

HYDROCARBON POTENTIAL OF DEEPER HORIZONS IN SUI GAS FIELD AND ITS REGIONAL IMPLICATIONS

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Sui structure being a large surface anticline located in a proven petroleum habitat and equipped with the required infrastructure was an excellent candidate for exploring the potential of deeper horizons in view of some gas discoveries from various Cretaceous formations in the concessions located in the Central Indus Basin. PPL re-evaluated the potential of the formations deeper than currently producing Sui Main and Upper Limestone (SML & SUL) in Sui structure with new insight provided by these recent discoveries. The re-evaluation indicated significant potential of deeper formations. Therefore, PPL decided to drill a deep exploratory well to explore the potential of Cretaceous section in Sui field. In this regard a seismic survey of about 150 line km was carried out in 1997 followed by structural mapping of various horizons and sequence stratigraphic study of the Lower Cretaceous section. Seismic and sequence stratigraphic interpretations indicated the possibility of basinal sand of Lower Goru in the eastern part of Sui structure and some Direct Hydrocarbon Indications (DHI) at Upper Goru level. Consequently, the well Sui Deep-1 was drilled in 1998-99 to a total depth of 4,713m in Jurassic carbonates (Chiltan Limestone). The well made gas discovery from the shallowest Cretaceous formation, Pab Sandstone. However, the results of Drill Stem Tests (DST) and drilling data of other Cretaceous formations also exhibited their significant hydrocarbon potential. Interpretation of DSTs carried out in other Cretaceous formations i.e. Moghalkot Limestone, Parh Limestone and Goru Formation indicates that the potential of these formations is dependent primarily on presence of effective fracture system. Upper Gont, conventionally considered a non-reservoir (a regional cap rock) exhibited very good gas shows and DST flowed some gas from the locally abundant but partially to completely healed fractures. The potential of Lower Cretaceous (Lower Goru) and Jurassic Carbonates (Chiltan Limestone) could not be tested properly due to limitations of the tools against extremely high temperature (> 350°F) and pressures (> 10,000 psi). However, very good gas shows (up to 19%) and a gas kick controlled by mud weight of 2.1 Specific Gravity (SG) suggest extension of Lower Gont petroleum systems as far as Sui area. Regional investigation of these formations is required for locating suitable areas where these formations may exhibit better reservoir characteristics either due to facies change or development of effective fracture systems.

This paper emphasizes that the information on the hydrocarbon potential of deeper (than Pab) Cretaceous Formations obtained from Sui Deep Well provides ample enticement for seriously pursuing further investigation of these formations in Sui and the surrounding areas wherein mainly the Tertiary limestone and Pab Sands are considered to contain hydrocarbon potential due to history of gas discoveries from these formations in the area.