

Innovation in the Cardium Halo Play at West Pembina

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Petrobakken and its predecessor companies have been drilling horizontal wells in the Cardium at West Pembina since 2009. Understanding the Cardium reservoir, along with constantly improving, innovative drilling and completion practices have resulted in Petrobakken's success in one of the key areas of the Cardium Tight Oil Play.

Cardium sandstone reservoir in the horizontally targeted halo, west of the main Pembina field ranges from 6 to 16% porosity and air perms of under 1 md to 6 md; compared to the vertically exploited main Pembina field where porosity values of range up to greater than 20 percent and air permeability's range up to of greater than 30 md. Net Sandstone lower limits of the main Pembina field are approximately 6-7 metres of sandstone net pay (defined as greater than 6% porosity); lower limits of the halo are still being tested, economic wells have been drilled in areas with 3m of net sandstone pay.

The first horizontal wells in the West Pembina Cardium halo Play were drilled in 2009. Early wells were drilled with intermediate casing, to a shorter length than currently drilled wells. Current drilling practices include monobore drilling, longer laterals, with shared surface pads. Early completions utilized fewer frac ports with oil-based fluids and finer-grained propanant. Current completion practices utilize more frac ports with optimized, lower-cost slickwater fracs able to pump a higher volume of coarser-grained propanant.

Understanding and delineating the Cardium reservoir with systematic implementation of drilling and completion innovations such as longer wells with more frac ports, monobore drilling, refining completion fluids and programs has resulted in Petrobakken's success in the Cardium halo in West Pembina.