

Isotropic AVO Methods to Detect Fracture Prone Zones in Tight Gas Resource Plays

Bill Goodway, John Varsek, and Christian Abaco
EnCana Corp., Calgary, AB, Canada
william.goodway@encana.com

Abstract/Excerpt

Exploration and drilling for natural gas in North America has moved radically away from conventional reservoirs to focus on unconventional reservoirs such as coal bed methane (CBM), tight gas sands and shales. These reservoirs, termed Resource Plays at EnCana, are low permeability-porosity reservoirs with gas stored in natural fractures or cleats and within the matrix porosity. Due to low permeability, economic gas production can only be achieved through hydraulic fracture stimulation. Effective stimulation requires either the opening of a connection to existing natural fractures or the presence of geo-mechanical brittleness within the formation capable of supporting extensive induced fractures. Despite adequate stimulation significant variations exist between wells in stabilized gas rates and economic ultimate recovery due to the heterogeneity of these Resource Plays. Consequently, predicting natural fractures or fracture prone “sweet spots” is essential to the successful development of such plays.

Seismic 3D, AVO and AVO variation with azimuth (AVAZ) to detect anisotropy due to fractures or stress, offer the only opportunity to directly identify “sweet spots” prior to committing to significant horizontal well drilling costs. This paper describes the rock mechanics and conventional isotropic AVO that can be applied to map Resource Play potential and predict optimal drilling locations.