

# Stratigraphic Techniques and their Application to the Upper Mannville of the Western Canadian Sedimentary Basin

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### **Abstract**

Clastic sediments of the Upper Mannville in the Western Canadian Sedimentary Basin (WCSB) of Alberta were deposited over a wide range of continental, shoreline and marine sedimentary environments, as well as a wide range of accommodation settings. Sediments deposited in coastal settings are characterized by transgressive/regressive stratigraphy, but a range of erosional surface trajectories control the real facies preservation architecture. During regression, the space between sea level and the sea floor is filled with sediments deposited in delta front, shoreface and tidal flat settings. As the shoreline advances, this progradational sediment wedge is reworked by distributary channels, fluvial channels, and tidal channels. During transgression, preservation architecture is controlled by erosional surface trajectories of the tidal/fluvial ravinement surface, the tidal ravinement surface and the wave ravinement surface. Under these conditions, incised valleys make up a significant component of the low gradient WCSB. They contain a tripartite fill of fluvial, marine and transitional facies. A typical exploration or development workflow for these incised valleys consists of initial contour analysis, followed by regional mapping, fill analysis and finishes with development of play concepts. Application of these concepts to the Mannville of the WCSB shows low accommodation settings in Saskatchewan and SE Alberta are dominated by exposure surfaces and incised valleys. Central and NE Alberta has higher accommodation and a mixture of shoreline deposits, incised valleys and compound coals. NW Alberta and BC show highest accommodation, with fewer incised valleys, thicker preserved shoreline and marine deposits, and single cycle coal seams.