
Chile Vieja Field: 3D Seismic Data Adds over 70 BCF of Reserves by Revealing that a ‘Bald’ Structural High is Actually a Small, Shale-Filled Canyon

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ABSTRACT

Chile Vieja Field in Willacy County is a combination structural/stratigraphic trap that produces from upper-middle Frio age sands. The primary trapping element is a shale-filled erosional channel (the Raymondville Canyon) that cut and removed up to 400 ft of in situ marine deltaic sands. The canyon runs across the apex of a 4-way anticlinal structural high, which formed as a downthrown rollover to a regional growth fault. The field produces from 4 geopressured sandstone reservoirs truncated against the perimeter of the shale-filled canyon.

Detailed log and core characterization of the dominantly upward-coarsening, productive sands place the environment of deposition in a nearshore, lower to middle shoreface environment, which was deposited near wave base. The interpreted depositional environment is a prograding to aggrading shelf-margin deltaic complex, formed within a highstand prograding wedge, punctuated by short-lived transgressive episodes. The last transgressive event in the Chile Vieja parasequence set resulted in the formation of the Raymondville Canyon, interpreted to have developed due to mass wasting of a sediment-starved, unstable delta margin.

A detailed review of the discovery and development history of this field strongly suggests that early, pre-3D seismic interpretations mischaracterized the productive structure as a ‘bald’ structural high. Following the early drilling of numerous updip, shaled-out wells, this interpretation probably led to the conclusion that productive reservoir sands ‘pinched-out’ over a pre-existing bathymetric high. 21 yr after initial field development ceased, Suemaour E&P’s acquisition of a large 3D seismic volume revealed the existence of the canyon. Recognition of the canyon’s presence led to the realization of likely additional reserves downdip to the original discovery well.

Prior to Suemaour’s involvement in the field, cumulative totals for this package of reservoirs was 27 billion cubic ft of gas (BCFG), and 1.02 million barrels of condensate (MMBC) from 4 wells spanning 41 yr. Since Suemaour’s ‘rediscovery’ in 2006, 71 BCFG and 1.28 MMBC of additional reserves have been produced from 26 new well completions. This represents reserve increases of over 240% for gas and 100% for condensate.

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