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Session: **New Technical Methods Session**
Time: **1200 – 1230 hrs**

New Approaches and New Eyes for an Old Basin; Canning Basin Rejuvenated

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ARC Energy announced in May, 2006 that it had secured a significant regional exploration holding in the onshore Canning Basin in Australia's northwest. The Palaeozoic Canning Basin covers a vast area of about 500,000 sq km in central northern Western Australia. Two population centres, Broome and Derby, have shipping and air facilities, and Broome also serves as the shipping terminal for petroleum for the region. Minor oil pipeline grids service the Blina fields in the northern part of the basin and the Telfer gas pipeline runs along the southern margin of the Basin. The entry into the Canning Basin is the result of a detailed review of the exploration potential of the area, several months of negotiation with the existing permit holders, and applications for areas with specific geological attractiveness. The Canning Basin is one of the largest under-explored areas in onshore Australia and has geological similarities to highly productive Palaeozoic basins in North America and the Middle East.

Petroleum exploration activity began in the Canning Basin in the early 1920s. Nearly 250 wells have since been drilled onshore and 13 offshore, and about 78,000 km of seismic data have been acquired onshore. Up until the mid-1980s, exploration largely focused on the northern and central basin areas. Since then, some exploration has targeted the sub-salt Ordovician section, where Shell intersected a significant oil column in tight reservoirs at its Looma 1 discovery in the southern Canning Basin. Although many of the regional exploration wells have had numerous shows, especially of oil, the basin remains substantially under-explored with limited valid structural and stratigraphic tests. The relatively small size of pools in the primary exploration target areas and the low oil price in the late 1980s has meant that exploration has languished.

The Canning Basin contains two major northwesterly trending depocentres separated by a mid-basin arch. The depocentre in the northern part is separated into the Fitzroy Trough and the Gregory Sub-basin, which are estimated to contain up to 15 km of predominantly Devonian and younger rocks. The southern depocentre includes the Kidson and Willara sub-basins, where there are thinner sedimentary sequences (5 km in thickness) of predominantly Ordovician to Silurian age. These contain substantial salt deposits, perhaps the thickest in Western Australia. World-renowned Devonian reef complexes are exposed on the Lennard Shelf along the northern edge of the basin. The exposed reefs give an excellent insight into the subsurface carbonate geology, and Blina Oilfield produces from the sub-surface extensions of these reefs. Permian glacial and post-glacial deposits reservoir many known oil accumulations on the shelf.

Exploration targets in the basin are varied in both area and age. The Fitzroy Trough has been considered to be the most prospective area of the Canning Basin due to its proximity to the oil-fields of the Lennard Shelf, carbonate buildups along the half-graben hingeline in the north, large central anticlinal structures, and the likelihood that many of the known hydrocarbons were generated in the trough. Other prospective areas include the Jurgurra and Barbwire Terraces, the Broome Platform and the Willara and Kidson Sub-basins. Salt related, stratigraphic and structural plays offer tempting targets with analogues in other major Palaeozoic hydrocarbon basins from around the world.

The key to success in the Canning Basin has been thought to be the recognition of traps that were in place prior to the Permian because basin modeling indicates that the last main period of oil generation and migration in the trough was during the Permian. Subsequent structural inversion and regional movement has then tilted or even breached many traps and as such many structures have remained undrilled. However secondary migration to some of these late features has occurred and many of these younger traps with new mapping still have merit. Reservoir quality is also an important issue that is a key to success, there have been many tests of carbonate and clastic reservoirs that have proved to be tight or have intersected reservoirs with very low deliverability. With a better understanding of fractures and diagenesis along with detailed reservoir characterization, modern horizontal appraisal drilling and stimulation techniques, these problems can be overcome.

ARC will apply a disciplined approach to exploration in the Canning Basin, using a proven business model based on high equities, permit operatorship, aggressive, technically driven exploration; and fast track development of oil and gas reserves. ARC brings to the Canning Basin a level of funding, commitment, and onshore exploration and development expertise that has not been applied to the area since the initial discovery of oil in the 1980s. The dynamics of exploration in the Canning Basin have also been transformed by the new reality

of sustained high oil prices, and the encouragement to develop domestic gas resources in Western Australia.