

Monday, December 12th, 2016
College West Room 237.3, University of Regina

“Unconventional Tight Light Oil Play Types, Western Canada Sedimentary Basin”

By: Per Kent Pedersen
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AAPG Allan P. Bennison Distinguished Lecturer

Pizza Lunch @11:45, talk starts at noon.

Please RSVP to Jason Cosford at cosford@jdmollard.com by noon on Friday, Dec. 9th, if you are going to have lunch. Usual Society lunch prices apply.

Abstract:

Oil production in North America has the last years surged due to the successful exploitation of unconventional low-permeability (tight) light oil reservoirs in North America by multistage hydraulic fractured horizontal wells. Tight light oil plays exhibit a wide range of reservoir characteristics, that can be subdivided into three main play categories:

“Shale Oil” – light oil plays where the source = the reservoir, matrix permeability is very low, nano Darcy, and organic matter is usually high. These plays are analogous to shale gas plays.

“Tight Oil” – light oil plays where the source \neq the reservoir, and matrix permeability is low (< 0.1 mD). These plays are analogous to tight gas plays and may be composed of clastics or carbonates or a mixture.

“Halo Oil” – light oil plays where the source \neq the reservoir, and matrix permeability is relatively high (> 0.1 mD) compared to the other two play type categories. Halo Oil plays represent portions of conventional light oil pools that do not meet traditional petrophysical cutoffs and pay criteria, and may be composed of clastics or carbonates or a mixture.

Examples for the three light oil play categories will be presented from the Western Canada Sedimentary Basin; Shale Oil (Turonian Second White Specks Formation), Tight Oil (Late Devonian to Early Mississippian Bakken Formation), and Halo Oil (Turonian Cardium Formation). The tight light oil reservoirs span a wide range of depositional and tectonic settings and exhibit very different reservoir geometries and lateral extent. For each play the geological, reservoir, and production characteristics will be presented and discussed to deduce the primary controls on production performance in each play category. Note that the same stratigraphic unit might grade into a different play categories in different part of a basin depending on geologic setting, reservoir type, fluids, and pressure. For the mature plays a review will be presented of the success in identifying sweet spots during the initial exploration phase, leading to a discussion of the reservoir parameters that control the production, with the sweet spot often in an area of overlap of several parameters. The unconventional tight light oil play classification scheme facilitates a subdivision of the broad range of unconventional light oil plays and proper use of analogs for early phase light oil plays.

Bio:

Per Kent Pedersen is an associate professor with the Department of Geoscience at the University of Calgary, and owner of a consulting company providing technical support for reservoir characterization. He also teaches field seminars for petroleum companies and geological societies. Pedersen, an AAPG member, holds a doctorate in geology from the Department of Earth Sciences, University of Aarhus, Denmark, and has had a diverse career in academia, government and the oil and gas industry.

His previous academia experience includes Postdoctoral Fellow at Carleton University, Ottawa, Canada, and assistant professor at Brandon University, Brandon, Canada. He also spent several years in the industry as exploration geologist with Apache Canada and senior exploration geologist with Kereco Energy.

Since joining the University of Calgary in 2008 he has established a multidisciplinary research program with a large number of graduate students, which is primarily industry-funded and involves collaboration with a large and diverse group of researchers from universities, government institutions and the oil and gas industry.

The research program builds on his work in industry and government, with current research focused on three areas:

1. Mudstone depositional processes and stratigraphic architecture, and controls on organic accumulation and lateral variability.
2. Geological reservoir characterization of a wide spectrum of tight oil reservoir types from pore size to basin scale, with a focus on the link between depositional process and lateral and vertical heterogeneity from bed to sequence scale and their link to production.
3. The link between sedimentary facies, composition and fabric, and fracture characteristics (i.e. fracture intensity, height, in outcrops and subsurface, and induced seismicity.)