

Onshore Western Australia Reinvigorated*

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Abstract

In Western Australia attractive opportunities are being revealed with onshore Paleozoic and Mesozoic plays for conventional oil and gas, as well as for shale gas. In 2011, light oil was discovered in likely Carboniferous carbonates of the Canning Basin. In the same year there was a successful appraisal of a significant gas accumulation in the Carboniferous, with analysis suggesting tight wet-gas, as well as conventional, reservoirs. The basin is thought to have in excess of 200TCF of recoverable unconventional gas from one play (Ordovician) alone.

Two gas and condensate discoveries in the Jurassic Cattamarra Coal Measures in the northern Perth Basin were made in 2010-2011.

New players may take up onshore acreage through farm-in opportunities or by applying for acreage released by the Western Australian Department of Mines and Petroleum. The Department generally releases 5 to 10 areas for work program bidding twice a year.

Canning Basin (Figure 1)

In October 2011, Buru Energy's Ungani 1 well discovered light oil (~37 degrees API gravity) in dolomitised limestones of the likely Carboniferous Laurel Formation. The well flowed at a peak rate of 1647 barrels per day on a ½-inch choke. The original target was gas. This is the first significant oil discovery in the Canning Basin since the 1980s and is believed to be a new oil play in the basin. This is also the first new field onshore oil discovery in Western Australia in 10 years. This discovery has generated renewed interest in the basin, and this was reflected in a higher level of bidding for Canning Basin acreage in a subsequent work program bidding round.

In July 2011 the Valhalla 2 well was a successful appraisal of a significant gas accumulation. A basin-centred gas accumulation may be present. Preliminary analysis indicates the presence of a wet-gas-charged section of tight and possible conventional gas reservoirs across a

Laurel Formation interval of at least 1300 m. Buru's initial interpretation suggested an accumulation of several TCFs of gas and in excess of 50 mm bbls of associated liquids. McDaniel & Associates Consultants have pointed to a high case of more than 33 TCF gas and 1 billion barrels of liquids. A possible new conventional play type has been identified in the Laurel carbonates.

Other significant developments in the basin include:

- Buru indicates that the 2010 Yulleroo 2 Carboniferous Laurel Formation reservoir stimulation was successful in demonstrating that the reservoir will flow gas and that the gas is of good quality. Buru estimates 332 BCF recoverable gas and 13.4 mm bbls liquids.
- Buru drilled Pictor East 1 in August 2011 and confirmed a hydrocarbon column in the Ordovician Nita Formation carbonate reservoir. A horizontal appraisal well is being considered.
- Buru and Mitsubishi Corporation have established the Canning Superbasin Exploration and Development Alliance to jointly explore and develop the Canning Superbasin. Under the terms of the alliance, Mitsubishi Corporation will contribute up to A\$152.4 million to the costs of exploration and development of Buru's exploration portfolio in exchange for an equity interest of up to 50% in the majority of Buru's exploration permits. Up to A\$102.4 million will be spent by Mitsubishi Corporation on exploration with a further A\$50 million available to fund the development of the major oil and gas production infrastructure. As at 31 December 2011, approximately A\$67 million had been spent.
- The US Energy Information Administration and Advanced Well Technologies have both independently identified the Canning Basin as having in excess of 200 TCF of recoverable unconventional gas based on the Goldwyer Formation play alone. This Ordovician-age marine shale is roughly correlative with U.S and Baltic units.
- In September 2011 New Standard Energy announced a farm-in deal that will see ConocoPhillips spending up to US\$109.5 million covering the exploration costs of a Goldwyer liquids-rich shale gas project in the Canning Basin.
- Hess Corporation has several areas under application and has moved to obtain more acreage in the Canning Basin by acquiring the unlisted Kingsway Oil. One of the Canning Basin permits includes the Sally May oil discovery, which was drilled by Kingsway in 2005. The Sally May-1 well in permit EP-429 well encountered good oil shows in the Ordovician Nita Formation within the areally extensive Sally May anticline. The structure has a prospective resource potential of between 2-139 mm bbl. The mean prospective resource potential volume is 65 mm bbl, and the probability of geological success is estimated at 32%.
- Oil Basins drilled the Backreef 1 well in October 2011 and discovered oil in Carboniferous Yellowdrum/Gumhole Formation dolomites. A net pay of 12 m was inferred.

Southern Carnarvon Basin (Figure 1)

Recent developments in this basin include:

- Tap Oil is expanding beyond its traditional focus on offshore exploration with a deal focusing on shale oil and gas plays in the onshore Carnarvon Basin. Besides the Permian shale gas and Devonian shale oil targets, the area also holds conventional oil and gas potential.

- The deal with private company Rusa Resources covers two Special Prospecting Authority (SPA) applications -- a large part of the Palaeozoic Merlinleigh Sub-basin, the entire Byro Sub-basin, plus associated shelfal areas. This area is located close to the Dampier to Bunbury natural gas pipeline, allowing any potential discovery to be commercialised either through the growing Western Australian domestic gas market or the liquefied natural gas export market.
- Under the agreement, Tap and Rusa will carry-out exploration work, such as geochemical surveys over the 38,000 square kilometre SPA areas to delineate the preferred acreage for conversion to exploration permits in 2013. Up to half of the SPA areas can be converted into exploration permits, with Tap having the right to earn a 20% interest. Tap will also have an option to earn an additional 15% in each permit.
- New Standard Energy indicates that it has identified a highly prospective shale-gas opportunity, in addition to several prospective conventional targets within its Merlinleigh Project, and that the project is likely to comprise gas predominantly, with the possibility of liquid hydrocarbons being present across portions of the acreage.
- Empire Oil and Gas has proposed to drill a shale gas well in the Paterson Trough in 2012.

Perth Basin (Figure 1)

Empire Oil and Gas made two gas and condensate discoveries in the Jurassic Cattamarra Coal Measures in the northern Perth Basin. In March, 2011, Red Gully 1 tested 12 MMCFG/D gas and 832 barrels of condensate per day. The testing of the well resulted in the largest gas and condensate flow recorded from a Jurassic reservoir in onshore Western Australia. In April, 2010, Gingin West 1 flowed at a rate of 8 MMCFG/D and 376 barrels of condensate per day. Empire, ERM and Wharf have agreed to sell to ALCOA a total of 15,000 Terajoules (TJ) of gas from the Gingin West Gas Field and the Red Gully Gas Field. A gas and condensate plant is planned to be constructed.

Other developments in Perth Basin include:

- Following the analysis of the Woodada Deep-1 core results, AWE estimated that the middle interval of one of the shale intervals in the Permian Carynginia Formation alone holds a gross Gas in Place of 13 to 20 TCF.
- In September, 2011, Latent's Warro 4 tight gas well flowed gas at 0.42-0.65 MMCFG/D from the Jurassic Yarragadee Formation. The resource has been estimated at 8-10 TCF of gas in place.
- In April, 2010, AWE's Corybas 1 tight gas well initially flowed at a rate of over 4 MMCFG/D from the Permian Irwin River Coal Measures. It was fracture-stimulated in 2009.
- Norwest Energy's Arrowsmith 2 well was drilled in June, 2011, and was planned to be fracture-stimulated in July, 2012. It has shale gas in the Triassic Kockatea Formation, Permian Carynginia Formation, and Permian Irwin River Coal Measures, as well as tight gas in the Permian High Cliff Sandstones. Core and log analyses indicate that all five targeted zones have potential to flow gas following hydraulic stimulation.

Bonaparte Basin (Figure 1)

In November, 2011, Advent Energy's Waggon Creek 1 well was re-entered and preliminary field observations showed that during the 6-hour-flow test the well flowed gas from the Lower Carboniferous Milligans Formation sandstone at a rate of approximately 1.07 MMCFG/D of gas which was still rising slowly at the end of the flow test.

Acreage Take-up

New players may take-up onshore acreage through farm-in opportunities or by applying for acreage released by the Western Australian Department of Mines and Petroleum (website given below). The Department generally releases 5 to 10 areas for work program bidding twice a year.

Website

Government of Western Australia, Department of Mines and Petroleum: Petroleum and Geothermal – Latest Acreage Releases. Web accessed 30 August 2012. www.dmp.wa.gov.au/acreage_release

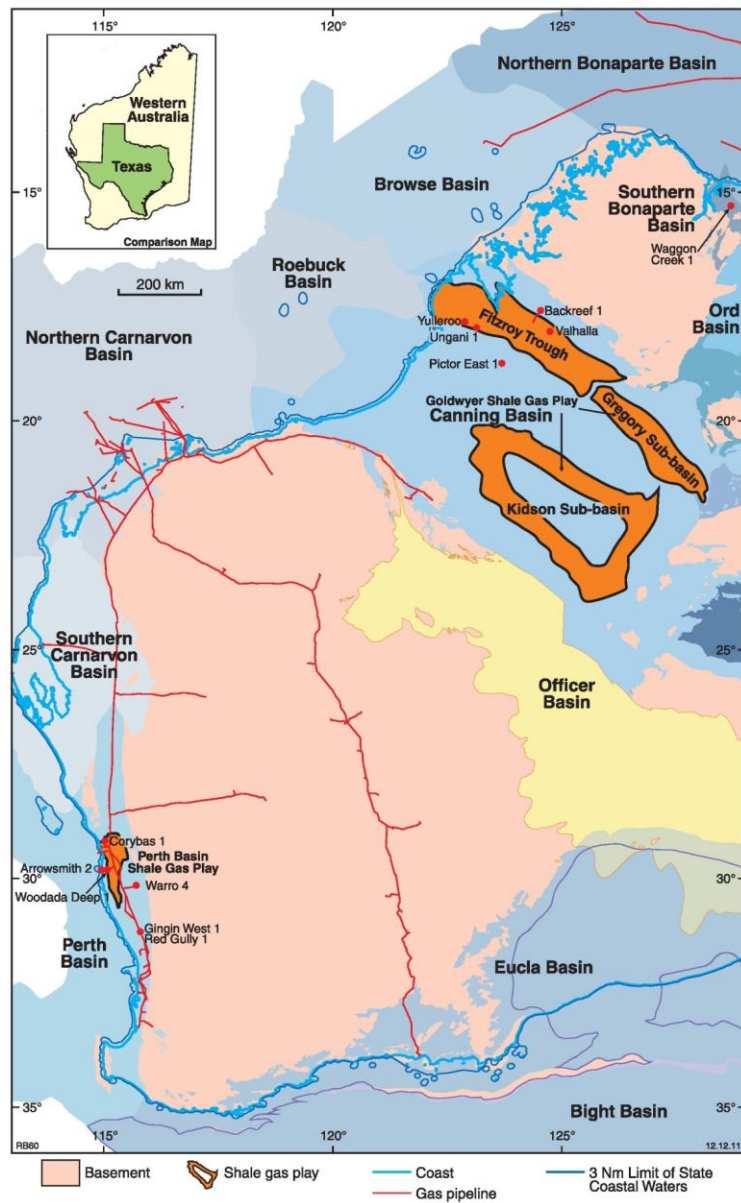


Figure 1: Map showing some recent onshore Western Australia successes and two shale gas plays identified by US EIA.