

**New Insights into the Deposition of the Lower
Cretaceous McMurray Formation:
Translation of Tidally Influenced Channel Meander Bends**

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Summary

Although the Athabasca Oil Sands Deposit (Alberta, Canada) has estimated reserves of more than one trillion barrels of oil within the Lower Cretaceous McMurray Formation, depositional environments of bitumen-bearing units are still a matter of considerable debate. Observation that a majority of strata dip northwards has been difficult to interpret in the context of the widely accepted fluvial-estuarine point-bar depositional model. Recent workers have suggested that some of the sediments were deposited as part of downstream-translated tidally influenced channel meander bends.

This study includes a range of investigations conducted to confirm the latter hypothesis and to investigate its implications for reservoir exploration and development: (1) Depositional dips of point bar strata from dozens of outcrops and from several published case studies confirms that the majority, but not all of the dips are oriented towards the north (basinward?); (2) Seismic time slices from two different properties in the Athabasca deposit clearly demonstrates the downstream translation concept; (3) Numerous aerial photos and satellite images of modern rivers suggest that downstream translation is a common phenomena in many parts of fluvial systems; and (4) Comparison of schematic models of downstream translation with previously suggested classical lateral accretion point bar and deltaic deposit concepts shows very different geometries of reservoir and non-reservoir facies.

Point bar translation was an important process during deposition of the Athabasca Oil Sands. Further investigation is aimed at comparing reservoir geometry and quality of translated and laterally migrated point bar deposits in this globally important deposit. The potential implications for future development of the immense petroleum deposit are significant.