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Abdul Waheed¹ (1) Oil and Gas Development Company Limited, Islamabad, Pakistan

Aspects of Petroleum Prospectivity of Tertiary Indus Delta: Pakistan's Untapped Exploration Frontier

The Tertiary Indus Delta is one of the remaining frontiers for exploration in Pakistan, where large gas/oil discoveries are expected, akin to other producing Tertiary deltas of the world.

The Offshore Indus Basin of Pakistan resulted from the development of a passive margin in Late Cretaceous and continent-continent collision in Late Cenozoic. Early sediments were derived from mildly uplifted orogenic fronts (due to initial oblique collision) and the tectonically quiescent passive margin. Maximum delta progradation and fan building occurred during Late Tertiary, a period coincident with the head-on collision between Indo-Pakistan and Eurasian Plates, the subsequent massive uplift and unroofing of Himalayas. Mainly quartz-rich detritus of recycled orogen and fold-thrust belt provenances was transported into delta and dispersed by fluvial and wave processes. Basin fill is related to cyclic delta top and delta front deposits, lowstand canyon incisions and fan progradation, and highstand deposition in canyons and on the shelf.

Known source rock is gas-prone but oil-prone source is likely to be present within the pre-deltaic sequence. Good quality sandstones reservoirs are present in delta-front and canyon/basin floor turbidites. Interbedded shale can provide an effective seal. Traps include growth fault rollovers and diapirs in delta top/slope and imbricate fold/thrust structures at delta toe.

Recent exploration has led to a better understanding of petroleum system of Offshore Indus Basin. With fiscal incentives offered by the Government, the exploratory efforts in this frontier basin are likely to accelerate.