

An Exciting Devonian Shale Play in the Central Mackenzie Valley, Northwest Territories – Moving our Exploration Strategies North

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The Central Mackenzie Valley, situated in the Northwest Territories, Canada, has been known as a prolific hydrocarbon province since the 1920's. The Norman Wells oil field, the largest accumulation discovered to date in the region, has produced more than 200 million barrels of oil in its 90+ year history. The source of that light, sweet crude has long been known to be the Devonian-aged Canol Shale. The Canol Shale is part of the Horn River Group which also contains the Hare Indian Formation and the Bluefish Member. These stacked shales are stratigraphically equivalent to Devonian-aged shales in the Horn River Basin of northeast British Columbia: the Muskwa, Otter Park and Evie.

The pursuit of source rocks as primary reservoir targets has proven successful around the globe. The techniques to successfully explore for and subsequently exploit these unconventional resources were first developed in the Mississippian-aged Barnett Shale of the Fort Worth Basin, Texas. These strategies have since been successfully transferred to additional basins and numerous formations resulting in the current shale development boom. Characterization of a shale reservoir is a multi-faceted study, two key aspects of which are sample analysis (core and cuttings) and petrophysical analysis.

In Canada, one of the first shales to be recognized as a viable reservoir target was the Devonian Muskwa Shale due to its similarities to the productive Barnett Shale. The successful transfer of knowledge from Texas to British Columbia solidified the shale rush in Canada. As technologies evolved, the Barnett was found to be productive for oil as well as gas. In an effort to duplicate this continued shale evolution a search for a Devonian oil reservoir target moved east of the Horn River Basin to Alberta and north to the Northwest Territories. The greatest potential was found in the equivalent stacked Canol, Hare Indian and Bluefish Shales in the Central Mackenzie Valley. Data collection to evaluate these shales was approved by the NEB (National Energy Board) in 2009. Historic wells drilled throughout the Central Mackenzie Valley exploring for Devonian-aged reefs, similar to that which hosts the Norman Wells oil field, offered complete drill cuttings coverage as well as occasional cores across these shale intervals. Laboratory analyses defined key characteristics necessary for superior shale resource potential. These include:

- Excellent source rock (2 – 7% TOC)
- Type II kerogen
- oil window maturity
- good porosity and permeability (measure porosity up to 12% and permeability up to 8000nd)

- brittle lithology (up to 86% quartz)

In two landsales (2011 and 2012) industry committed >\$600MM to test this concept. Successful bidders mobilized quickly and have already spent >\$100MM on drilling, seismic and associated operations to progress this shale oil play from prospective to proven.