

Integrated Anisotropic Velocity Modeling Using Perforation Shots, Passive Seismic and VSP Data

Shawn Maxwell*

Pinnacle Technologies, Calgary, Alberta, Canada

Shawn.Maxwell@Pinntech.com

Julie Shemeta

Pinnacle Technologies, Denver, Colorado, United States

and

Nancy House

EnCana Oil and Gas (USA) Inc, Denver, Colorado, United States

Abstract

Economic development of tight gas reservoirs often rely on hydraulic fracturing to stimulate production. Passive microseismic mapping of these hydraulic fractures is a quickly growing technology to map fracture geometry and complexities created during these stimulations. Reliable microseismic locations depend on an accurate velocity model. In this study we examine velocities obtained from Vertical Seismic Profile (VSP) data, perforation shots from an adjacent well, and microseismic data to determine an anisotropic velocity model for improved microseismic hypocentral locations. We examine location uncertainties associated with uncertainties in the velocity model, in addition to uncertainties in arrival time data. The observed anisotropy is consistent with an effective media representation of the geological reservoir structure.