

A Comparison of Sequence Stratigraphy and Mineralogical Variations Associated with Total Organic Carbon in the Marcellus Shale: Washington County, Pennsylvania

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Recent interest has arisen concerning the organic-rich Devonian black shales of the Appalachian Basin and their potential to produce natural gas. Production of natural gas from these black shales is widespread; with high versus low production rates controlled by both the gas content of the shale and the susceptibility of the shale to fracture. It is hypothesized that the propensity for shales to fracture may be controlled by the amount of silica and/or calcite in the rock, and that the variability in the occurrence of those minerals may be predicted by sequence stratigraphy.

A regional correlation of well logs drilled in Pennsylvania will be completed for sequence stratigraphic analysis of the Marcellus Shale and will enable the development of a sequence stratigraphic model that will be used to test if mineralogy can be predicted by sequence stratigraphy and if there is a relationship between mineralogy and total organic carbon content of the rock. To determine if a relationship exists between mineralogy and total organic carbon, a mineralogical analysis will be performed on 15 sidewall cores taken from a vertical Marcellus well located in Washington County, Pennsylvania using x-ray diffraction to determine the mineralogy in each sidewall core which will then be compared to calculated total organic carbon percentages taken from the same sample suite. If a relationship exists, it is hypothesized there may be specific zones that can be identified in a predictable manner within certain sequence stratigraphic intervals within the Marcellus Shale that are likely more productive than others.