

# Ichnological and Sedimentological Study to Determine Depositional Environments of the McMurray Formation Succession in the McKay River Area

*Kayode Famade, Murray Gingras*

The study of the McMurray Formation around the McKay River area contributes to our understanding of the complex geology of the McMurray Formation away from the main bitumen fairway. Sedimentological, ichnological, and FMI log data from 8 wells across 4 townships were integrated to identify a depositional model for the McMurray Formation in Athabasca Oil Sand Corporation's South Birch Field Phase 1 IDA. 13 facies were identified from core to encompass attributes of the various processes responsible for deposition of the McMurray in the McKay area. The fluvial Lower McMurray member is absent in this study area as tide-dominated estuarine deposits of the Middle McMurray Formation unconformably overlay Devonian carbonates. Estuarine deposits are sharply overlain by deposits strongly influenced by deltaic processes, and finally capped by Upper McMurray shallow marine deposits. The Upper and Middle McMurray sediments are oil charged with staining ranging from good to excellent. The Upper McMurray is fairly continuous, except at the top, while Middle McMurray deposits are compartmentalized by mud interbeds, mud drapes and fluid muds towards the top. A predictive depositional model is essential for optimal production from the very complex McMurray Formation. This study will help Athabasca Oil sands Corporation with reservoir characterisation and distribution, landing depth for producer wells, and perhaps a detailed production strategy.