

Reservoir Distribution in the 2nd Order Rhaetian to Sinemurian Sequence, Western Sverdrup Basin, Canadian Arctic Archipelago

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The Rhaetian–Valanginian (latest Triassic – Early Cretaceous) 1st order sequence contains almost all the discovered hydrocarbons in the Sverdrup Basin. The largest share of these hydrocarbons occurs in the Rhaetian - Sinemurian 2nd Order sequence. This sequence is sandstone–dominant over the eastern and central Sverdrup Basin where a large delta developed. In the western Ellef Ringnes/King Christian Island area, the sequence consists mainly of delta front sandstones with interbeds of delta plain strata near the top of the sequence. Good reservoir strata occur over this entire area and potential traps are mainly structural culminations.

In the western Sverdrup Basin, sediment supply was much less and an offshore shelf environment, dominated by argillaceous deposits, was widespread during the Rhaetian-Sinemurian interval. Three 3rd Order sequences can be mapped throughout the western Sverdrup Basin and these are capped by unconformable shoreline ravinements along the basin margin and by maximum regressive surfaces farther basinward. The ages of these sequences are Rhaetian, Hettangian and Sinemurian. Each 3rd order sequence has sandstones with good reservoir qualities developed with the upper portion of the RST. These reservoir facies occur either as westward prograding tongues of delta front sandstones or as strandplain/shoreface deposits along the southwest margin of the basin.

The reservoir strata within each 3rd order sequence have a relatively limited distribution due to truncation on the basin margin and a facies change to shale and siltstone basinward. The distribution of the reservoir strata in each sequence has been mapped using the available well and outcrop data. Potential traps along the distribution fairways include structural highs, unconformity-related pinchouts along the basin edge and pinchouts on the flanks of salt structures.