GeoConvention
Calgary • Canada • March 7-11 2016
OPTIMIZING RESOURCES

# Lithic Mannville: Significant New Oil Opportunities

*Leonard Stevens, Richard Wierzbicki, Dan Potocki, Frank Palmai, Gregg Milne*

## Abstract

The informal stratigraphic names “Lithic Mannville” and “Lithic Glauconitic” are becoming more common in Industry Press Releases, yet what do they mean?

The “Lithic Mannville” and “Lithic Glauconitic” in the WCSB are significant plays with large upside potential. Glauconitic and Post Glauconitic Upper Mannville Group lithic channels have been successfully developed for gas production over many years with fracture stimulated vertical wells yet, remain relatively underexploited for oil especially when comparing them to the Cardium and Viking. Evidence shows that these plays should experience significant oil and gas production growth in the immediate future. Even in today’s challenging price environment, these lithic channels often demonstrate favorable economics.

The Upper Mannville Group consists of channels and “regional sandstones”. Extensive channel systems exist in both the Glauconitic Formation as well as in the Post Glauconitic Upper Mannville Group. Fluvial channel sandstones in the Glauconitic quartzose to Glauconitic and Post Glauconitic Lithic time period records a progressive provenance change manifested by a decrease in mineralogical maturity. Compositional changes coupled with burial diagenesis result in notably reduced reservoir quality in lithic sandstones.

Traditionally the conventional higher quality Glauconitic Formation quartzose channels have been the favored oil exploration and development target, while the more extensive lower permeability Glauconitic and Post Glauconitic lithic channels remain largely underevaluated and undeveloped. With the advent of multistage fracture stimulated horizontal wells, the lower quality lithic sandstones have recently been targeted as a new oil resource. Oil-In-Place for the lithic channels can range from 12-20 million barrels of oil per section per channel. Therefore, in many areas, lithic channel stacking can dramatically increase potential oil reserves.

Understanding the paleogeography, stratigraphy, provenance, lithostratigraphy, petrology, diagenesis and petrophysics is the key to unlocking this play. These factors result in lithic sandstones having distinct but recognizable rock properties that require different exploration and exploitation strategies. Three case histories will illustrate how previous lithic sandstone bypassed pay was recognized and subsequently developed for oil production. A seismic example ill additionally illustrate the integration of geology and geophysics.