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Geochemical Assessment Of Shale Gas And Shale Oil Potential In Rocky Mountain Basins, U.S.A. And Canada

The success of various shale gas resource plays suggests the possibility of similar plays in Rocky Mountain basins in both the U.S. and Canada. Various commercial gas play types exist in the Rockies including (1) tight, high flow rate thermogenic, (2) fractured, lower flow rate thermogenic, (3) interbedded shale/tight sand or silt thermogenic systems, and (4) fractured, lower flow rate biogenic. However, identification of shale oil resources is valuable also. These resources are identifiable from the same geochemical analyses as completed for shale gas plays.

Numerous models for each play type exist to evaluate Rocky Mountain systems including the high maturity thermogenic plays of the Ft. Worth, Delaware, and Arkoma basins, the low maturity thermogenic plays of the Illinois Basin, the interbedded shale/reservoirs of the Bossier Shale of the East Texas Basin, and the biogenic Antrim Shale play of the Michigan Basin. The Williston Basin Bakken Formation oil play provides one model of a shale oil system.

Natural fractures are not a prerequisite for gas production out of the Barnett Shale, whereas other shale play types require some degree of fracturing. What is a prerequisite for the very high gas flow rates from shales is the secondary cracking of higher molecular weight hydrocarbons and nonhydrocarbons (resins and asphaltenes) to gas and the ability to stimulate these tight rocks without loss of energy into faults or other horizons.

Gas contents are important, but not necessarily indicative of producibility, as other factors may control gas flow particularly when gas is stored as both free and adsorbed gas. In fractured shale gas plays where gas is primarily stored as adsorbed gas, such as biogenic or low maturity fractured shale plays, gas contents are predictable from organic richness (TOC).

Fifteen Rocky Mountain basins are evaluated and results suggest prospective areas for pursuit of these shale gas plays as well as shale oil.