

DISTRIBUTION OF INFRACAMBRIAN RESERVOIRS ON PUNJAB PLATFORM IN CENTRAL INDUS BASIN OF PAKISTAN

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The discovery of non-biodegraded heavy crude oil (170 API) in four reservoirs at Baghewala-1 in 1991 in the Bikaner-Nagaur Basin of India opened a new exploration play in the southeastern part of Punjab Platform. In the Bikaner-Nagaur Basin, the deepest occurrence of oil is recorded in Infra/Lower Cambrian Jodhpur Sandstone with porosity ranging 16-25% and oil saturation 65- 80%. Similar crude oil has been discovered in the overlying Bilara Dolostone having porosity of 7-15%. Thin siltstone layers in the Hanseran Evaporite (equivalent to Salt Range Formation) have also been found to contain heavy oil. The youngest unit containing oil is Upper Cambrian Carbonate. Correlation of sediments (lying over volcanics) in the Machh Group of Infracambrian at the Kirana Hills near Sargodha in Pakistan within the lower part of Marwar Group of Rajasthan in India containing Jodhpur Formation, suggests extension of Bikaner- Nagaur Basin and Infracambrian play to the southwest into Pakistan. Metamorphism of Machh Super Group sediments is expected to decrease towards southeastern Punjab Platform which further supports the increase in prospectivity. The Infra-Cambrian play has not been sufficiently explored on the Punjab Platform. Out of seven wells drilled on the Punjab Platform since 1959, two wells were planned to explore an Infra-Cambrian play. However, only one well Bijnot-1 penetrated InfraCambrian reservoir with good oil shows while Suji-1 entered into Basement without assessment of InfraCambrian section. Analysis of the subsurface data suggests that the deposition of the Jodhpur and Bilara Formations is controlled by basement topography. InfraCambrian sediments thicken on either side of basement ridges extending from India into Pakistan. This structure might be the result of release of stresses of the Aravalli Orogeny and its counter clockwise movement which resulted in extension to the west, marginal compression to the east and rifting in the Indo-Gangetic area. Post Cambrian sediment sequence thickens towards northwest along the regional dip. The geological and seismic data demand that Infra-Cambrian reservoirs potential may be re-evaluated in the southeastern part of Punjab Platform particularly in the close proximity of Indian discoveries where source rock is believed to be of a localized nature.