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Reservoir Characterization for Energy Security

Unlocking the Montney: Geological Insights and Development Build-Outs from a Basin-Wide Geomodel

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ABSTRACT

The Montney Formation has emerged as the most prolific unconventional reservoirs in the Western Canada Sedimentary Basin, yet its vast areal extent and heterogeneous reservoir and fluid properties introduce development challenges. This presentation leverages McDaniel & Associates' basin-wide three-dimensional (3D) geomodel to provide both a regional perspective and a focused case study on maximizing Montney development.

In the first half of the presentation, we will explore the geological framework of the Montney across all major development regions. Using a multi-billion-cell geomodel, we examine fluid maturity, thickness, porosity, water saturation, H₂S distribution, and pressure regimes to show how geological attributes vary between regions. This basin-wide context illustrates the variability that underpins reservoir performance and future development potential.

The second half transitions to a regional case study where geological characterization is integrated with engineering parameters to evaluate completions design, pad drilling density, and parent-child well interactions. Beyond well performance, gas composition must be considered, particularly as sour gas concentrations increase. Constraints on sour gas processing capacity raise costs and limit expansion, shaping capital decisions for both operators and midstream developers. We demonstrate how these factors subdivide the region into type-curve areas for gas, condensate, and liquids, and how they influence undrilled inventory, recoverable volumes, and capital efficiency. Economics under multiple price decks are used to high-grade inventory, while production build-outs show how wedges of existing and future development shape the long-term supply outlook.

Together, these insights demonstrate an integrated approach to bridging geoscience and engineering, supporting technical forecasts, resource evaluations, and investment decisions. By combining basin-scale geological understanding with detailed regional case studies, this work underscores just how much potential remains in the Montney, and how it might be unlocked.