

SEQUENCE STRATIGRAPHY AND FACIES MODEL OF THE VIKING FORMATION IN THE CROSSFIELD AREA AND ADJACENT AREAS. ALBERTA, CANADA

Nakari Diaz

Simon Fraser University, Earth Science, Coquitlam, BC, Canada
nakarid@sfu.ca

ABSTRACT

The Lower Cretaceous Viking Formation in the Crossfield area produces hydrocarbons from unconventional “tight” siliciclastic reservoirs. The area, however, has yet to receive an integrated sedimentological, ichnological and sequence stratigraphic study. The proposed research concentrates on along-strike variations in depositional environments and their reservoirs within individual systems tracts, utilizing a four systems tract model. The Viking Formation mainly records deposition in wave-to storm-dominated shallow-marine deltas and shorefaces. Reservoirs show increasing mudstone interbeds as successions transition along strike from strandplain shorefaces to mixed process deltas. The strong wave energy reflected in the facies also favors pronounced delta asymmetry, impacting predictions of reservoir distributions along depositional strike. Thus, it is crucial to identify the ichnological and sedimentological evidence of fluvial-sediment influx and the onset of deltaic characteristics within the successions, separated by systems tract. In order to establish a predictive model for the tight oil reservoirs, detailed core descriptions of 50 cored wells and log analysis of at least 1000 wells will be used to establish a sequence stratigraphic model and high-resolution facies model for the study interval. This study will allow discrimination of the different systems tracts, followed by the paleogeographic mapping of facies associations along depositional strike within each systems tract. The petrophysical properties of the reservoir facies will then be evaluated and integrated with the geophysical well logs, in order to evaluate the impact of deltaic versus shoreface conditions on their properties. This study has direct application to other important reservoirs characterized by spatially variable reservoir characteristics.