

Sedimentology of the Upper Vivian, Lower Vivian, Agua Caliente, and Cushabatay Formations, Northern Marañon Basin, Peru

Radomski, Mark A.¹; Rait, Geoff¹; Dolberg, David²; Hearn, Mark² (1) Exploration Technology and Geoscience, Talisman Energy, Calgary, AB, Canada. (2) Peru Exploration, Talisman Energy, Calgary, AB, Canada.

The Marañon Basin, of northern Peru, is one of the sub-Andean foreland basins of South America. It is at the southern extent of a much larger structural basin that includes the Putumayo Basin of southern Colombia as well as the prolific hydrocarbon bearing Oriente Basin of Ecuador. The Marañon Basin contains a 4000 m thick wedge of Cenozoic molasse deposits derived from the Andes to the west, a westward thickening Mesozoic succession of marine and terrestrial deposits derived from the Brazilian Shield to the east, and a widely variable underlying Paleozoic succession dating back to the Ordovician.

Hydrocarbon production in the Marañon Basin has historically been concentrated in the shallow northeast portions of the basin within Cretaceous aged marginal-marine to fluvial deposits of the Upper Vivian, Lower Vivian, and Agua Caliente formations, in fields formed by gentle Neogene inversion of Paleozoic normal faults. Talisman Energy and partners are actively exploring the much deeper northwest Marañon Basin in the Situiche structural complex. The complex lies at the north end of a WNW- to NW-trending zone of en-echelon grabens and half-grabens in Late Cretaceous to Paleogene strata. Oil was tested from the Lower Vivian Formation in well 64-15-2X ("Situiche Central-2X") in January 2006 and exploration of the structure is ongoing.

Very little published geological data exists from the Marañon Basin. In a basin-wide study of cored successions within the Upper Vivian, Lower Vivian, Agua Caliente, and Cushabatay formations, fluvial and subordinate marginal-marine environments of deposition were interpreted. Sedimentological observations in the fluvial successions include the presence of poorly-sorted coarse-grained trough cross-bedded sandstones with interbedded coaly organics, gutter scours, rhizoliths, calcrete horizons, and a lack of observable trace fossils. These formations are interpreted as prograding sequences, deposited during four distinct sea level regression events and their subsequent lowstands, within a basin that was heavily influenced by cyclic eustacy and tectonics throughout the Middle and Late Cretaceous.

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