

# **Preliminary Results: 3-Dimensional Architecture and Facies Associations of the McMurray Formation, North Mine Area – Syncrude Canada Ltd. Lease**

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## **ABSTRACT**

The Athabasca Oil Sands of northeastern Alberta, Canada, is host to one of the richest hydrocarbon reserves on planet Earth. The Athabasca Oil Sands deposit contains approximately 144.5 billion m<sup>3</sup> (908.7 billion barrels) of bitumen within unlithified sediment. The McMurray Formation holds the majority of this bitumen. A dataset from the McMurray Formation, consisting of 2107 closely spaced vertical well bores, is used to generate a three-dimensional visualization of the stratal-architecture and facies associations of Syncrude's North Mine Area. The novel application of Flexible Variable Zone Modeling is used to create a detailed sedimentologic and stratigraphic model from high-density well-bore data (commonly less than 100 m spacing). Due to the horizontal and lateral extent of sedimentologic and stratigraphic heterogeneities within the McMurray Formation, Syncrude's Lithofacies (approximately 45 individual facies) are amalgamated into approximately 7 facies associations and subsequently mapped in three dimensions. The methodology for developing such models is discussed in detail and is the main focus of the current study.