

Petroleum Geology of the Parshall Field Area, Mountrail County, North Dakota

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The Parshall Field of the Williston basin was discovered in 2006 by EOG Resources. This Devonian-Mississippian middle Bakken Formation resource play covers some 40 townships in Mountrail County, North Dakota and is still expanding. The development of horizontal drilling and modern fract techniques has made this field possible.

The Bakken Formation in the field area consists of three members: (1) upper shale, (2) middle dolomitic sandstone, (3) lower shale. The total Bakken interval ranges in thickness from 80 to 130 ft over the field area. The upper shale is dark-brown to black organic rich mudstone and ranges in thickness from 10 to 18 ft over the field area. The middle member ranges in lithology from bioturbated, argillaceous, calcareous very fine grained sandstones to cross-bedded fine to very fine-grained sandstone to very fine-grained sandstone with cm scale shale laminations. The middle member ranges in thickness from 30 to 70 ft. The lower shale member is also a dark-brown to black organic rich mudstone and ranges in thickness from 20 to 45 ft.

The main reservoir in the Parshall Field is the middle member which has low matrix porosity and permeability and is found at depths of 9000 to 10500 ft. The middle Bakken porosities range from 2 to 12% and permeabilities average 0.02 mD. Some key factors that contribute to the success of this play include good stratigraphic trapping conditions, generation of hydrocarbons from the organic rich mudstones, and fractures.