

Fluviodeltaic deposits in the lower Kamik Formation (Lower Cretaceous), Mackenzie Delta, NWT

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ABSTRACT

The gas-bearing Lower Cretaceous Parsons Group of the Mackenzie Delta area consists of three formations, in ascending order they are: Martin Creek, McGuire and Kamik. Two major transgressions divide the succession into three transgressive-regressive (TR) sequences. The lowermost consists of the upper Husky and Martin Creek formations; the middle one consists of the McGuire and lower Kamik, and the upper one the upper Kamik Formation. It is in the middle TR sequence that fluviodeltaic beds are preserved in the lower Kamik Formation in the subsurface of Mackenzie Delta.

In the subsurface, the lower Kamik Formation typically consists of thick sandstone units with some interbedded shale and siltstone, and a few thin coal seams. Gamma-ray log response is typically blocky, reflecting the presence of thick sandstone units. Core from Parson L-43 and N-10 will be used to illustrate the character of these beds.

In Parsons L-43 the bulk of the core consists of a fining-upward succession. The lower part consists of multiple, erosionally based, cross-bedded, coarse-grained sandstone units that are interpreted to have been deposited as sand bars in a fluvial channel. These beds fine-upward into thinly interbedded shale and sandstone that are interpreted to be floodplain deposits. The uppermost metre is another coarse-grained, cross bedded sandstone resting erosionally on underlying beds. This upper interval also is interpreted to have been deposited in a fluvial channel.

The lower 6 m of the core at Parsons N-10 consists of three 1 m thick sandstone intervals separated by shale and siltstone intervals, and capped by a thin coal bed. Two of the sandy units fine-up and one is a coarsening-upward interval. This part of the core is interpreted to be a mix of crevasse channel and crevasse splay deposits separated by floodplain muds. The top 4 m consists of an erosionally based, medium to coarse grained, cross bedded sandstone that is interpreted to be a channel fill deposit.

The fluvial deposits of the Parsons L-43 and N-10 wells are part of a large fluviodeltaic complex that extends westward to the Richardson Mountains, where marine influences begin to appear and the lower Kamik changes facies to widespread shoreface deposits. The abundance of storm-generated bedding features in the broad blanket-like marine beds suggests that the delta was wave-dominated.

The lower Kamik Formation contains some of the more porous and permeable beds within the Parson Group, hence its importance as an exploration target as a potential reservoir for gas.