Opportunities and Challenges in Accessing Stranded Pay and Atlantic Margins Heterogenous Reservoirs in SAGD Bitumen Projects

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Abstract

Currently uneconomic oil-sands deposits found near the edges of existing SAGD pads, stranded pay above or below producing intervals, and within heterogeneous oil-sands zones could provide future opportunities for operators to grow the reserve base for their projects. In many cases this would be dependent on the development of new technologies. Reservoir heterogeneity and variable reservoir quality associated with inclined heterolithic stratification (IHS) commonly limit production growth for SAGD operations in the McMurray Formation. The most challenging reservoirs are characterized by mud-dominated IHS, which has a strong negative impact on performance, especially where muds create laterally extensive vertical permeability barriers between the injector and producer. New technologies to pre-condition and enhance vertical permeability within IHS-dominated reservoirs may be the next breakthrough needed to enhance in-situ oil-sands production.

Recognizing that new technologies need time to test and implement other proven advances in SAGD operations can be considered for enhancing production for variable quality reservoirs. Non¬condensable gas (NCG) or methane co-injection takes advantage of gas-push to assist in recovering conductively heated bitumen intervals not in direct contact with the steam chamber. Results indicate that bitumen production can be maintained while reducing steam injection rates and associated cumulative steam-oil ratio. This process takes advantage of both convective and conductive heating in oil-sands reservoirs with heterogeneity above the injector well but having a relatively high permeability interval at the base which enables efficient communication between injector and producer wells.