Characterization of the Upper Mannville CBM Play in South Central Alberta

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Summary

In the world of unconventional gas, the Mannville CBM play is one of the most significant CBM plays in North America, and even across the world. As much as 350 Tcf are thought to exist as original gas-in-place within Mannville coals along a fairway extending south eastwards across Alberta. The fundamental question is; how much of this gas is recoverable?

Much of EnCana's focus for the past four years has been on the Upper Mannville coals of south central Alberta. The coals here, on the down dip edge of the fairway, are very unique in many ways. One of the most fundamental differences is that the coals here tend to be drier, as opposed to the wet coals found further up dip. In other word, dry gas flows immediately with no dewatering. A possible explanation as to the origin of the dry coal fairway will be presented, in addition to documenting a number of key controlling geological factors (stratigraphic and structural framework, and coal sedimentology) which must also be closely examined in order to fully understand the capability and true nature of this drier fairway. The actual coal stratigraphy is very much controlled by accommodation space, which is related to foreland subsidence, and locally to re-activation of faults during deposition.

To date, the greatest challenge of this play has been permeability. The coals referred to here range from 1400m to over 1800m in depth, much deeper than industry previously inferred cut-off of 1200m which at the turn of the century was used to determine the aerial extent of the fairway and size of the play. Even though the coals are deeper than what was initially thought to be "too tight", permeability does exist. However, in order to identify areas of enhanced permeability, one must look beyond regional stress patterns in the rock, and attempt to understand and characterize the cleat/fracture networks in the coals and the processes responsible for their genesis. The integration of key geological components with innovative petrophysical analyses and sophisticated 3D seismic techniques is one approach which can lead to identifying areas of enhance permeability.