

Fine-grained sediment distribution, stratigraphy, and ichnology in closely spaced cores from the Lower Clearwater Formation, Athabasca oil sands, Alberta, Canada

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Detailed stratigraphic descriptions and sedimentology of 14 vertical wells were used to correlate lithofacies within the Lower Clearwater Formation. Located in the Mobile Water V pattern in the southeast part of the Firebag Project in northern Alberta, these wells were drilled between 25 and 50 m apart from each other. The close spacing of these wells allows for detailed lithofacies, structural, and lithological analysis. Vertical heterogeneity and lateral continuity were mapped within the Lower Clearwater Formation. Trace fossil assemblages and sedimentary structures were used to correlate 14 different lithofacies packages from well to well and were used to define 7 lithologies. It was determined that these lithofacies were part of nearshore to offshore marine environments which underwent several sea level changes. Detailed correlation shows variation in structure and lithological packages over less than 300 m. Expanding this study to a more regional area outside of the Mobile Water V pattern and into a larger portion of the Firebag Project area has shown that the detailed correlations continue in the Lower Clearwater Formation. The goal of this study is to expand the correlations to encompass the whole of the Firebag Project area and to see how far the correlations continue. From the results of this study, a solid base of information was collected that can be used to examine variations in rock integrity and the relationship between the reservoir and non-reservoir. Determining the detailed sedimentology of the Lower Clearwater Formation in the Firebag Project area will be significant for future SAGD oil and gas exploration and production.