

So, How Many Sands Does it Take to Make the McMurray Formation?

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Abstract

The Athabasca Oil Sands of northeastern Alberta represent one of the largest reserves of hydrocarbons in the world. Barren fluvial sandstones of the Lower Cretaceous (Aptian) McMurray Formation form the principal reservoir in this play. However, despite extensive research, the detailed correlation of these stacked amalgamated sandstone sequences remains problematic. The incising nature of the McMurray Formation's deposition has resulted in a complex stratigraphic architecture. In many cases this results in heavily oil saturated sand-on-sand contacts thereby making it difficult to distinguish individual channel sequences. Furthermore, the McMurray Formation sandstones are mineralogically mature (typically comprising >95% quartz) with only minor to trace amounts of feldspars, clays and heavy minerals. As a result, the differentiation and correlation of individual channel packages is challenging using bulk mineralogical data from petrographic or XRD methods. The present study aims to ascertain whether individual channel packages can be differentiated and correlated using a forensic multi-disciplinary approach including high-resolution chemostratigraphy, heavy mineral analysis and zircon U-Pb geochronology.