

Variability and Shale Gas Potential of Milk River Formation Shales in Southwestern Saskatchewan

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Abstract

Exploration for shale gas resources is rising in importance as demand for natural gas increases, and conventional gas sources decline. Shale gas is acknowledged as a viable and economic resource due to successful production from five major basins in the United States. Canada is yet to produce shale gas commercially, even though shale gas resources in Canada are estimated to be significant. Natural gas is found in dark, organic-rich, fine-grained shale source rocks with significant gas storage via adsorption. Geologic and geochemical measurements of a system must be taken into account in order to fully assess shale gas potential.

This study examines source rock and reservoir potential of the Upper Cretaceous Milk River Formation. The study area is located in Twp 25 and Range 8W3. Core samples were analyzed to determine if conditions are present to allow for shale gas production. Rock – Eval, TOC and vitrinite reflectance (% Ro), as well as isotope analyses were completed. Samples analyzed have TOC values ranging from ~1 to 4 wt %, higher TOC values are found in siderite nodules present throughout the core. Siderite nodules contain type II kerogen; the remaining core samples contain type III and type IV kerogen. Grain size, palynology and core descriptions were correlated with geophysical logs to determine depositional environment and potential of the shale for gas generation and storage. Milk River Formation shales could become a natural gas play if natural fractures, silts and sands are present in sufficient quantity, and if suitable geochemical parameters are met.