

Evaluating of Amplitude-Versus-Offset (AVO) response of Lamshiwai Formation of Kabirwala Block, Punjab Platform, Central Indus Basin Pakistan.

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ABSTRACT

Amplitude-versus-offset (AVO) analysis has been widely used for hydrocarbon exploration since past two decades. AVO analysis involves estimation of the AVO intercept and gradient from *P*-wave reflection amplitude to the sine square of the angle-of-incidence. Bortfeld (1961) and Shuey (1985) have given better approximation of *P*-wave reflection coefficient using intercept-gradient cross plots.

The aim of present research study is intended to use same kind of analysis to evaluate Lumshiwai Formation of cretaceous age in Kabirwala block in Panjab Platform, in relation to future hydrocarbon exploration by using Seismic and well data. Lumshiwai Formation has been encountered in some wells drilled on Punjab Platform and has proven reservoir quality which produces gas in the Panjpir-01 and Nandpur gas fields. It consists of thick to massive bedded feldspathic and ferruginous sandstone and its thickness reported from 38 m to 194 m.

Total 14 seismic lines has been used in this study out of which seven (7) are time migrated and seven (7) are depth migrated sections while logs data are used of well Panjpir-01. Well tops of Panjpir-01 recognized that Lumshiwai formation is 70 m thick in study area, and it is located at 1220 ms interpreted on seismic sections at eastern side while gently dipping towards west reach at about 1270 ms. Fluid Replacement model has been used to calculate the Shear component by replacement of fluid (oil. Gas and water) by others fluid using Gassmann equations and then constructed offset synthetic seismogram by using *P*-wave sonic, density, and *S*-wave logs response for the analysis of Intercept and gradient of reflections in both gas and water cases. Interpretation of Gradient-Intercept cross-plot which revealed that sands of Lumshiwai Formation lying in 4th quadrant and it contains gas and having 20% effective porosity.