Modeling Lateral Accretion in McMurray Formation Fluvial-Estuarine Channel Systems: Grizzly Oil Sands' May River SAGD Project, Athabasca

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Abstract

Large-scale fluvial-estuarine point bars and other laterally accreting channel systems in the McMurray Formation represent the most important reservoirs in the Athabasca oil sands region of Alberta. For SAGD (steam-assisted gravity drainage) developments, steam chamber growth, steam/oil ratios, productions rates and recovery efficiencies are strongly dependent on sand body thickness, connectivity and heterogeneity. As a result, an industry goal has long been the construction of geologic models and reservoir simulations that realistically represent the reservoir architecture and flow units in these complex systems (e.g., Deschamps et al, 2012, Su et al, 2013). However, until recently, computing power and software limitations necessitated the broad use of "flat" layered models that exhibit simple "follow top" or "follow base" layering geometries.

The purpose of this paper is to present a geologic model that captures the geometries of inclined heterolithic stratification (IHS), inclined sands (IS) and their associated basal channel sands. The model integrates McMurray Formation outcrop observations with core, log and 3D seismic data from Grizzly Oil Sands' May River SAGD Project. The methodology used to construct the model wherein lithofacies, petrophysical properties, and conditioning parameters are distributed chronostratigraphically are discussed. The model has been upscaled for simulation so the potential effects of IHS on steam chamber development can be investigated.