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A Working Petroleum System in Deepwater East Trinidad

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Three wells have been drilled in the Columbus Basin deepwater Block 25 (a), which resulted in one sub-commercial gas discovery, one dry well with condensate and thermogenic gas shows, and one dry well with dry gas shows. In addition to these wells, piston cores recovered in the block unambiguously support the presence of a working petroleum system. Whilst shows are indicative of an active Naparima Hills/La Luna system in the area, there is also supportive evidence for the presence of a secondary petroleum system of Tertiary age. Based on the temperature gradients, oil is still being generated from both source rocks in the deep basin. Much hotter gradients are observed in the vicinity of a major wrench-fault, where thermogenic gas and condensate is being generated.

Absence of a commercial oil discovery in Block 25 (a) is related to the complexity of migration paths from either source rock system into the shallow overburden penetrated so far. Shale diapirs are not sufficient to provide effective migration pathways into the shallow sediments, as they generate from Late Miocene/Early Pliocene mobile shales which post-date both source rock systems. Successful oil exploration in deepwater Trinidad will require deep exploration drilling, below the mobile shale and its pressure boundary, or exploration along the major wrench-fault systems which bring the deep-seated source systems and associated reservoir objectives within shallower reach of the drill.

In addition to the thermogenic petroleum systems, a biogenic charge system is also active in Block 25 (a).