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GAS DISCOVERIES AND DEVELOPMENT CHALLENGES IN THE MANNAR BASIN, SRI LANKA

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The Mannar Basin located off the west coast of Sri Lanka and the South of the Cauvery Basin is a precratonic failed-rift basin which has evolved since lower Jurassic. Recent hydrocarbon discoveries in the Mannar Basin have proven the existence of an active petroleum system in the basin. These discoveries were encountered from Dorado and Barracuda wells. Most of the information pertaining to these discoveries have been unrevealed until recent past.

Dorado well is located approximately 30 km away from the western shore line and the Barracuda well is located approximately 38 km West to the Dorado well. Both the discoveries are dominant with dry gas (>95% methane) and they may have been charged from Albian or syn-rift sources in the basin since the Paleocene. The Dorado discovery was made in a forced fold structure formed above an igneous intrusion during the Maastrichtian period. The reservoir is feldspathic-arenite with average porosity and moderate permeability. The presence of gas in the trap is apparent on seismic data as a bright amplitude anomaly and also, the prospect is having Class III type Amplititude Versus Offset (AVO) response. Modlular Formation Dynamic Tester (MTD) - pressure data confirms the Gas-Water Contact (GWC) and thus, the pool limits were determined with high confidence. The Barracuda discovery was made in three intra flood-volcanic sand layers. These sand layers are feldspathic to subfeldspathic-arenites rich with mafic minerals and porosities of layers are consistent with variable permeabilities. Mapping of sand layers is a major technical challenge and thus, estimation of the pool limits is a major challenge. However, it is apparent on seismic data that the flood volcanic layer together with intra-volcanic sand layers is pinching out towards the basin margin. Therefore, higher lateral extension of these sand layers could be anticipated. Uncertainties involving hydrocarbon volume estimation, absence of a natural gas market in the country, high costs of deep water operation and imaging challenges are the major development barriers for moving forward from the present situation.