

DEPOSITIONAL FACTORS AFFECTING
COAL DEVELOPMENT IN THE LOWER
CRETACEOUS GATES FORMATION,
NORTHEASTERN BRITISH COLUMBIA

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The Lower Cretaceous Gates Formation forms part of a major coal-bearing sequence which extends for approximately 650 km in the Rocky Mountain Foothills of Western Canada. Core and outcrop studies indicate that the Gates coal measures in northeastern British Columbia were deposited in a coastal plain-deltaic setting south of a northerly prograding wave-dominated shoreline. On a regional scale three broad facies belts are recognized; marine, transitional and non-marine. In the transitional area, non-marine deposits interfinger with tongues of marine sediment which pinch-out towards the south. Regional isopachs of total coal thickness and a map of the number of coal seams greater than 1.5 m thick show that the maximum coal development in the Gates Formation (28 m total coal and six seams greater than 1.5 m thick) occurs near the boundary of the transitional and non-marine facies belts on the Monkman and Belcourt properties.

The thickness and continuity of coal seams depends to a large extent on the original depositional environment. Three major coal forming environments are recognised. Brackish (inter-deltaic to lagoonal) coals are present locally above coarsening-upward marine units. Coals in this environment are thin (less than 1 m thick) and discontinuous. Lower coastal plain coals overlie coarsening-upward marine units in the lower part of the Gates Formation. These coals vary from 0.4-11 m thick (average 3.5 m) and are laterally very extensive. The lower coastal plain represents the most important coal forming environment in the Gates Formation. Upper coastal plain coals are associated with fluvial channel, lake, crevasse splay and overbank deposits. These coals vary from 0.3-7.7 m thick (average 1.8 m) and are laterally less continuous than coastal plain coals. Thinning and pinch-out of upper coastal plain coals occurs adjacent to fluvial channel and splay deposits. Draping of coals over thick fluvial channel deposits leads to correlation problems.

In the southern part of the study area near Mount Belcourt, upper coastal plain coals are associated with thick coarse conglomerates interpreted as proximal braided river-alluvial fan deposits. In this area upper coastal plain coals in the upper Gates are thin and associated with numerous rooted, soil horizons. The absence of thick coals in this interval may be due to a change in climate or basin hydrology.