

Distribution of Overpressure and its Prediction in Saurashtra Dahanu Block, Western Offshore Basin, India

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Overpressured formations are encountered in the Saurashtra-Dahanu PEL Block, Western Offshore Basin, India. The block covers an area of 2500 sq. km. and six wells have been drilled so far for exploration of hydrocarbon to test prospectivity within Early Eocene to Early Miocene sequences. The thick basin fill of over 6000m is characterized by high geothermal gradient and overpressure. The drilled well data indicate that over-pressured formations occur at depths ranging from 1800m to 3600m within Early Eocene to Early Miocene strata. The overpressure was encountered in both limestone and shale sections in the area. Overpressure in Early Miocene limestone is confined in nature and overpressured pore fluid is developed probably due to fluctuating bathymetry and inability of pore fluid to escape. Since measured formation pressure data is scanty, the mud weight used while drilling is considered to be indicative of formation pressure where overpressure led to well activity. Normally it is assumed that mud weight used to control such well activity is higher than formation pressure. Drilling any high pressure and high temperature well is a costly affair in terms of well design and rig cost. We have used seismic interval velocity to predict overpressure in Saurashtra-Dahanu exploration block. Our analysis of plots of seismic interval velocity against time shows regression against zone of abnormal pressure. The well which did not show any regression in interval velocity vs. time plot did not encounter any high pressure while drilling. The acoustic well log analysis also show that travel time decreases within over-pressured zone. Our analysis can be used in the future locations to be drilled which may result in cost savings in terms of well design and rig cost and lead to smooth drilling of well.