Seismic Multivariate Attribute estimation of Log Curves for Reservoir Development: a Case Study

Doug Pruden*
GEDCO, 1200, 815-8th Ave. SW, Calgary, AB, T2P 4H2
Pruden@GEDCO.com

ABSTRACT
A 3D seismic survey was acquired to image an older gas producing Glauconite sand reservoir in southern Alberta. The object of the survey was to locate and exploit any undeveloped compartments of the reservoir that might be identifiable on the 3D survey. Sustained gas production from the pool over a period of years had resulted in gas depletion in most of the existing well bores in the pool.

AVO analysis and inversion for rock/fluid properties were performed on the 3D survey, resulting in an abundance of data to tie to the reservoir characteristics within each well on the 3D survey. These multiple seismic attributes were analyzed using multivariate linear and non-linear analysis techniques in order to synthesize geologically meaningful volumes from the seismic data. Pseudo gamma ray and bulk density logs were estimated at each seismic trace location using all available rock/fluid property volumes. These new volumes were used to identify previously difficult to image sand bodies and estimate relative porosity within the sand bodies. The derived rock and fluid property attributes were then interpreted again in light of the new lithologic interpretation.

Two new wells were drilled on the basis of this work resulting in the discovery of two new gas reservoir compartments at virgin reservoir pressure. The drilling of these wells would not have been likely without the described analysis.