ORAL PRESENTATION

New Exploration Potential in the Aure Moresby Fold & Thrust Belt, Papua New Guinea

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Submarine fans are important targets for oil and gas exploration and turbidites form prolific petroleum reservoirs in many sedimentary basins worldwide. Remarkable imaging from modern proprietary and multi-client 2D seismic data in south-eastern Papua New Guinea (PNG), has uncovered exciting new potential within large-scale Neogene channel-fan turbidite complexes.

Historic exploration in PNG has primarily focused on plays associated with the Jurassic Toro Formation and Miocene reef carbonates. Late Pliocene turbidites sourced from the Fly River Delta have been targeted in the Gulf of Papua (GoP), leading to the Flinders and Hagana discoveries in 2013.

The identification in the Aure Moresby Fold and Thrust Belt (AMFTB) of Mid-Miocene outcrops composed of fine– coarse, quartz, 'greywacke' sandstones, up to 122m thick in the Diamana village area, offered evidence for the presence of turbidite depositional fairways and the transport of quartz-rich material into deep water. These encouraging outcrops led to the drilling of two onshore wildcat wells: Oroi-1 in 1949 and Kaufana-1 in 1958. The wells were drilled on surface anticlines, without the benefits of seismic data and encountered off axis turbidite systems. And yet, despite advances in our understanding of turbidite reservoirs, as well as innovations in seismic acquisition and processing technology, clear evidence for large sedimentary basins extending for over 800km, plus the discovery of active light oil seeps, there has been no further exploration drilling in the AMFTB since the 1980s.

Regional high resolution, broadband, PSDM, multi-client 2D seismic data acquired by Searcher in 2015–2016, has revolutionised the understanding of the offshore AMFTB, and has driven recent exploration efforts. In the PPL579 area, seismic data has enabled the division of the Miocene to recent interval into multiple sequences, which record the evolution of a Neogene foreland basin to an active deep-water fold and thrust belt, the cessation of contractional tectonics and relative passivity.

A distinctive Mid-Miocene system has now been identified, exhibiting impressive seismic facies that differ greatly from subsequent transverse and long-ranging axial systems. Large-scale channel and lobe complexes are observed, which are involved in thrusted anticlines and overlain by a thick, seismically transparent interval, which is interpreted to be a sealing unit, composed of hemipelagic marine shales deposited during a period of relative tectonic quiescence.

The major Mid-Miocene pulse of sediment transport into deep water can be subdivided into four phases, marking the initial incision and erosion, followed by the backfill, waning and abandonment phases. At the base of slope, weakly confined to unconfined channel complexes are observed, which are captured within a broad canyon or basal scour. A thick, gross reservoir interval can be characterised by laterally extensive, stacked, amalgamated channels and shingled reflector pairs. The shingled seismic reflectors dip towards a final stage channel and are indicative of active, lateral channel migration, within a meandering channel belt. Constructional levee systems appear to be absent, indicating that there was an abundant supply and deposition of flow-stripped, coarse-grained material into to the proximal fan area. The unconfined channel complexes transition on the basin floor into laterally extensive, amalgamated, stacked sheet sands and lobe systems. These are characterised by two, thick, High Amplitude Continuous (HAC) packages, interspersed with more discontinuous events which are interpreted to be distributary channels.

Basement high systems associated with rift structure form prominent bathymetric highs, which ponded and diverted the Neogene turbidite systems to the east. The switch in orientation resulted in the depositional axis of the proximal fan to parallel the strike of the advancing AMFTB. This configuration is highly favourable for reservoir continuity within E-W striking frontal thrust anticlines, which postdate reservoir deposition.

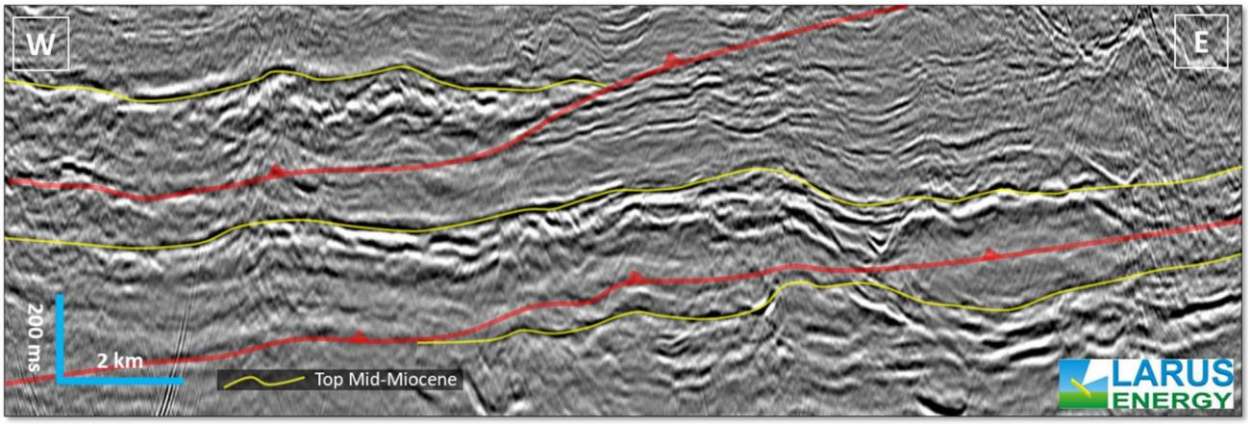

Figure 1: Proprietary 2D Seismic Data (strike line to structure): Showing Mid-Miocene, Semi-Confined to Unconfined Channel Complex Reservoir and Hemipelagic Shale Seal Pairs, Structurally Repeated by Thrust Systems

SPEAKER BIOGRAPHY

Alaister is the Exploration manager for Larus Energy, the Operator of PPL579, in Papua New Guinea. He is a structural geologist and petroleum geoscientist with technical expertise in the interpretation and analysis of geologically complex areas and has been exploring PNG for the last 6-years.

Prior to joining Larus, Alaister has worked both exploration & production roles with: Eni, DNO, Maersk Oil and Total Energies.