

Organic Geochemical Analysis of the Second White Speckled Shale Formation, Upper Cretaceous Colorado Group, West Central Alberta – Implications for Shale Gas Production

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Traditionally, shale sequences have been of interest as source rocks for hydrocarbons, however, they may also act as unconventional reservoirs. Gas is stored within the shales as an adsorbed phase on the kerogen, at the top of coarsening-upwards units, and within fracture and micro-fracture porosity. The geochemistry and structural influences within an area will determine the potential of the shale to act as a reservoir.

The Upper Cretaceous Second White Speckled Shale (SWS) and underlying Belle Fourche formations are examples of shales with possible gas production potential in the study area, located in west central Alberta (Township 54 to 62 and Range 15W5 to W6). Detailed core logging, geophysical well log correlation, and high frequency sample collection for organic geochemistry (determining kerogen type, total organic carbon content (TOC), and thermal maturity using Rock-Eval/TOC pyrolysis) allow for characterization of the SWS and Belle Fourche as potential shale gas reservoirs in the study area.

The results of geochemical analysis indicate that the Belle Fourche and SWS are thermally mature with respect to oil generation. They contain Type II to Type III kerogen, with TOC's ranging from >1 wt.% to close to 5 wt.% in the central part of the study area. Thermal maturity increases towards the west, with consequent inferred increase in gas generation. Modeling using Platte Rivers Basin Mod 1-D[®] software will determine the geographical boundary for onset of gas generation from within the Colorado Group.