

## Exploring In The Rock Creek Formation

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### ABSTRACT

The Rock Creek Formation has been called the riskiest exploration play in Western Canada. A large part of the risk occurs because seismic data does not resolve the reservoirs, and geological understanding of the unit has been very poor in comparison to other units. This is shown by the number of one-well fields where chance discoveries have not been developed systematically.

The Rock Creek formation is definitely not a transgressive sheet sand, as indicated by the difficulty of internal correlations even between closely spaced wells. In cores, facies indicate marine-related conditions; bioturbation predominates, but flaser bedding generated by tidal currents is by far the most common physical structure.

On well log cross-sections, the fundamental problem is to correlate the blocky to slightly fining-upward reservoir and non-reservoir sands. In places, clear correlations can be established across a blocky sand, a classic indicator of continuous units that were incised or channelled during a fall in relative sea level. Therefore each of the blocky sands within the Rock Creek consists of incised channel or valley-fill sands formed in estuarine conditions as relative sea level rose. This stratigraphic pattern is more difficult to recognize in this unit than in others because there is no consistent background or regional pattern preserved. The formation is made up of stacked, intercutting channel sands because Middle Jurassic subsidence was essentially zero, and almost no space was created for accumulation. In many places, the entire formation consists of a single channel fill formed by the last incision event that has removed all the others.

From productive areas, reservoirs can be mapped by using a simple criterion related to the valley cutting process: the same valley fill hangs downward from the same stratigraphic level within the formation. Also, Rock Creek estuarine channels do not show local facies changes or lithologic variation. However, many channel sands are broken into segments by later incision events. Different segments commonly have different fluid contents.

The fluid content of Rock Creek sands is affected by the paleostructural (pre-Late Cretaceous tilting) elevation of the unit. Some of the production comes from highs evident on sections hung on the Fish Scales. Early hydrocarbon migration preserved superior Rock Creek reservoir properties in these small Jurassic structures.

Exploration and development in the Rock Creek formation requires intensive geological work, but has great rewards as the unit is underexplored and underexploited compared to most productive units in the basin.