty Ltd
	Nippon Oil Exploration (Dampier) Pty Ltd		Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd		* Woodside Energy Ltd
	* Santos Limited	WA-9-R R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
WA-27-L	Kufpec Australia Pty Ltd		BP Developments Australia Pty Ltd
	Nippon Oil Exploration (Dampier) Pty Ltd		CNOOC NWS Private Limited
	Woodside Energy Ltd		Chevron Australia Pty Ltd
	* Santos Limited		Japan Australia LNG (MIMI) Pty Ltd
WA-28-L	Mitsui E&P Australia Pty Limited		Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd		Woodside Energy Ltd
WA-29-L	Apache Northwest Pty Ltd	WA-10-R R1	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	Santos (BOL) Pty Ltd		BP Developments Australia Pty Ltd
WA-30-L	BHP Billiton Petroleum (North West Shelf) Pty Ltd		CNOOC NWS Private Limited
	BP Developments Australia Pty Ltd		Chevron Australia Pty Ltd
	CNOOC NWS Private Limited		Japan Australia LNG (MIMI) Pty Ltd
	Chevron Australia Pty Ltd		Shell Development (Australia) Proprietary Limited
	Japan Australia LNG (MIMI) Pty Ltd		Woodside Energy Ltd
	Shell Development (Australia) Proprietary Limited	WA-12-R R1	Apache Northwest Pty Ltd
	Woodside Energy Ltd		* BHP Billiton Petroleum (Australia) Pty Ltd
WA-31-L	ARC (Offshore PB) Limited	WA-13-R	Drillsearch Energy (WA) Pty Limited
	AWE Oil (Western Australia) Pty Ltd		Frontier Bonaparte Pty Ltd
	Cieco Energy Australia Pty Ltd	WA-14-R R1	Chevron (TAPL) Pty Ltd
	Roc Oil (WA) Pty Limited		Mobil Australia Resources Company Pty Limited
WA-32-L	BHP Billiton Petroleum (Australia) Pty Ltd		Shell Development (Australia) Proprietary Limited
	Woodside Energy Ltd		* Chevron Australia Pty Ltd
WA-33-L	Eni Australia B.V.	WA-15-R R1	Chevron (TAPL) Pty Ltd
WA-34-L	Kansai Electric Power Australia Pty Ltd		Mobil Australia Resources Company Pty Limited
	Tokyo Gas Pluto Pty Ltd		Shell Development (Australia) Proprietary Limited
	Woodside Burrup Pty Ltd	WA-16-R	Chevron (TAPL) Pty Ltd
			Chevron Australia Pty Ltd
			Shell Development (Australia) Proprietary Limited
		WA-17-R	Chevron (TAPL) Pty Ltd
			* Chevron Australia Pty Ltd
		WA-18-R	Chevron (TAPL) Pty Ltd
			Shell Development (Australia) Proprietary Limited
			* Mobil Exploration & Producing Australia Pty Ltd
		WA-19-R	Chevron Australia Pty Ltd
			Mobil Australia Resources Company Pty Limited
			Shell Development (Australia) Proprietary Limited
		WA-20-R	Chevron Australia Pty Ltd
			Mobil Australia Resources Company Pty Limited
			Shell Development (Australia) Proprietary Limited

**PETROLEUM (SUBMERGED LANDS) ACT, 1967 – Retention Lease**

Title	Registered Holders (* denotes Nominee)
WA-1-R R3	BHP Billiton Petroleum (North West Shelf) Pty Ltd * Esso Australia Resources Pty Ltd
WA-2-R R2	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Shell Development (Australia) Proprietary Limited * Chevron Australia Pty Ltd
WA-3-R R2	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Shell Development (Australia) Proprietary Limited





Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

TPL/7 R1	Apache Oil Australia Pty Ltd Pan Pacific Petroleum (South Aust) Pty Ltd Santos (BOL) Pty Ltd Tap (Shelfal) Pty Ltd
TPL/8	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TPL/9	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TPL/10	Inpex Alpha Ltd Mobil Exploration & Producing Australia Pty Ltd * BHP Billiton Petroleum (Australia) Pty Ltd
TPL/11	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TPL/12	Apache East Spar Pty Limited Apache Kersail Pty Limited Santos (BOL) Pty Ltd * Apache Oil Australia Pty Ltd
TPL/13	Apache East Spar Pty Limited Apache Kersail Pty Limited Apache Northwest Pty Ltd Apache Oil Australia Pty Ltd Kufpec Australia Pty Ltd Santos (BOL) Pty Ltd Tap (Harriet) Pty Ltd
TPL/14	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TPL/15	BHP Billiton Petroleum (North West Shelf) Pty Ltd BP Developments Australia Pty Ltd Chevron Australia Pty Ltd Japan Australia LNG (MIMI) Pty Ltd Shell Development (Australia) Proprietary Limited * Woodside Energy Ltd
TPL/16	BHP Billiton Petroleum (North West Shelf) Pty Ltd BP Developments Australia Pty Ltd Chevron Australia Pty Ltd Japan Australia LNG (MIMI) Pty Ltd Shell Development (Australia) Proprietary Limited * Woodside Energy Ltd
TPL/17	Apache Northwest Pty Ltd Santos (BOL) Pty Ltd
TPL/18	ARC (Offshore PB) Limited AWE Oil (Western Australia) Pty Ltd Cieco Energy Australia Pty Ltd ROC Oil (WA) Pty Limited
TPL/19	Woodside Burrup Pty Ltd

TL/2	Apache Oil Australia Pty Ltd Pan Pacific Petroleum (South Aust) Pty Ltd Santos (BOL) Pty Ltd Tap (Shelfal) Pty Ltd
TL/3	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TL/4	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TL/5	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TL/6	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TL/7	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TL/8	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TL/9	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd

#### PETROLEUM (SUBMERGED LANDS) ACT, 1982 – Retention Lease

Title	Registered Holders (* denotes Nominee)
TR/1 R1	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TR/2 R1	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd
TR/3 R1	Apache Northwest Pty Ltd
TR/4	Chevron (TAPL) Pty Ltd Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd * Chevron Australia Pty Ltd
TR/5	BHP Billiton Petroleum (North West Shelf) Pty Ltd BP Developments Australia Pty Ltd Chevron Australia Pty Ltd Shell Development (Australia) Proprietary Limited * Woodside Energy Ltd

#### PETROLEUM AND GEOTHERMAL ENERGY RESOURCES ACT, 1967 – Access Authority to Deviated Well

Title	Registered Holders (* denotes Nominee)
ADW 8/90-1	Chevron (TAPL) Pty Ltd
ADW 10/92-3	Kufpec Australia Pty Ltd
ADW 12/91-2	Kufpec Australia Pty Ltd
ADW 8/90-1	Mobil Australia Resources Company Pty Limited Santos Offshore Pty Ltd

#### PETROLEUM (SUBMERGED LANDS) ACT, 1982 – Production Licence

Title	Registered Holders (* denotes Nominee)
TL/1	Kufpec Australia Pty Ltd Tap (Harriet) Pty Ltd * Apache Northwest Pty Ltd

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

ADW 10/92-3	Tap (Harriet) Pty Ltd
ADW 12/91-2	Tap (Harriet) Pty Ltd
ADW 10/92-3	* Apache Northwest Pty Ltd
ADW 12/91-2	* Apache Northwest Pty Ltd
ADW 8/90-1	* Chevron Australia Pty Ltd

**PETROLEUM AND GEOTHERMAL ENERGY RESOURCES ACT, 1967 – Drilling Reservation**

Title	Registered Holders (* denotes Nominee)
DR 8	Red Mountain Energy Pty Ltd
DR 9	Backreef Oil Limited
DR 10	Red Mountain Energy Pty Ltd

**PETROLEUM AND GEOTHERMAL ENERGY RESOURCES ACT, 1967 – Exploration Permit**

Title	Registered Holders (* denotes Nominee)
EP 61 R6	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd
EP 62 R6	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd
EP 104 R5	ARC Energy Limited
	First Australian Resources Limited
	Gulliver Productions Pty Ltd
	Indigo Oil Pty Ltd
	Pancontinental Oil & Gas NL
	Phoenix Resources PLC
EP 110 R4	Carnarvon Petroleum Limited
	Pancontinental Oil & Gas NL
	Strike Oil Limited
EP 129 R5	ARC Energy Limited
EP 307 R4	Kufpec Australia Pty Ltd
	Tap (Harriet) Pty Ltd
	* Apache Northwest Pty Ltd
EP 320 R3	ARC (Beharra Springs) Pty Ltd
	* Origin Energy Developments Pty Limited
EP 321 R3	Latent Petroleum Pty Ltd
EP 325 R3	Advent Energy Ltd
	Bow Energy Ltd
	Victoria Petroleum NL
	* Strike Oil Limited
EP 341 R3	Strike Oil Limited
	* Tap (Shelfal) Pty Ltd
EP 342 R3	Strike Oil Limited
EP 357 R2	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd
EP 358 R2	Apache Northwest Pty Ltd
	Kufpec Australia Pty Ltd
	Tap (Harriet) Pty Ltd
EP 359 R2	Lansvale Oil & Gas Pty Ltd
	Pace Petroleum Pty Ltd
	* Rough Range Oil Pty Ltd
EP 363 R3	Kufpec Australia Pty Ltd
	Tap (Harriet) Pty Ltd
	* Apache Northwest Pty Ltd

EP 368 R2	Origin Energy Developments Pty Limited
	Westranch Holdings Pty Ltd
	* ARC Energy Limited
EP 371 R1	ARC Energy Limited
EP 380 R2	Jagen Nominees Pty Ltd
	* Amadeus Energy Limited
EP 381 R2	Whicher Range Energy Pty Ltd
EP 386 R2	Advent Energy Ltd
EP 389 R1	Empire Oil Company (WA) Limited
	Wharf Resources PLC
EP 390 R1	ARC Energy Limited
EP 391 R1	ARC Energy Limited
EP 406	Euro Pacific Energy Pty Ltd
	* Victoria Diamond Exploration Pty Ltd
EP 407 R1	Latent Petroleum Pty Ltd
EP 408 R1	Whicher Range Energy Pty Ltd
EP 409 R1	OMV Barrow Pty Ltd
	* Apache Oil Australia Pty Ltd
EP 412 R1	Bounty Oil & Gas NL
	* Rough Range Oil Pty Ltd
EP 413 R2	ARC Energy Limited
	Geary, John Kevin
	Norwest Energy NL
	Origin Energy Developments Pty Limited
	ROC Oil (WA) Pty Limited
	Victoria Petroleum Offshore Pty Ltd
EP 416 R1	Allied Oil & Gas Plc
	* Empire Oil Company (WA) Limited
EP 417	New Standard Exploration Pty Ltd
EP 419	Advent Energy Ltd
EP 421	Bow Energy Ltd
	* Strike Oil Limited
EP 424	Carnarvon Petroleum Limited
	Pancontinental Oil & Gas NL
	* Strike Oil Limited
EP 425	Heritage Petroleum Plc
EP 426	Allied Oil & Gas Plc
	* Empire Oil Company (WA) Limited
EP 427	Grange Court Pty Ltd
	Valadon Pty Ltd
	* Victoria Diamond Exploration Pty Ltd
EP 428	ARC Energy Limited
EP 429	Kingsway Oil Pty Ltd
EP 430	Empire Oil Company (WA) Limited
EP 431	ARC Energy Limited
EP 432	Allied Oil & Gas Plc
	* Empire Oil Company (WA) Limited
EP 433	Lansvale Oil & Gas Pty Ltd
	Pace Petroleum Pty Ltd
EP 434	Pace Petroleum Pty Ltd
	Rough Range Oil Pty Ltd
	* Lansvale Oil & Gas Pty Ltd
EP 435	Australian Oil Company No 3 Pty Limited
	Bounty Oil & Gas NL
	Rough Range Oil Pty Ltd
EP 436	ARC Energy Limited
EP 437	CalEnergy Gas (Australia) Limited
	* ARC Energy Limited

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

EP 438	Cosmetica Research Pty Ltd
	Gulliver Productions Pty Ltd
	Indigo Oil Pty Ltd
	Seaville Investments Pty Ltd
	Venus Bay Pty Ltd
EP 439	Falcore Pty Ltd
	Indigo Oil Pty Ltd
	Longreach Oil Limited
	Rough Range Oil Pty Ltd
	Vigilant Oil Pty Ltd
EP 440	Empire Oil Company (WA) Limited
EP 441	Apache Northwest Pty Ltd
EP 442	New Standard Exploration Pty Ltd
EP 443	New Standard Exploration Pty Ltd
EP 444	Rough Range Oil Pty Ltd
EP 445	Red Mountain Energy Pty Ltd
EP 446	Red Mountain Energy Pty Ltd
EP 447	European Gas Limited
EP 448	Cosmetica Research Pty Ltd
	Gulliver Productions Pty Ltd
	Indigo Oil Pty Ltd
	Kjirt Exploration Services Pty Ltd
	Seaville Investments Pty Ltd
	Venus Bay Pty Ltd
EP 449	Kingsway Oil Pty Ltd
EP 450	New Standard Exploration Pty Ltd
EP 451	New Standard Exploration Pty Ltd
EP 452	ARC Energy Limited
EP 453	Budside Pty Limited
	Pobelo Pty Ltd
EP 454	Empire Oil Company (WA) Limited
EP 455	Westralian Gas and Power Limited
EP 456	New Standard Exploration Pty Ltd
EP 457	Rey Resources Ltd
EP 458	Rey Resources Ltd
EP 459	Strike Oil Limited
EP 460	Rough Range Oil Pty Ltd
EP 461	Rough Range Oil Pty Ltd

L 11	ARC (Beharra Springs) Pty Ltd
	* Origin Energy Developments Pty Limited
L 12	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd
L 13	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd
L 14	ARC Energy Limited
	Geary, John Kevin
	Norwest Energy NL
	Origin Energy Developments Pty Limited
	ROC Oil (WA) Pty Limited
	Victoria Petroleum Offshore Pty Ltd
L 1H R1	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd

**PETROLEUM AND GEOTHERMAL ENERGY RESOURCES ACT, 1967 – Retention Lease**

Title	Registered Holders (* denotes Nominee)
R 1	ARC Energy Limited
	First Australian Resources Limited
	Gulliver Productions Pty Ltd
	Indigo Oil Pty Ltd
	Pancontinental Oil & Gas NL
	Phoenix Resources PLC
R 2	BHP Billiton Petroleum (North West Shelf) Pty Ltd
	BP Developments Australia Pty Ltd
	Chevron Australia Pty Ltd
	Shell Development (Australia) Proprietary Limited
	* Woodside Energy Ltd
R 3	Tap (Shelfal) Pty Ltd
	Westranch Holdings Pty Ltd
	Wildlook Enterprises Pty Ltd

**PETROLEUM AND GEOTHERMAL ENERGY RESOURCES ACT, 1967 – Production Licence**

Title	Registered Holders (* denotes Nominee)
L 1 R1	APT Parmelia Pty Ltd
	ARC Energy Limited
	Origin Energy Developments Pty Limited
L 2 R1	Origin Energy Developments Pty Limited
	* ARC Energy Limited
L 4 R1	ARC Energy Limited
L 5 R1	ARC Energy Limited
L 6 R1	ARC Energy Limited
L 7 R1	ARC Energy Limited
L 8 R1	ARC Energy Limited
L 9	BHP Billiton Petroleum (Australia) Pty Ltd
L 10	Chevron (TAPL) Pty Ltd
	Mobil Australia Resources Company Pty Limited
	Santos Offshore Pty Ltd
	* Chevron Australia Pty Ltd

**PETROLEUM PIPELINE ACT, 1969 – Pipeline Licence**

Title	Registered Holders (* denotes Nominee)
PL 1 R1	APT Parmelia Pty Ltd
PL 2 R1	APT Parmelia Pty Ltd
PL 3 R1	APT Parmelia Pty Ltd
PL 5 R1	APT Parmelia Pty Ltd
PL 6 R2	ARC Energy Limited
PL 7	ARC Energy Limited
PL 8 R1	Mitsui Iron Ore Development Pty Ltd
	Nippon Steel Australia Pty Limited
	North Mining Limited
	Sumitomo Metal Australia Pty Ltd
	* Robe River Mining Co Pty Ltd
PL 12	Kufpec Australia Pty Ltd
	Tap (Harriet) Pty Ltd
	* Apache Northwest Pty Ltd

Table 9. Western Australia List of Petroleum Titles and Holders as at 1 July 2008

PL 14	Apache Oil Australia Pty Ltd		Kufpec Australia Pty Ltd
	Pan Pacific Petroleum (South Aust) Pty Ltd		Santos (BOL) Pty Ltd
	Santos (BOL) Pty Ltd		Tap (Harriet) Pty Ltd
	Tap (Shelfal) Pty Ltd	PL 43	Western Power Corporation
PL 15	Chevron (TAPL) Pty Ltd		* APT Pipelines (WA) Pty Limited
	Mobil Australia Resources Company Pty Limited	PL 44	APT Parmelia Pty Ltd
	Santos Offshore Pty Ltd	PL 45	APT Parmelia Pty Ltd
	* Chevron Australia Pty Ltd	PL 46	APT Parmelia Pty Ltd
PL 16	BHP Petroleum (Ashmore Operations) Pty Ltd	PL 47	DBNGP (WA) Transmission Pty Limited
PL 17	Kufpec Australia Pty Ltd	PL 48	Statewest Power Pty Ltd
	Tap (Harriet) Pty Ltd	PL 52	APT Parmelia Pty Ltd
	* Apache Northwest Pty Ltd	PL 53	APT Parmelia Pty Ltd
PL 18	ARC (Beharra Springs) Pty Ltd	PL 54	Western Power Corporation
	* Origin Energy Developments Pty Limited		* APT Pipelines (WA) Pty Limited
PL 19	BHP Petroleum (Ashmore Operations) Pty Ltd	PL 55	Talison Wodgina Pty Ltd
PL 20	Inpex Alpha Ltd	PL 56	Epic Energy (WA) One Pty Ltd
	Mobil Exploration & Producing Australia Pty Ltd	PL 57	Australian Gold Reagents Pty Ltd
	* BHP Billiton Petroleum (Australia) Pty Ltd	PL 58	BHP Billiton Petroleum (North West Shelf) Pty Ltd
PL 21	Chevron (TAPL) Pty Ltd		BP Developments Australia Pty Ltd
	Mobil Australia Resources Company Pty Limited		Chevron Australia Pty Ltd
	Santos Offshore Pty Ltd		Japan Australia LNG (MIMI) Pty Ltd
	* Chevron Australia Pty Ltd		Shell Development (Australia) Proprietary Limited
PL 22	Epic Energy (Pilbara Pipeline) Pty Ltd		* Woodside Energy Ltd
PL 23	APT Parmelia Pty Ltd	PL 59	Esperance Pipeline Co. Pty Limited
PL 24	Alinta DEWAP Pty Ltd	PL 60	Gas Transmission Services WA (Operations) Pty Ltd
	Southern Cross Pipelines (NPL) Australia Pty Ltd	PL 61	APT Parmelia Pty Ltd
	* Southern Cross Pipelines Australia Pty Limited	PL 62	Kufpec Australia Pty Ltd
PL 25	Southern Cross Pipelines Australia Pty Limited		Tap (Harriet) Pty Ltd
PL 26	Southern Cross Pipelines Australia Pty Limited		* Apache Northwest Pty Ltd
PL 27	Southern Cross Pipelines Australia Pty Limited	PL 63	Gas Transmission Services WA (Operations) Pty Ltd
PL 28	Southern Cross Pipelines (NPL) Australia Pty Ltd	PL 64	ARC Energy Limited
PL 29	Apache East Spar Pty Limited		Origin Energy Developments Pty Limited
	Apache Kersail Pty Limited	PL 65	Dalrymple Resources NL
	Santos (BOL) Pty Ltd		LionOre Australia (Wildara) NL
	* Apache Oil Australia Pty Ltd	PL 67	Hamersley Iron Pty Ltd
PL 30	Apache East Spar Pty Limited	PL 68	Gas Transmission Services WA (Operations) Pty Ltd
	Apache Kersail Pty Limited	PL 69	DBNGP (WA) Nominees Pty Limited
	Santos (BOL) Pty Ltd	PL 70	ARC (Offshore PB) Limited
	* Apache Oil Australia Pty Ltd		AWE Oil (Western Australia) Pty Ltd
PL 31	Epic Energy (Pilbara Pipeline) Pty Ltd		Cieco Energy Australia Pty Ltd
PL 32	APT Pipelines (WA) Pty Limited		ROC Oil (WA) Pty Limited
PL 33	APT Pipelines (WA) Pty Limited	PL 72	EDL NGD (WA) PTY LTD
PL 34	Newmont Yandal Operations Pty Ltd	PL 73	Redback Pipelines Pty Ltd
PL 35	Plutonic Operations Limited	PL 74	EDL LNG (WA) PTY LTD
PL 36	Australian Pipeline Ltd	PL 75	ERM Power
PL 37	Centaur Nickel Pty Limited	PL 76	APA Group
PL 38	Epic Energy (Pilbara Pipeline) Pty Ltd		
PL 39	Origin Energy Pipelines Pty Limited		
PL 40	DBNGP (WA) Nominees Pty Limited		
PL 41	DBNGP (WA) Transmission Pty Limited		
PL 42	Apache East Spar Pty Limited		
	Apache Kersail Pty Limited		
	Apache Northwest Pty Ltd		
	Apache Oil Australia Pty Ltd		

Please consult DoIR's online Petroleum and Geothermal Register for the most current information on Titles and Holdings.

# WESTERN AUSTRALIAN GOVERNMENT OVERSEAS NETWORK

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