## OFFSHORE PETROLEUM RESOURCES, PROJECTS AND GEOLOGY IN THE KIMBERLEY

On 1 April 2015, **Tim Griffin**, Deputy Director General of Western Australia's Department of Mines and Petroleum (DMP), gave a PowerPoint presentation to the Kimberley Society on a very topical subject. We were grateful to Tim, a long time member of the Society, for stepping in when DMP sent our designated speaker, Jeff Haworth, to Canberra at short notice. Thanks are also due to Tim's executive assistant for selecting and uploading all the PowerPoint slides while Tim attended to his work.

Aided by maps, Tim spoke at length about the distinction between State and Commonwealth control over oil and gas resources in the Timor Sea and on the North West Shelf. His first slide showed a rock that received considerable publicity after being discovered by Geoscience Australia (the Commonwealth geological survey agency) in 2014. With two other rocks, on North Scott and Seringapatam Reefs, the rock remains above water at all times. That gives them the status of islands, and the discovery resulted in WA's maritime boundaries being redrawn.

With the new boundaries in place, the State's jurisdiction expanded significantly to cover gas fields in waters that were previously controlled by the Commonwealth. That change gives the State a much greater portion of the Browse gas field where Woodside is the major equity holder and operator. Control over a greater share of the field increases both the State's say in what happens on the field and the amount of royalties it receives when the fields are developed.

One difference between State and Commonwealth is that the former collects royalties from the resource, as it is extracted, while the latter receives rent taxes, after development costs have been deducted. The wait for the taxes can be as long as 20 years. The flow of royalties is a significant component of the WA Government revenue that also enables DMP to support the minerals and petroleum industry, e.g. by building the geoscience knowledge base. That work encourages investment by providing up-to-date information about the state's resources, and thus reducing the financial risks involved in assessing the commercial viability of those resources. The number of petroleum titles in existence suggests that there is no shortage of interest, and we heard a little about conditions that have to be met for their retention.

With a focus that was largely on liquefied natural gas (LNG) projects, Tim spoke about the massive amount of investment that those projects bring to Australia. He also mentioned that rapid changes in technology precipitate changes in legislation and regulations. The reasons for those changes are twofold. The State's desire to attract money plays a part, with the government continually working to streamline the approvals process. The public's right to know what is happening also plays a part. During question time, Tim said that WA was at the forefront in making LNG practices transparent. See the end of this summary for more on that.

Much of the Australian LNG activity is situated off the north-west coast (Northern Carnarvon Basin) and the Kimberley coast (Browse Basin and Bonaparte Basin). In the Browse Basin, Inpex will be piping gas from the Ichthys project 889 kilometres to Darwin for processing. The company had aimed to process it on Maret Islands off the Kimberley coast but circumstances led to Darwin being seen as a better option. In the Bonaparte Basin, Eni uses a much shorter pipeline (only 108 kilometres) to transport gas from the Blacktip gas field to Wadeye on the Northern Territory coast, and from there it goes into other gas pipelines in the Territory.

In discussing the Browse Basin, Tim touched on the community-based opposition that prevented the gas being brought from there to a processing plant that was planned for

James Price Point. He also mentioned that Shell is building a world-first floating LNG platform, at a phenomenal cost, for the Prelude project north-east of Ichthys. Only a small number of people will be at work on the platform at any time because gas processing is a high-risk activity. Premier Colin Barnett has been highly critical of the trend towards floating platforms and the piping of gas to Darwin, citing the loss of jobs and income for West Australians. Nevertheless, WA can gain a technological and commercial advantage in being the first jurisdiction to maintain and regulate such a large floating natural gas development.

Falling oil prices over the past year have impacted on the speed at which projects are likely to proceed but a lot is still happening. Woodside Energy's Browse venture is proceeding and, when the economics are right, it is likely to use a floating processing plant.

Natural gas is mostly methane, which is what the gas field operators take from it. In processing the gas, they remove all the other components. Tim explained that those components include carbon dioxide ($CO_2$), which has to be captured and transported to suitable storage sites so that it doesn't act as a greenhouse gas. He used Barrow Island as an example, telling us how Chevron (the operator) has the Gorgon CO2 Injection Project injecting millions of tonnes of $CO_2$ into a geological layer situated underneath the island. That layer is equivalent to the layers where oil or gas has resided for over 60 million years prior to being extracted. That carbon sequestering project is one of the largest of its kind in the world. Other companies are looking into the potential for using this type of sequestration on the mainland if their Canning Basin projects eventuate.

It was no surprise to see Tim peppered with questions at the end of his talk. One was about fracking, which is officially known as Hydraulic Fracturing. Tim explained it as a process that increases the flow of gas or oil by stimulating fractures in layers of rock. He described it as a safe technology that involves sinking a bore and pumping fluid into it at pressure high enough to fracture the adjacent rock layers. The fluid contains chemicals and either sand, glass beads, or other matter that will hold the fractures open when the pressure is removed. Tim's comment about walnut shells being used provoked a few chuckles but the tone was otherwise serious. It was in talking about safety that Tim mentioned the WA Government's efforts to bring transparency to the 'down-hole' use of chemicals and other substances in petroleum or geothermal related activities. The compositions of the fluids used in fracking had long been treated as commercial secrets but DMP has a Chemical Disclosure Guideline that requires companies to reveal the products and chemicals they use. The formula used by each company remains secret but the public can now get information about what is being pumped into the ground during fracking.

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