

An Integrated Approach to Resource Assessment of the Macasty Shale Formation on Anticosti Island

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The Anticosti Basin is a large, elongated Paleozoic sedimentary basin that covers the northern portion of the Gulf of St. Lawrence. Anticosti Island is located approximately in the middle of the basin. The Late Ordovician Macasty shale was deposited in a deep water marine environment and contains Type II kerogen. Based on information available from the well and seismic data, the Macasty Formation is present almost across the entire island.

Two independent methods were used to estimate the present-day volume of hydrocarbons within the Macasty shale.

The first method was based on mapping of the pyrolysis S1 data by basin modeling. The pyrolysis data was incorporated into a basin development history model created using tools for numerical simulation of burial, thermal and hydrocarbon generation history. Hydrocarbon generation history is the product of complex interplay among several key variables such as Lithologic parameters, Sedimentation/burial rate, Erosion, Heat flow and Organic matter kinetics. A burial history simulation that includes these parameters revealed the net effect of their interaction.

The second method was based on traditional geological mapping using a gross isopach map in conjunction with net-to-gross ratio, porosity and hydrocarbon saturation values from the petrophysical analysis.

The pyrolysis data was interpreted to represent the minimum present-day residual oil saturation within the Macasty shale, and the petrophysical analysis was interpreted to represent the total hydrocarbons that might currently be present within the shale. These two methods resulted in two deterministic estimates of total petroleum in place.

To reflect uncertainty in resource estimation, the results from these two methods were interpreted to define the P90 and P10 values of a log-normal distribution respectively with the P50 value as the best estimate.