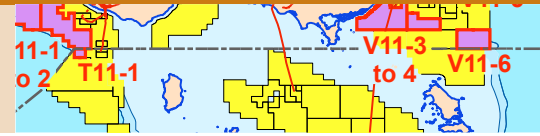




The 2011 Acreage Release for offshore petroleum exploration

Release includes large areas in frontier regions

Thomas Bernecker



The Australian Government formally released new offshore exploration areas at the annual Australian Petroleum Producers and Explorers Association Conference on 11 April 2011. The Minister for Resources and Energy, the Hon. Martin Ferguson AM MP, released twenty-nine areas in nine offshore basins for work program bidding. Closing dates for bid submissions are either six or twelve months after the release date, that is 13 October 2011 and 12 April 2012 respectively, depending on the exploration status of these areas and data availability.

“The 2011 Release is the largest since 2000... located in Commonwealth waters offshore Northern Territory, Western Australia, Victoria and Tasmania.”

The 2011 Release is the largest since 2000, covering approximately 200 000 square kilometres with all 29 areas located in Commonwealth waters offshore Northern Territory, Western Australia, Victoria and Tasmania (figure 1). Underexplored regions off the Northern Territory and Western Australia are represented by 13 areas characterised by a large areal extent ranging from around 100 to 270 graticular blocks. These areas, located in the Money Shoal, outer Browse, Roebuck, Northern Carnarvon, Southern Carnarvon and North Perth basins, offer new opportunities for data-acquisition and regional exploration. The release of three large areas in the Southern Carnarvon and North Perth basins is supported by new data acquired and interpreted by Geoscience Australia as part of its Offshore Energy Security Program.

The producing hydrocarbon provinces of the Northern Carnarvon, Otway and Gippsland basins are represented by smaller gazettal blocks. These are located close to existing infrastructure and are supported by extensive open file data-sets. Other areas that are close to known oil and gas discoveries lie in the Caswell Sub-basin (eastern Browse Basin) and on the Ashmore Platform (northwestern Bonaparte Basin).

Money Shoal Basin

Two Release Areas (NT11-1 and NT11-2) are available for bidding in the Money Shoal Basin, offshore Northern Territory. These are located in shallow waters (10 to 110 metres) about 150 kilometres north of Darwin. The Money Shoal Basin is Mesozoic to Cenozoic in age and is underlain by the Goulburn Graben in the northeast which is part of the Neoproterozoic to Permian Arafura Basin (figure 2). The northeastern part of Area NT11-2 has access to the Goulburn Graben, which is known to host liquid hydrocarbons, while further west Area NT11-2 partly overlaps the Bonaparte Basin, a known gas producing province. Both Release Areas are located to the southeast of the Evans Shoal, Caldita and Barossa–Lynedoch gas accumulations in Australian waters and the Abadi gas accumulation in Indonesian waters. The Bayu–Undan to Darwin gas pipeline is located about 30 kilometres south of Release Area NT11-2.

No wells have been drilled in either of the Release Areas, but well control is provided by four wells to the north and northeast of NT11-1 and nine petroleum

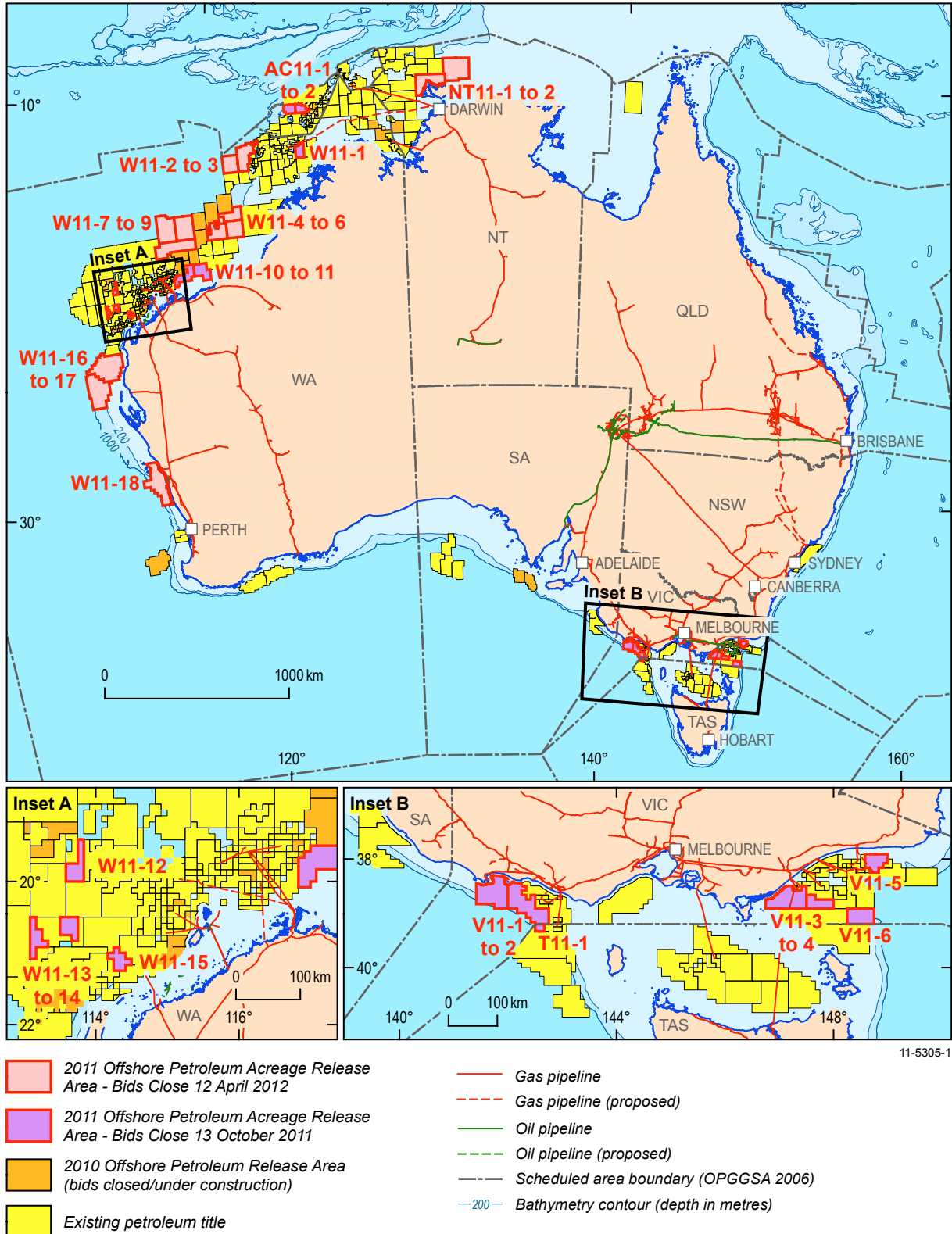


Figure 1. Location map showing the 2011 Offshore Petroleum Acreage Release Areas.

exploration wells in the Goulburn Graben area, northeast of NT11-2. Some of the most significant oil shows were intersected in Arafura-1, and pervasive oil indications occur in Goulburn-1. Tasman-1 encountered an oil show in an unnamed Carboniferous carbonate,

and Kulka-1 discovered an oil show in the Kulshill Group. A review of available geological data together with the results

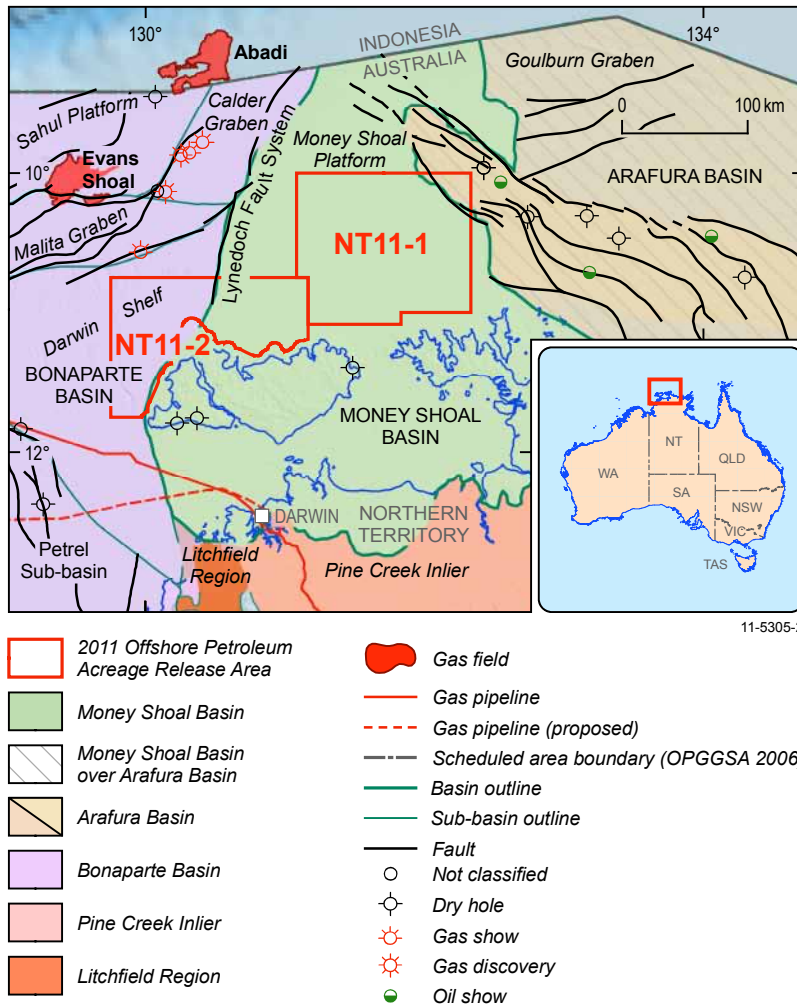


Figure 2. Tectonic elements map of the Money Shoal Basin showing location of the 2011 Release Areas and petroleum accumulations.

from a survey investigating potential hydrocarbon seepage in the Arafura Basin (Logan et al 2006) show that the region contains not only all the required petroleum systems elements to generate, expel and trap hydrocarbons, but also evidence that generation and expulsion has occurred.

Bonaparte Basin

In this year's acreage release, the Bonaparte Basin is represented by two areas on the Ashmore Platform (figure 3), an extensive, elevated and highly structured block that borders the Vulcan Sub-basin to the east, the northern Browse Basin to the south and deepens into the Timor Trough to the west. The Release Areas AC11-1 and AC11-2 are located in shallow water (less than 300 metres), adjacent to the Vulcan Sub-basin (figure 3), the host to several oil accumulations.

Drilling on the Ashmore Platform has focused on the Upper Cretaceous Puffin Formation sandstone fans and Triassic sandstones (Nome and Challis formations) that immediately underlie the prominent base-Cretaceous unconformity. Most of the drilling activity

has been focused on the eastern margin of the platform, relying on Jurassic-sourced hydrocarbons migrating from the adjacent depocentres in the Vulcan Sub-basin. Top-Triassic targets have been tested by wells on the western, central and northern parts of the platform (Ashmore Reef-1, Sahul Shoals-1, Brown Gannet-1, North Hibernia-1 and Cartier-1). The main trap types for this exploration play are tilted fault blocks, unconformity pinchouts and broad anticlines that are all sealed by Lower Cretaceous claystones above the Jurassic-Lower Cretaceous unconformity.

A potential new play type on the Ashmore Platform comprises lower-middle Miocene reefs within the Oliver Formation. More than 30 patch reef structures have been identified on the southeastern and eastern margin of the Ashmore Platform, and confirmed by reefal facies intersected in the Lucas-1, Pascal-1 and Prion-1 wells.

Browse Basin

The Browse Basin is one of the richest hydrocarbon provinces in Australia. Areas in two different parts of the basin were released this year: Area W11-1 in the Caswell Sub-basin and Areas W11-2 and W11-3 on the Scott Plateau in the outer Browse Basin (figures 1 and 3).

The Caswell Sub-basin is the northernmost major depocentre of the Browse Basin and contains up to 15 kilometres of

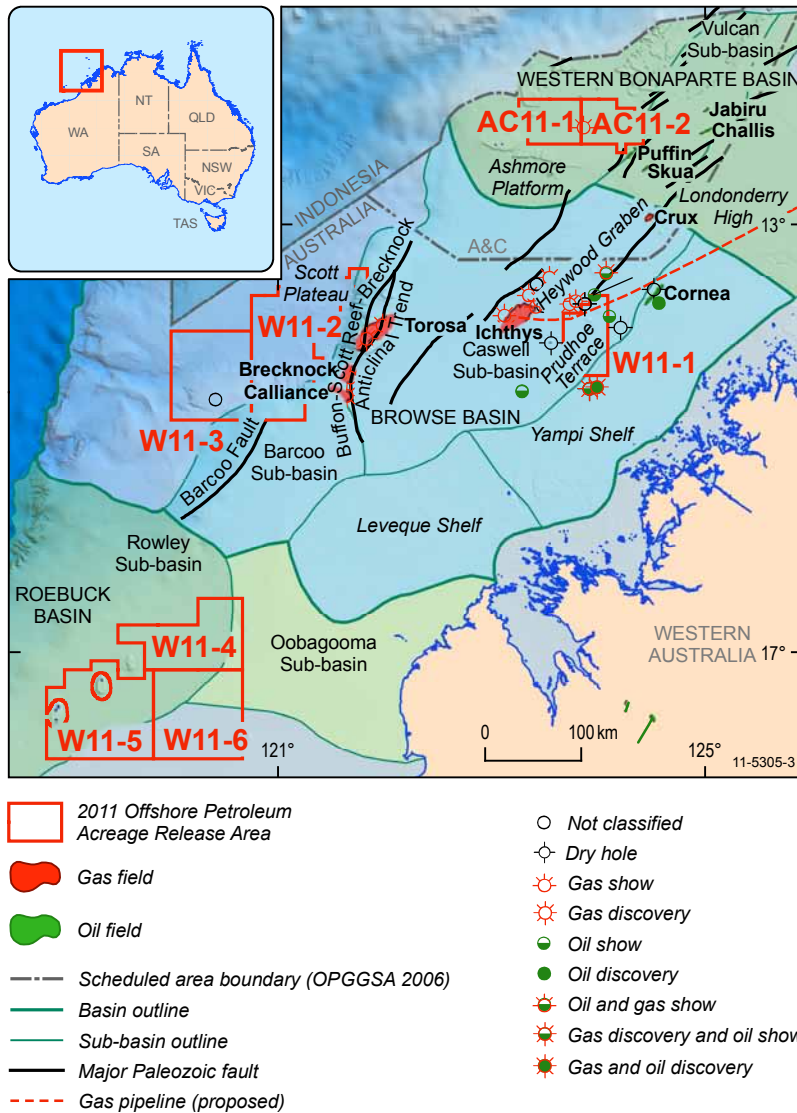


Figure 3. Tectonic elements map of the Browse Basin region showing location of the 2011 Release Areas and petroleum accumulations.

Paleozoic to Cenozoic sediments (Struckmeyer et al 1998). It is well explored and hosts significant discoveries of gas, condensate and to a lesser extent, oil. Five gas fields have been discovered in the Caswell Sub-basin, but remain undeveloped: Torosa, Brecknock, Calliance (Brecknock South), Ichthys (Brewster) and Crux. Release Area W11-1 is located on the Prudhoe Terrace which separates this sub-basin from the Yampi Shelf, an area that is characterised by an onlapping succession of Permian to Mesozoic sediments onto shallow basement. No wells have been drilled in the Caswell Release Area to date. However, hydrocarbon accumulations have been encountered near the Release Area in both structural and stratigraphic plays in the Caswell Sub-basin and on the Yampi Shelf.

Release Areas W11-2 and W11-3 are located in deep water (1000 to 3000 metres) on the largely unexplored Scott Plateau. The geological inventory is not well understood but believed to

comprise up to four kilometres of ?Carboniferous to Cenozoic rocks overlying ?Paleozoic and older basement. Despite being well covered by modern 2D seismic data, insufficient data exists to confirm the presence of active petroleum systems in this part of the Browse Basin. Regional studies by Geoscience Australia, recent exploration activities and comparisons with the petroleum systems in the adjacent Caswell and Barcoo sub-basins, however, indicate the potential of this underexplored region.

Several models presented by Hoffman and Hill (2004) for the structural development of the Scott Plateau infer shallow-water source rocks (Plover Formation) may have developed during the pre- and early-rift stages, while thick syn-rift to immediately post-rift sequences (Vulcan Formation) may also have been deposited in the Late Jurassic restricted marine depocentres (or areas of thick sediment accumulation in a sedimentary basin). Regional subsidence and thermal history modelling by Kennard et al (2004) suggests that if source rocks are present, oil and gas were expelled from the Jurassic rift depocentres on the Scott Plateau during the late Cenozoic. The results of BHP Billiton's HBR 2002A Seabed Coring Survey (BHP Billiton Petroleum Pty Ltd 2002) imply Plover and Vulcan Formation source rocks are mature in this region.

Roebuck Basin

The Roebuck Basin covers approximately 93 000 square kilometres on the North West Shelf. It forms the central part of the Westralian Superbasin, which is a northeast-trending passive margin of late Paleozoic and Mesozoic age. Three Release Areas (W11-4, W11-5 and W11-6) are located in the Rowley Sub-basin (figure 3), a major Mesozoic depocentre situated on the outer continental shelf. The sub-basin contains about nine kilometres of Permo–Carboniferous or older strata and up to six kilometres of Mesozoic–Holocene sediments.

Well control is limited to nine wells in the entire Roebuck Basin, none of which was commercially successful. The only significant hydrocarbon shows were recorded by Phoenix-1 and Phoenix-2 in the adjacent Bedout Sub-basin. Because of the perceived absence of a prolific source rock, the petroleum potential of the Roebuck Basin is currently considered to be poor compared to other areas along the North West Shelf. However, recent research suggests that the Lower Permian and Lower Triassic strata possibly include marine shales as well as organic-rich coaly sediments which could be capable of expelling liquid hydrocarbons (Geoscience Australia and Geomark Research 2005). Widespread distribution of oil inclusions in the Roebuck Basin, including in East Mermaid 1, may be indicative of palaeo-oil columns and evidence of petroleum generation within the Rowley Sub-basin. The entire Triassic section within the sub-basin remains untested to date and it is therefore possible that the application of new concepts to these Release Areas may translate to exploration success.

Northern Carnarvon Basin

The Northern Carnarvon Basin is one of Australia's most explored and prospective hydrocarbon provinces and has ready access to established oil and gas exploration, production and support infrastructure. Large-scale development projects under way include the Gorgon, Pluto and Wheatstone LNG projects, Macedon–Pyrenees project (gas and oil) and Reindeer–Devils Creek Development (gas). New discoveries were made in 2010 and 2011, highlighting the large exploration potential of the region which is supported by established and expanding production infrastructure. The 2011 Release Areas (figure 1) are located on the northeastern Exmouth Plateau (three areas), in the Beagle and Dampier Sub-basins (two areas), Central Exmouth Plateau (three areas) and Exmouth Sub-basin (one area).

Northeastern Exmouth Plateau

The Exmouth Plateau is a broad, sunken continental block, which is underlain by 10 to 15 kilometres of a generally flat-lying or

block-faulted and tilted, Lower Cretaceous, Jurassic, Triassic and Paleozoic section. These sediments were deposited during periods of extension that preceded the breakup of Australia and Argo Land in the Middle Jurassic and then Greater India in the Early Cretaceous. Release Areas W11-7 and W11-8 lie on the outer part of the plateau (figure 4) in water depths greater than 1000 metres, while Release Area W11-9 lies within the northern part of the Beagle Sub-basin on the outer shelf, where water depths range between 500 and 1000 metres.

The giant Scarborough and Io-Jansz gas fields, along with the gas discoveries at Jupiter-1, Chandon-1, Thebe-1 and -2, Martell-1, Larsen Deep-1 and Alaric-1, demonstrate that the deepwater Exmouth Plateau is prospective for large gas discoveries. The extension of this prospectivity further north, to the northern margin of the plateau, is yet to be demonstrated. However, several of the key elements that combine to produce successful petroleum systems further south also occur in the region of the Release Areas.

The prospectivity of the Beagle Sub-basin is demonstrated by the Nebo-1 oil discovery confirming the presence of an active petroleum system. It is unclear whether this system is locally restricted or whether it extends across major parts of the Release Areas. As with the Roebuck Basin, all exploration wells drilled in this part of the

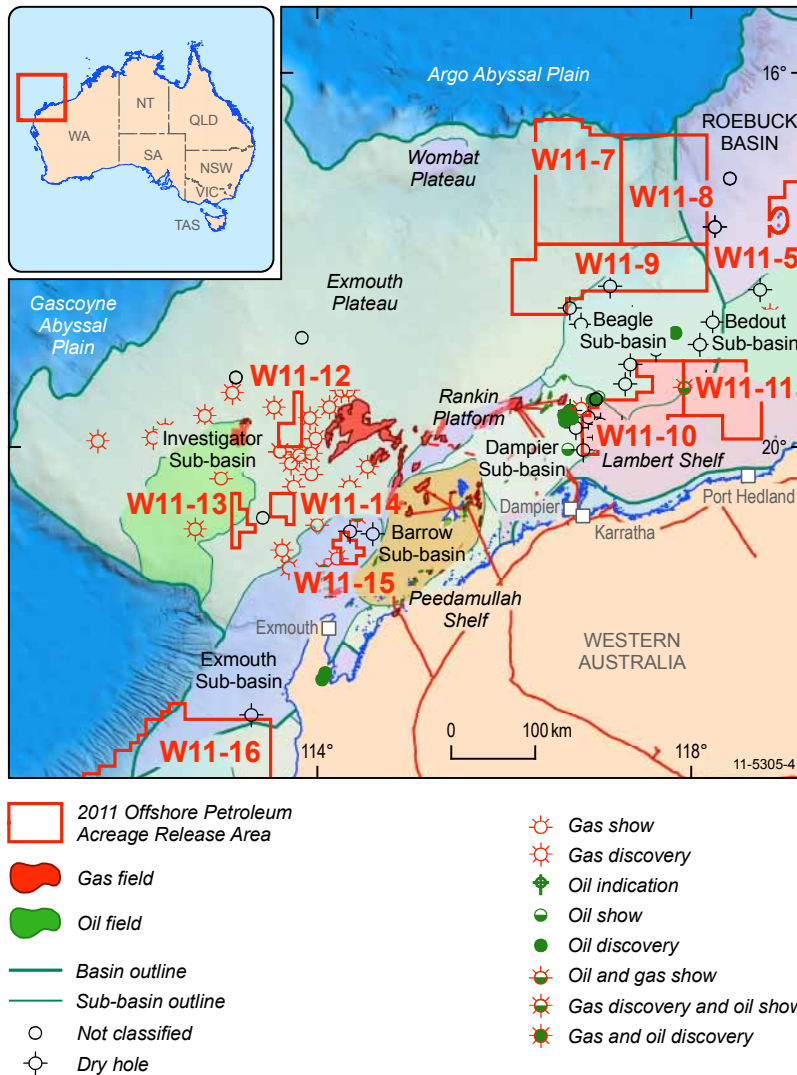


Figure 4. Tectonic elements of the Northern Carnarvon Basin and adjacent basins showing the 2011 Release Areas, oil and gas accumulations and selected wells.

Northern Carnarvon Basin have targeted Jurassic objectives while the thick Triassic strata have not been tested. Given the widespread hydrocarbon occurrence in Triassic sediments further west, the three large exploration blocks offer opportunities to test that stratigraphic section.

Dampier and Beagle Sub-basins/Lambert Shelf

The Beagle and Dampier sub-basins are bounded to the southeast by the Lambert Shelf, an offshore extension of the Precambrian Pilbara Block. The Release Areas W11-10 and W11-11 straddle the southern Beagle Sub-basin, northeastern Dampier Sub-basin and Lambert Shelf (figure 4) of the Northern Carnarvon Basin. The northeastern part of Release Area W11-11 extends into the Bedout Sub-basin of the Roebuck Basin. Release Area W11-10 is located immediately to the east of the Legendre, Amulet and Talisman oil accumulations in

the Dampier Sub-basin, and is proximal to the gas pipelines connecting the Rankin Platform gas fields to the LNG processing plant at Karratha. Minor oil and gas occurrences have been recorded at Bruce-1 within Release Area W11-11, indicating that an active petroleum system is present in this part of the southern Beagle Sub-basin and the Lambert Shelf.

The Beagle and Dampier sub-basins contain a Paleozoic to Cenozoic sedimentary succession with a maximum thickness of 10 to 12 kilometres. The sediments are predominantly Triassic to Middle Jurassic in the Beagle Sub-basin and Triassic to Lower Cretaceous in the Dampier Sub-basin. The Beagle Sub-basin is a frontier area of the Northern Carnarvon Basin, with only 25 wells drilled to date. Initial exploration drilling between 1971 and 1992 tested a variety of play types, but no hydrocarbon shows were recorded except at Bruce-1 (1979; minor oil and gas) on the boundary between the Beagle Sub-basin and the Lambert Shelf.

The main structural play types in the southeastern Dampier Sub-basin, southern Beagle Sub-basin and Lambert Shelf are Middle Jurassic to Lower Cretaceous horsts, tilted fault blocks and low-side rollovers, Triassic to Lower Cretaceous anticlines and faulted anticlines, and drapes and anticlines over Triassic to Jurassic fault blocks. The marginal location of Release Areas W11-10

and W11-11 relative to the main basin depocentres implies that the source rocks may be thin, immature and/or of low quality, and some of the areas may be outside the range of lateral hydrocarbon migration from the main source kitchens. Hydrocarbon accumulation in the area has been hampered by poor seal development due to erosion or high sand content, leakage via basin-bounding faults, lack of closure, and biodegradation. Since this part of the Northern Carnarvon Basin is underexplored, new data and new geological concepts have the potential to identify viable prospects.

Exmouth Plateau

The Exmouth Plateau is a deep-water marginal plateau that represents the westernmost structural element of the Northern Carnarvon Basin. Most of the plateau is underlain by 10 to 15 kilometres of generally flat-lying or block faulted, tilted Lower Cretaceous, Jurassic, Triassic and older sedimentary section. These sediments were deposited during the periods of extension that preceded the break-up of Australia and Argo Land in the Middle Jurassic, and then Greater India in the Early Cretaceous.

Release Areas W11-12, W11-13 and W11-14 are located in deep water (900 to 1400 metres) to the south and east of the giant ~8 trillion cubic feet (or Tcf) Scarborough gas field and to the west and southwest of the supergiant Io-Jansz field (figure 4). Gas production facilities are currently being developed for the Chevron-operated Gorgon and Io-Jansz fields and the Woodside-operated Pluto field. ExxonMobil and BHP Billiton are currently examining development options for the Scarborough and Thebe fields, as is Chevron for the Wheatstone field.

The thick Triassic and older sedimentary section on the Exmouth Plateau has the greatest potential for mature source facies, with possible organic-rich units in the Lower Triassic (marine Locker Shale equivalents) and Upper Triassic (deltaic Mungaroo Formation facies and marine equivalents). Recent exploration activities on the Exmouth Plateau are based on a model that invokes gas charge from the deeply buried coal and carbonaceous claystone of the Mungaroo Formation. Peak gas generation from these Triassic source rocks is interpreted to occur now at depths greater than five kilometres below sea level.

Given that a proven hydrocarbon system has already been established across the central Exmouth Plateau, continued success relies on the identification of additional valid traps with access to charge from the gas-prone Mungaroo source. Key exploration tools that are likely to lead to future discoveries on the deep-water Exmouth Plateau are 3D seismic and AVO technology.

Exmouth Sub-basin

The Exmouth Sub-basin is a Jurassic depocentre and has geological affinities with the Barrow, Dampier and Beagle sub-basins representing a failed rift system that developed during the early syn-rift phase of breakup of the northwestern Australian continental margin. Oil was first discovered in 1998 (Vincent-1) and was followed by several additional oil discoveries including Coniston, Laverda, Stybarrow, Ravensworth and Stickle, establishing the Exmouth Sub-basin as a new oil province with a reserve potential of 300 million barrels. Two new oil projects commenced production in 2010; the Van Gogh oilfield and the Pyrenees project, comprising the Crosby, Ravensworth and Stickle oilfields (Department of Mines and Petroleum 2010).

Release Area W11-15 is located in the northern part of Exmouth Sub-basin (figure 4) and has access to two petroleum systems. The extensive Locker/Mungaroo–Mungaroo/Barrow petroleum system, which has sourced some of the giant gas fields in the Northern Carnarvon Basin, was proven south of the Release Area with the discovery of gas in the Mungaroo Formation at Falcone-1A. The Upper Jurassic Dingo Claystone is the principal source for oil in the Exmouth Sub-basin (Tindale et al 1998) and it is relatively thick within the Release Area W11-15. The proven traditional Triassic

fault block play, which hosts most of the hydrocarbon reserves in the Northern Carnarvon Basin, is adjacent to the Release Area. Mungaroo Formation sandstones in fault block traps are sealed by either the Dingo Claystone or intraformational seals. Gas sands interpreted in the Mungaroo Formation equivalent from electric logs at Zeepaard-1, north of the Release Area W11-15, comprise an example of this play type. Partially confined channels have been proven to contain hydrocarbons within the Jurassic sandstones plays.

Southern Carnarvon Basin

The Southern Carnarvon Basin, a large (192 000 square kilometres), predominantly Paleozoic sedimentary basin to the south of the Mesozoic Northern Carnarvon Basin, is comprised of the Gascoyne, Merlinleigh and Byro sub-basins and the Bernier Platform. Of these, the Bernier Platform and western Gascoyne Sub-basin lie offshore (Figure 5).

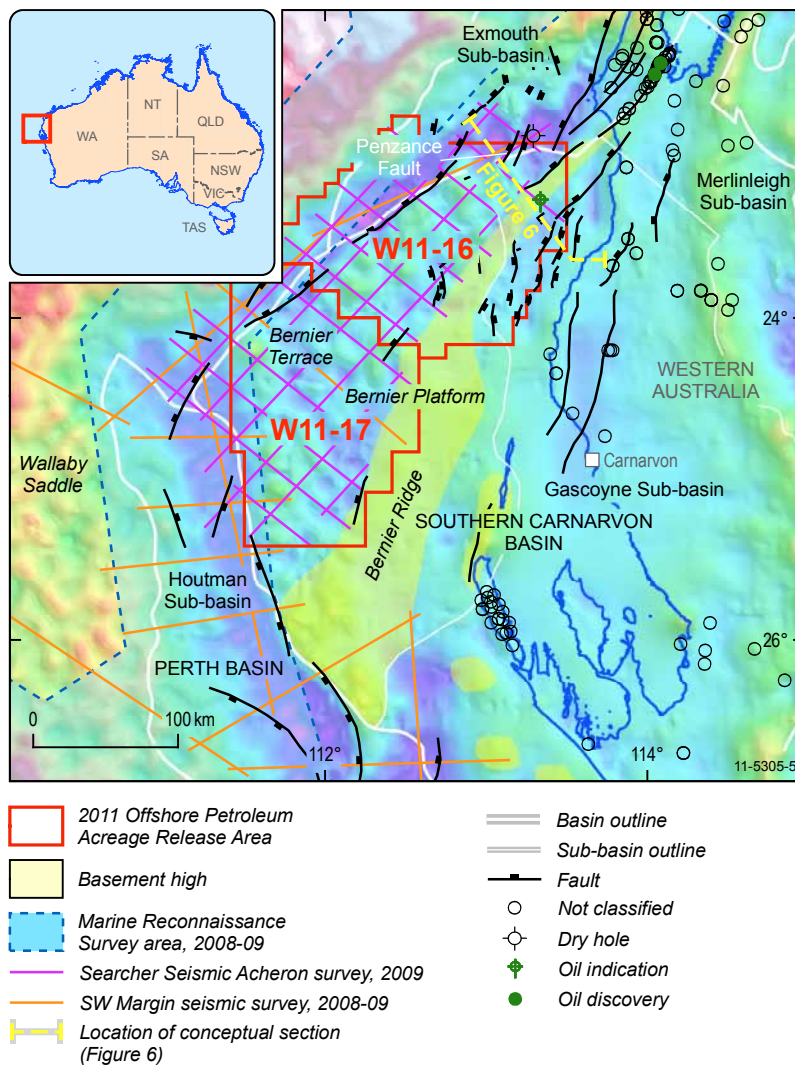


Figure 5. Tectonic elements map of the Southern Carnarvon Basin based on Geoscience Australia's interpretation of gravimetric data.

Release Areas W11-16 and W11-17 lie partly within the Paleozoic Bernier Platform and Gascoyne Sub-basin of the Southern Carnarvon Basin and partly on the southernmost Mesozoic Exmouth Sub-basin of the Northern Carnarvon Basin. Area W11-16 is the largest of this year's release featuring 264 graticular blocks covering an area of 20 735 square kilometres, while Area W11-17 comprises 230 graticular blocks covering an area of 17 925 square kilometres. Both Release Areas lie within the frontier part of the Carnarvon Basin. Pendock-1A was drilled over 40 years ago and during the last 20 years permits have covered only parts of Release Area W11-16.

Lack of exploration activity in the area could be partly attributed to the general focus on highly successful exploration in the adjacent Northern Carnarvon Basin. In recent years, new seismic data has been acquired to assess the basin architecture, tectonic styles and the hydrocarbon prospectivity of the Southern Carnarvon Basin. As part of its Offshore Energy Security Program, Geoscience Australia acquired regional seismic data sets along the Southwest Margin targeting potential depocentres that are delineated by gravity lows. This new data covers much of the northwestern, deep water parts of the Release Areas. Additional seismic data over both areas has been acquired by Searcher Seismic, but these were not interpreted prior to this year's acreage release.

The region has potentially two active petroleum systems: Paleozoic and Mesozoic. So far no commercial discoveries from Paleozoic petroleum systems have been made in the Southern Carnarvon Basin, however oil and gas shows have been encountered in a number of wells. Within the Paleozoic Gascoyne Sub-basin and Bernier Platform, source rocks are present in the Silurian and Upper Devonian. Effective reservoirs and seals are present both in the Paleozoic and the post-breakup Cretaceous succession (figure 6). The Mesozoic petroleum system of the southern Exmouth Sub-basin of the Northern Carnarvon Basin includes potential source rocks in the Triassic Mungaroo Formation and Jurassic Dingo Formation with multiple reservoir and seal units in the Triassic, Jurassic and Cretaceous. The potential of the Mesozoic petroleum system in the southernmost part of the Exmouth Sub-basin has not been proven. A test of a valid structure at Herdsman-1 suggests that the thickness of the Mesozoic succession is a critical factor for hydrocarbon generation in this part of the basin.

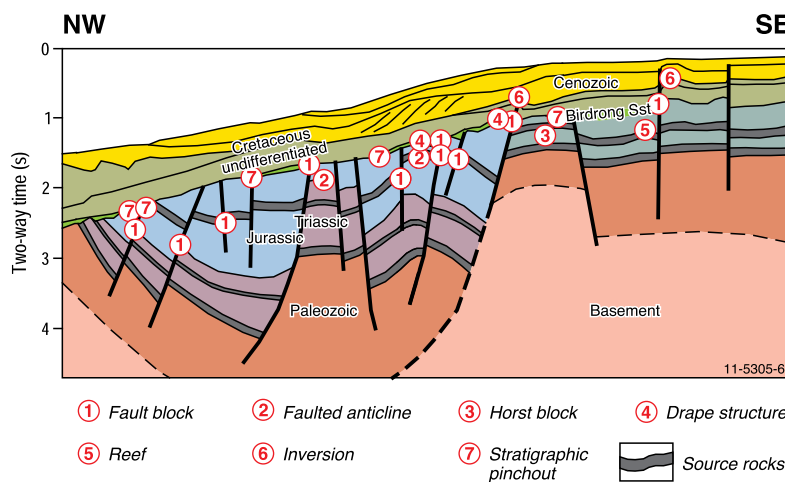


Figure 6. Conceptual cross-section across Southern Carnarvon Basin showing possible exploration plays.

North Perth Basin

The Perth Basin is a large (172 300 square kilometres), elongate, north to northwest-trending sedimentary basin extending about 1300 kilometres along the southwestern coast of Australia and encompassing both onshore and offshore areas. The maximum extent of the offshore part of the Perth Basin is placed at the limit of basin fill ranging in age from Cisuralian (Early Permian) to Early Cretaceous.

Release Area WA11-18 is situated in the offshore portion of the northern Perth Basin, around 200 kilometres northwest of Perth and directly offshore from Geraldton (figure 1). The Release Area comprises 260 graticular blocks, and covers an area of 17 475 kilometres and abuts Production License WA-31-L over the

Cliff Head oil field.

New data have been acquired, interpreted and integrated with existing data-sets to assess the hydrocarbon prospectivity of this offshore frontier as part of Geoscience Australia's Offshore Energy Security Program. The results of this work will be published in a future issue of *AusGeo News*.

Otway Basin

The Otway Basin is a northwest-striking passive margin rift basin that extends from southeastern South Australia to the northwestern coast of Tasmania. The basin is filled with Upper Jurassic to Holocene sediments and covers an area of 150 000 square kilometres, 80 per cent of which lies offshore. The basin hosts several producing gas fields, most of which are located in the eastern offshore region, as well as onshore Victoria and South Australia. The 2011 Release Areas are located east of the South Australian border (figure 1) and cover much of the Voluta Trough and parts of the Mussel Platform.

Three petroleum systems, Austral 1, Austral 2 and Austral 3, are believed to exist in the Otway Basin (O'Brien et al 2009). Austral 1 is related to Upper Jurassic/Lower Cretaceous source rocks and dominantly Lower Cretaceous reservoirs in the onshore. Austral 2 is related to Aptian-Albian source rocks and dominantly Upper Cretaceous reservoirs both

onshore and offshore. The Austral 3 system relies on mature Turonian source rock intervals and is as yet unproven.

The shallow shelf regions of Release Areas V11-1 and V11-2 are known to have access to the prolific Austral 2 petroleum system, but the main discoveries seem to be concentrated around the Shipwreck Trough area. Maturity modelling suggests that the shelf region inboard of the Tartwaup–Mussel Fault Zone lies well within the area of mature Eumeralla source rocks and it will be a matter of carefully mapping appropriate structures on modern seismic, ideally in 3D-format. In these areas, it is also very important to understand lateral facies changes that range from fully terrestrial lower coastal plain to open shelf depositional environments. The most critical exploration uncertainty in the deeper water regions of the Release Areas is the presence of mature Turonian source rocks which would be a marine equivalent to the marginal marine to terrestrial Waarre Formation. The extent of Paleogene and Neogene overburden in the far offshore also impacts severely on the maturity levels of the Upper Cretaceous section. However, if it can be demonstrated that access to a mature Austral 3 petroleum system exists, these deep water parts of the Release Areas may indeed be more prospective than the lack of exploration success indicates.

Gippsland Basin

The Gippsland Basin, one of Australia's most prolific hydrocarbon provinces, is situated in southeastern Australia and is located about 200 kilometres east of the city of Melbourne. Most of the hydrocarbon discoveries which have been made are stored within the siliciclastics of the Upper Cretaceous to Paleogene Latrobe Group. Remaining reserves are estimated at 400 million barrels of liquids and 6 trillion cubic feet (Tcf) of gas.

“The 2011 Offshore Acreage Release offers a wide variety of geological settings in shallow as well as deep water.”

Release Areas V11-3 to V11-6 are distributed across the basin (figure 1) providing explorers with the choice of several different tectonic settings, play types and petroleum systems. Release Areas V11-3 and V11-4 are in close proximity to the southern Gippsland coast. Water depths across both of these are typically shallow, with the maximum depth of around 70 metres reached in the eastern edge of V11-4. Release Area V11-5 lies in the northeastern part of the basin with water depths increasing from 50 to 150 metres towards the

southeast. This area also includes the small Leatherjacket oil field and is close to the Kipper gas field. Release Area V11-6 is in the far southeastern part of the Gippsland Basin, and covers the majority of the area known as the Pisces Sub-Basin. This Release Area stretches over the southern margin of the Bass Canyon, where water depths range from 50 metres on the shallow shelf up to more than 1500 metres in the northeastern corner of the Release Area.

In terms of prospectivity, it must be pointed out that the Release Areas are relatively underexplored, particularly along the southern margin of the basin. An effective regional seal is likely to be present over the majority of the Release Areas, although the lithologies in the eastern offshore area and on the Southern Platform remain unknown. The quality of intraformational seals depends very much on the overall facies associations and their variations through time. Well control in the central part of the basin (Central Deep) and in the north (Northern Terrace) indicates that the Latrobe Group sediments tend to have more marine influence in the easternmost part of the basin.

Although the Gippsland Basin is a mature, well explored hydrocarbon province with a long production history, there are still many areas that deserve a fresh look. In addition, the deeper stratigraphic levels remain poorly understood with respect to hydrocarbon generation and



migration. The Release Areas offer access to a variety of structural and depositional settings in which known and new play concepts can be tested.

Summary

The 2011 Offshore Acreage Release offers a wide variety of geological settings in shallow as well as deep water. Area selection continues to be undertaken in consultation with industry, the states and the Northern Territory. As part of that consultation, large blocks were gazetted in the 2011 release round, totalling about 200 000 square kilometres in area, the largest release since 2000. The annual Acreage Release caters for the whole gamut of exploration companies since many areas are located within producing regions and close to existing infrastructure while others are located in offshore frontier regions with very little supportive data. New data, acquired in unexplored regions as part of Geoscience Australia's Offshore Energy Security Program, have yielded new insights into the hydrocarbon prospectivity of the North Perth and the Southern Carnarvon basins.

References

- BHP Billiton Petroleum Pty Ltd. 2002. HBR2002A, Seabed Coring Survey, Interpretation Report, Outer Browse Basin. Unpublished.
- Department of Mines & Petroleum. 2010. Petroleum in Western Australia. Available at: www.dmp.wa.gov.au/documents/Petroleum_in_WA_magazine_09_10.pdf (last accessed 2 May 2011).
- Geoscience Australia & Geomark Research. 2005. The Oils of Western Australia II. Regional Petroleum Geochemistry and Correlation of Crude Oils and Condensates from Western Australia and Papua New Guinea. Unpublished proprietary report Geoscience Australia and GeoMark Research Ltd, Canberra and Houston.
- Hoffman N & Hill KC. 2004. Structural-stratigraphic evolution and hydrocarbon prospectivity of the deep-water Browse Basin, North West Shelf, Australia. In: Ellis GK, Baillie PW & Munson TJ (eds). Timor Sea Petroleum Geoscience. Proceedings of the Timor Sea Symposium, Darwin, 19–20 June 2003. Northern Territory Geological Survey Special Publication 1.
- Kennard JM, Deighton I, Ryan D, Edwards DS & Boreham CJ. 2004. Subsidence and thermal history modelling: new insights into hydrocarbon expulsion from multiple petroleum systems in the Browse Basin. In: Ellis GK, Baillie PW & Munson TJ (eds). Timor Sea Petroleum Geoscience. Proceedings of the Timor Sea Symposium, Darwin, 19–20 June 2003. Northern Territory Geological Survey Special Publication 1.
- Logan GA, Ryan GJ, Glenn K, Rollet N, Hemer M, Twyford L & Shipboard Party. 2006. Shallow Gas and Benthic Habitat Mapping, Arafura Sea. *RV Southern Surveyor* May–June 2005, Post Cruise Report. Geoscience Australia Record 2006/19.
- O'Brien GW, Boreham CJ, Thomas HJ & Tingate PR. 2009. Understanding the critical success factors determining prospectivity—Otway Basin, Victoria. *The APPEA Journal* 49.
- Struckmeyer HIM, Blevin JE, Sayers J, Totterdell JM, Baxter K & Cathro DL. 1998. Structural evolution of the Browse Basin, North West Shelf: new concepts from deep-seismic data. In: Purcell PG & Purcell RR (eds). *The Sedimentary Basins of Western Australia 2: Proceedings of the Petroleum Exploration Society of Australia Symposium*, Perth, 1998.
- Tindale K, Newell N, Keall J & Smith N. 1998. Structural evolution and charge history of the Exmouth Sub-basin, Northern Carnarvon Basin, Western Australia. In: Purcell PG & Purcell RR (eds). *The Sedimentary Basins of Western Australia 2: Proceedings of the Petroleum Exploration Society of Australia Symposium*, Perth.

For more information on data supporting the 2011 acreage release

Seismic data is available in GeoFrame™, Kingdom and Landmark™ formats
email ausgeodata@ga.gov.au

Related websites/articles

2011 Acreage Release
www.petroleum-acreage.gov.au

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