

Facies Analysis Using 3C 3D Seismic Data in Oil-Sands Reservoir

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Abstract

Oil-sands and heavy-oil deposits are major players for the future of energy. The world's largest deposits are located in western Canada. The oil sands reservoir in the present study is located in the Upper McMurray Formation, located in the Athabasca basin, one of the three major basins in Northern Alberta, Canada.

High-resolution 3C 3D seismic data was processed using the most advanced workflows in order to image several facies defined based on cores and logs available at wells in the study area. These workflows include joint PP-PS inversion and neural network analysis and Bayesian facies classification.

Using the above-mentioned workflow in the oil-sand reservoir, we find that the method correctly locates pay and non-pay facies allowing for prediction of oil saturation and reservoir connectivity, including permeability and barrier baffle locations. Probability maps along with maps of the most probable facies will be used by the team of geophysicist-geologist-engineer for in-situ operations such as planning of the SAGD horizontal wells.