

Characterization of Complex Facies and Stratal Architecture of Organic Rich Mudstones of the Upper Cretaceous Second White Specks Petroleum System, West-Central Alberta, Canada

Nick A. Zajac¹ and Per K. Pedersen¹

¹Department of Geoscience, University of Calgary, Calgary, Alberta, Canada (nazajac@ucalgary.ca)

Abstract

The Upper Cretaceous Second White Specks petroleum system is actively being explored as an emerging shale oil resource play across western Alberta. Historically, several highly productive vertical oil wells (+1 million barrels) testify the prolific character of the Second White Specks petroleum system, although often dismissed as an unpredictable fracture controlled play based on poor production in offsetting wells. The petroleum system is comprised of a 500-1200m thick succession with several organic rich mudstones, separated by siliciclastic and calcareous mudstones. These units are separated into the siliceous, organic rich mudstones of the Fish Scales Formation, the non-calcareous, siliciclastic rich mudstones of the Belle Fourche Formation and the calcareous, organic rich mudstones of the Second White Specks Formation. Characterizing and mapping the reservoir properties of the various facies aid in identifying the various light oil fairways to be exploited by multistage hydraulically fractured horizontal wells.

References Cited

- Jiang, P. and Cheadle, B.A. 2013. Depositional and burial domain influences on microporosity modalities in carbonaceous mudstones of the Upper Cretaceous Colorado Group, western Canada foreland basin: AAPG 2013 Abstract.
- Myrow, P.M. and Southard, J.B. 1996. Tempestite deposition: *Journal of Sedimentary Research*. v. 66/5, p. 875-887.
- Nittroyer, C.A. and Wright, L.D. 1994. Transport of particles across continental shelves: *American Geophysical Union*, v. 32/1, p. 85-113.
- Plint, A.G., Macquaker J.A.S., and Varban, B.L. 2012. Bedload transport of mud across a wide, storm-influenced ramp: Cenomanian-Turonian Kaskapau Formation, western Canada foreland basin: *Journal of Sedimentary Research*. v. 82, p. 801-822.
- Schieber, J. and Southard, J.B. 2009. Bedload transport of mud by floccule ripples—direct observation of ripple migration processes and their implications: *Geological Society of America*. v. 37/6, p. 483-486.
- Tyagi, A., Plint, A. G., and McNeil, D. H. 2007. Correlation of physical surfaces, bentonites, and biozones in the Cretaceous Colorado Group from the Alberta Foothills to southwest Saskatchewan, and a revision of the Belle Fourche-Second White Specks formation boundary: *Canadian Journal of Earth Science*, v. 44, p. 871-888.

Varban, B.L. and Plint, A.G. 2008. Paleoenvironments, paleogeography, and physiography of a large, shallow, muddy ramp: Late Cenomanian-Turonian Kaskapau Formation, western Canada foreland basin: *Sedimentology*. v. 55, p. 201-233.