

Aguas Vivas Field – A significant new gas discovery “hidden” for over 70 years of exploration history in the Lower Magdalena Valley Basin, Colombia.

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Summary

The most important gas reservoir in the Lower Magdalena Valley (LMV) basin onshore NW Colombia is the Oligocene to Lower Miocene Cienaga de Oro (CDO) Formation, a thick section (up to 5000 Ft) of fluvial, estuarine and shallow marine sandstones, shales and coals resting on basement and overlain by a thick regional marine shale top seal (Porquero Fm.). Most of the historical CDO gas discoveries in the basin have been in structural traps associated with extensional faults which were identified by mapping the top CDO horizon. In the Aguas Vivas area, first gas was discovered by the Jobo-1 well in 1947. Five pools (Jobo, Cañaflecha, Cañahuate, Arianna and Katana) have been discovered and produced a cumulative 110 BCF. Historical practice was to drill the crest of a structure and continue through gas bearing sandstones until the first wet sandstone was encountered and call TD. 3D seismic data was acquired over the area in 2007-2012 and reprocessed with an AVO compliant workflow in 2015. This new reprocessing coupled with a reevaluation of the legacy well data demonstrated that previously unrecognised structural closures existed at horizons deeper than the historically productive uppermost CDO. These closures are spatially offset from the top CDO accumulations due to the dip of the bounding faults. Fault dip and structural crest migration with depth, coupled with numerous legacy contract boundaries present challenges for completely testing stacked reservoir sandstones through the thick CDO section. In 2021, the prospect was tested by two wells drilled on opposite sides of a contract boundary: Cañahuate-4 was drilled on the Esperanza block to test upper CDO sandstones as mapped at top CDO closure and encountered 72 Ft. (22 m) of net pay. Later the same year, the Aguas Vivas-1 well was drilled on the VIM-21 block to test deeper CDO Sandstones on an offset structural crest and encountered 412 Ft. (126 m) of net pay, the largest ever encountered by a single well in the basin. The combined net pay of both shallow and deep zones encountered in the two wellbores was 484 Ft. (148 m). The application of detailed mapping on 3D seismic has led to a new significant gas discovery overlooked by several previous operators over a period of 70 years.