

Well Log Analysis and Seismic Attenuation in a Heavy Oilfield: Ross Lake, Saskatchewan

Zimin Zhang and Robert Stewart
University of Calgary, Calgary, AB, Canada
zzhan@ucalgary.ca

Abstract/Excerpt

We analyze the relationship between seismic data attenuation and rock properties in well 11-25-13-17W3 from the Ross Lake heavy oilfield, Saskatchewan. Well log analysis indicates that the main lithologies in this well are shale and shaly sandstone. Interval Q values for the P wave and shear wave were estimated by applying the spectral ratio method on near-offset VSP data (which used both vertical and horizontal vibrators). The Q values are most reliable from 400m to 1050m for the P wave and from 225m to 1050m for the shear wave. The Q values correlate interestingly with petrophysical variables. Qp values increase with P- and S-velocities and decrease with Vp/Vs and porosity. Shaly sandstone shows more attenuation than pure shale and sandstone. The crossplot between Qp and clay-bound water indicates more attenuation in shaly sandstone possibly caused by the interaction between mobile water and clay-bound water. Q values for S-waves also display a similar relationship.