

Access Westralia: New Insights Into the Westralian SuperBasin of the Australian North West Shelf

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ABSTRACT

The Westralia SuperBasin is part of the Australian North West Shelf province, a world-class gas province with oily sweet spots. The PGS New Dawn MultiClient 2D seismic survey was the first with the long offsets necessary to provide deep imaging to construct a structural framework for the area. Consequently, it has become the basis for many of the fundamental studies into the tectonic development of the region by Geoscience Australia, Royal Holloway and many of the major Oil and Gas explorers of the North West Shelf. In 2015, PGS began the Access™ Westralia project, a large, multi-disciplinary geoscience study aiming to uncover new insights into the Westralia Superbasin. The project employs an integrated approach encompassing reprocessing a subset of the original survey from field tape, enabling the use of modern deghosting, demultiple and dephasing techniques, regional 2D seismic interpretation, utilization of gravity and magnetics, and quantitative interpretation through well log integration, achieving the goal of providing a new regionally consistent framework across the variable velocity regime of the North West Shelf. A study carried out by the Geoscience Australia NW Margin Team, confirmed that the oil that has been encountered and produced from Early Cretaceous sandstones in the Echuca Shoals and Jamieson formations in the Browse Basin (Kalyptea-1, Cornea-1, Gwydion-1, Caswell-2 & others) was sourced from the Early Cretaceous Echuca Shoals Formation. This is a separate petroleum play from the gas play for which the Browse Basin has previously been known and explored. We will demonstrate enhanced imaging of the deepest reflectors. This improves understanding of the complex tectonic history of the Westralia SuperBasin, giving new insights into structural compartmentalization. The Inner Browse Basin presents an example of new insights where new source pods have been identified leading to the development of a new oil play concept in what was previously regarded as a gas-prone province. The insights offered by the PGS Access Westralia Study indicate that in the inner Browse Basin there is an oil-prone Echuca Shoals Formation source kitchen, providing potential for generation and migration of oil in a previously under-explored margin. The basin slope is also well-placed for the development of stratigraphically-trapped sandstones, a play-type that has been historically underexplored in Australia.