

Variability in Upper Mannville Coal as seen in Cores from the Corbett Creek area, Alberta

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The Corbett Creek Mannville coalbed methane (CBM) project (Trident Exploration and Nexen) is the first commercial CBM project in the Mannville in Alberta. A number of cores have been cut in the area targeting the Mannville coal. Significant variation in coal and rock properties is observed in the cores on a number of scales both vertically and laterally. Production rates and inferred permeability in the Corbett Creek area are also variable, and may be related, though imperfectly, to coal property variability.

Coal is composed of bedded organic-rich sediment whose physical characteristics vary considerably due to the nature of deposition (sedimentation?). The distribution of flora, the amount and nature of the biomass, syndepositional events and non-organic sediment input combine to make a highly variable rock on many different scales.

CBM reservoir quality is influenced by many physical characteristics of coal including coal and rock lithotypes, coal maceral composition, and coal maturity. Coal cleating, gas content and maturity appear to have the greatest impact on reservoir quality (and therefore production), however none of these variables are truly independent. Gas content is closely related to maturity; propensity to cleat is influenced by maturity, coal maceral composition, and coal and rock lithotypes; coal and rock lithotypes are related to maceral composition and the proportion of mineral matter.

CBM production performance is influenced by the physical characteristics and reservoir quality of the coal, lateral and vertical variations in both of these, and by the impact of the processes used to drill complete and produce natural gas from coal. Because of these numerous and varying influences on production performance, a thorough understanding of the nature, importance, and variation of the physical characteristics of the coal is critical to optimizing production from coal reservoirs.

Coal cores from the heart of the Corbett Creek field are supplemented by cores from wells on the periphery. Differences in lithotypes, non-coal sediment content and cleating are readily observable. In particular, variation exists in cleat spacing, orientation, cleat width and cleat angle, and is interpreted to be the result of different macroscopic and microscopic composition and local differences in the stress regime. Correlations may be made between these visible rock variations and varying production performance.

1. Trident Exploration Corp.
2. Brigantine Energy Inc.