HYDROCARBON EXPLORATION PERSPECTIVE IN MIDDLE JURASSIC-EARLY CRETACEOUS RESERVOIRS IN THE SULAIMAN FOLDBELT, PAKISTAN

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ABSTRACT

The Sulaiman Foldbelt is a part of western Himalayas in Pakistan covered with rocks of Triassic to recent age. The first commercial discovery of gas condensate at Dhodak-1 (1976) in the frontal part of the Sulaiman Foldbelt, in the Upper Cretaceous and Paleocene reservoirs, brought momentum in exploration activities. In 1975, Jandran-1 flowed gas from Late Cretaceous (Mughal Kot) and Middle Jurassic (Chiltan Limestone) with low BTU. Good quality gas was discovered in Zarghun South-1 (1998) in the western periphery of the Sulaiman Foldbelt. Dewan-1 & Dewan 5-A (2005 & 2007) encountered hydrocarbons in Sembar/ Lower Goru and Chiltan formations that prove the existence of active petroleum system in the deeper Middle Jurassic–Early Cretaceous rocks. The deeper reservoir potential of the internal part of the Sulaiman Foldbelt is the focus of this paper. Wide spread distribution of thick, massive bedded Chiltan limestone characterized by shoaling-upward cycles and grainstone facies indicate high energy environments. Outcrop geology suggests that its upper part contains laterite and karstification which indicates paleo exposure. Such features generally enhance the reservoir quality. Early Cretaceous (Sembar-Goru) play consists of sand prograde, deposited in fluvio-deltaic setting. Depositional environment varies from proximal to basinal facies from eastern to western part of Sulaiman Foldbelt. Lowstand Wedges consists of good quality sands acting as potential reservoir.

Integrated well data, outcrop geology and history of hydrocarbon discoveries in the Sulaiman Foldbelt suggest an effective petroleum system comprising source, reservoir and seal trilogy in Middle Jurassic-Early Cretaceous succession to form prospective hydrocarbon plays in the internal part of the Sulaiman Foldbelt.