

Structural delineation and hydrocarbon potential evaluation using seismic and well log data of Basal area, Attock, Upper Indus Basin, Pakistan

Urooj Shakir; Furqan Aftab and Hassan Ali Khan

*Department of Earth & Environmental Sciences, Bahria University, Islamabad.
mhuroojshakir@gmail.com*

Abstract

Chief objective of this research paper is to delineate the structure and evaluation of hydrocarbon potential using seismic and well log data of Basal area, near Fateh Jhang, Attock district, Upper Indus basin, Punjab province, Pakistan. The Upper Indus basin is compression tectonic regime exhibiting thrust faulting with inference of overprints of transpressional strike-slip deformation. Basal oil field lies in Basal block bounded by Lat./Long. 33° 28' 39" N to 72° 11' 40" E. Tectonically block lies 77 kms south-west of Islamabad with Kalachitta mountain ranges in north, salt range in south, Jhelum/Soan river in east and Indus river in west. Five migrated seismic lines were used for structural seismic interpretation; 991-BSL-33, 991-BSL-34, 991-BSL-38, 991-BSL-39 (Dip lines) and 991-BSL-49 (Strike line). Seismic data interpretation has been performed on given seismic lines by marking faults and reservoir horizons of Chorgali and Lockhart formations by using formation tops and making T-D charts via analysis of multiple velocity functions (MVF) of all seismic lines. Time and Depth contour maps have confirmed the presence of fault-propagated anticline structure in study area. One main fault (throw ~ 1 second) and two back thrust faults EW-oriented with high dipping angles has been marked with dips either towards North or South. In this setting, Garhi-X-01 well was drilled. Results of Petrophysical analysis via combined interpretation of Raw log curves of Correlation, Resistivity and Porosity tracks has claimed the presence of one reservoir zone in Chorgali Formation belonging to Eocene age and five potential reservoir zones in Lockhart formation belonging to Paleocene age. Average Hydrocarbon saturation (Sh) of all five zones of Lockhart lime stone are more than 80%, makes Lockhart lime stone a potential reservoir formation for hydrocarbons in Basal area.