Larus Energy Limited

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COMPANY UPDATE

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Exploration – what others are doing in the region
G&G – what others are doing in the region. There is a massive amount of offshore 2D seismic being acquired in SE PNG.

Searcher planning to infill the Roho Airborne Survey, a multi-client airborne gravity gradiometry and magnetics survey.

Mailu 1 is a drape anticline and well south of the frontal thrust.
UNCONFORMITIES
1. Recent to Pliocene basins defined between the present-day sea floor and Woodlark Basin break-up unconformity.
2. Miocene to Paleocene basins bounded by an unconformity at the top and the Coral Sea break-up unconformity at the base, which corresponds to the C21 magnetic anomaly (5.2 Ma to 60 Ma).
3. Upper Cretaceous basins defined between the Coral Sea and Tasman Sea break-up unconformities (60 Ma or 79 Ma).
4. Lower Cretaceous to Upper Permian basins with the Middle Triassic and Permo-Carboniferous successions considered analogous to the Bowen and Galilee Basins located onshore Queensland in Australia.
5. Lower Permian to Upper Carboniferous basins are most likely economic basement.
6. Basement to Moho package allowing differentiation between continental, transitional and oceanic crust and consequently refinement of existing plate tectonic models.

Plays
- Compressional fold belt features, some up to 500 km long, not tested in deep water.
- Pliocene detached basin floor fans;
- Miocene pinnacle structures analogous to the Pasca and Pandora gas discoveries;
- (Late Cretaceous) break-up structures of various ages;
- Lower Cretaceous to Upper Triassic reservoir/seal pairs – primary targets in onshore and offshore PNG exploration;
- Middle Triassic to Upper Carboniferous reservoir/seal pairs analogous to the Bowen and Galilee Basins in Queensland;

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Zooming in to PPL579.
The ‘tweaks’ to the interpretation are;
- The Coral Sea Unconformity is cut by the Oligocene Unconformity but Mesozoic still present.
- The southern margin of the Torres Basin is now known
- Increased thickness in seal over Miocene Carbonates

Above: Composite seismic line with interpretation.
Left: Seismic line location (red line).
Papuan Basin Analogue For Source/Reservoir/Seal/Play

Hill et al. 2000, Structural and Stratigraphic Shelf-Edge hydrocarbon play

Oil Window

Gas Window

Post-rift successions

Rift successions

Break-up unconformity

Moho

Idealized cross-section of a passive margin (Not to scale)
Structural History of the North PNG Coast

Extension - Extension - Drift - Compression - Foreland - Extension

Triassic  Cretaceous  Cretaceous  Miocene  Pliocene  Recent

Starting configuration (15 Myr)

End configuration (Today)
Panorama looking west along the foothills to the north of PPL579. The flat coastal plain is seen in the distance. A major thrust fault system is under the hills and comes to the surface at the foot of the hills. The seep is down the gully to the right of the vehicle.
Oil Seep

Oil sample under normal light.

Oil sample under UV light.

Sample on water and pure light crude oil.
2017 Oil Seep – Analysis - Recapping

Gas chromatography
The science is: Pr/Ph 3.9-4.0 in refined oils but here at the seep Pr/Ph is 4.9 There are different patterns of intra-paraffin peaks between refined oil and the seep sample. Very high Pr/Ph ratios (more than 3) are associated with terrestrial sediments, fluvio-marine and coastal swamp environments. High values (4 to 10) are related to peat swamp depositional environments (oxidizing conditions).
The farmout effort has now been ramped up following the seismic program results and the oil seep discovery.
Torres Basin Plays and Petroleum Systems

**PLAYS**
1. Karst Miocene Limestone
2. Miocene Sst thrust anticline
3. Miocene Reefs
4. Miocene fractured limestones thrust anticline
5. Miocene fractured limestones sub-thrust anticline
6. Mid-Miocene fans thrust anticline
7. Late Cretaceous Sst thrust anticline
8. Early Cretaceous Sst thrust anticline
9. Jurassic, fluvio-lacustrine thrust anticline
10. Triassic, fluvio-lacustrine thrust anticline
Petroleum Systems
Oil and Gas

PLIOCENE-PLEISTOCENE MUDS DERIVED FROM OVER THRUST OCEANIC CRUST
REEFAL MOUNDS AND KARST LIMESTONE RESERVOIRS POSSIBLE

RESERVOIR AND SEAL ASSOCIATED WITH COLLISION DERIVED UPLIFT
CORAL BASIN NORTHERN MARGIN
RESERVOIR AND SEAL ASSOCIATED WITH UPLIFT AND EROSION
CRETACEOUS MARINE SOURCE

SEALING UNITS
TORO EQUIVALENT CLASTIC RESERVOIR
JURASSIC PROVEN MARINE SOURCE ROCK IN PAPUAN BASIN
INTRA FORMATIONAL SEALS
RESERVOIR AND SEAL UNITS ASSOCIATED WITH UPLIFT AND EROSION

TRIASSIC SOURCE UNKNOWN BUT PROBABLY LEAN
BASAL TRIASSIC PROXIMAL SANDSTONES ASSOCIATED WITH UPLIFT AND EROSION
PERMIAN RESERVOIR SEAL UNITS SEE IN AUSTRALIAN INTRA CRATONIC BASINS
PERMIAN SOURCE UNKNOWN BUT KNOWN AUSTRALIAN PLATE EXAMPLES

Time-space plot
Summary

• PPL579 work program favourable within the current exploration climate. Meeting Years 1 & 2 commitment.
• Seismic database improvements consolidate Larus geological model
• PPL579 over the Torres Basin holds analogous plays and petroleum systems of those proven in the Papuan and East Papuan Basins
• The first oil seep discovery in the Torres Basin greatly reduces the exploration risk. Ongoing analysis will further reduce risk.
• Farmout efforts are targeted and ongoing.