

Incised Valleys and Wabiskaw-McMurray Stratigraphic Nomenclature in the Mackay Region, Northwestern Part of the Athabasca Oil Sands, Alberta

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Resource delineation to support upcoming SAGD developments in the Mackay region, western part of the Athabasca Oil Sands, has resulted in dozens of new wells and kilometers of seismic data. Based on these new data, several diverse interpretations of the environment of deposition of the McMurray Formation have been recently proposed. These disparate (and often conflicting) interpretations include middle McMurray large fluvial-estuarine point bars, middle McMurray interbedded shorefaces, upper McMurray large tidal bars, upper McMurray delta/shoreline deposits, and upper McMurray channel sands, all occurring within the Mackay region. This presentation provides an evaluation of the viability of these different interpretations, and offers a unified solution.

Three SAGD developments are operating, or have been proposed, in the Mackay region of the Athabasca Oil Sands. The first Mackay River development, operated by Suncor Energy (formerly Petro-Canada), has been producing bitumen since 2002, and is currently producing in excess of 30,000 bbls per day. Based on compelling evidence from dipmeter data, facies distributions, and particle size data, the reservoir sands at the Mackay River development have previously been shown to be dominantly contained within a single large middle McMurray fluvial-estuarine point bar (Webb and Amare, 2009).

Two proposed developments less than 30 km to the west of Suncor's Mackay River facility have also incorporated the use of the name "Mackay" in their projects. However, interpretations of the reservoir sands differ significantly from the previously-described point bar model, as these operators have attributed their best reservoir sands to environments that include upper McMurray tidal bars/shorefaces, or upper McMurray channels. This study uses data from over 8 townships of contiguous land in the Mackay area to reconcile this diverse suite of observations. Existing data can be used to demonstrate that the stratigraphic succession in the Mackay area is dominated by middle McMurray point bar and associated overbank deposits that are overlain by incised valley deposits pertaining to the Wabiskaw D interval (ERCB, 2003). As a result, reservoir sands within Wabiskaw D incised valleys that cross the Mackay area have commonly been incorrectly assigned to the upper part of the McMurray Formation.

References

- Webb, M. and Amare, K., 2009, Development of SAGD reservoir-quality facies contained within a large ancient point bar, McMurray Formation, Athabasca Oil Sands, Canada (abstract): CSPG Joint Convention, Calgary.
- ERCB, 2003. EUB Report 2003-A: Athabasca Wabiskaw- McMurray Regional Geological Study. URL: <http://www.ercb.ca/docs/documents/reports/r2003-a.pdf>