



San Joaquin Geological Society

Date: Tuesday, December 11th, 2012

Time: 6:00 PM Social Hour
7:00 PM Dinner
8:00 PM Lecture

Place: American Legion
2020 H St. Bakersfield, CA 93301

PSAAPG Members & Mesozoic's

\$25 w/reservation

\$30 without reservation

Non PSAAPG Members

\$30 w/reservation

Full-time Students with ID:

Free, Courtesy of Chevron & Occidental

SJGS WEBSITE

<http://www.SanJoaquinGeologicalSociety.org/>

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Characterization of the Bakken System of the Williston Basin from Pores to Production; The Power of a Source Rock/Unconventional Reservoir Couplet

Anne Grau and Robert H. Sterling¹

¹Cirque Resources LP, Denver

The Williston Basin Bakken system development in the last five years has become the largest field in the Continental USA with 3.8 billion barrels recoverable (USGS). The Devonian aged Middle Bakken Carbonate interval and the Three Forks dolomites comprise the reservoirs of this highly economic sequence, and the world class source rocks include the upper and lower Bakken shales.

The reservoir rocks of both the Middle Bakken and the Three Forks formations are considered tight and unconventional, with average porosities of 4-8% and permeability in the microdarcy range. It is the close vertical juxtaposition of these reservoirs with the world class source rock shales that create an ideal target for stratified oil-saturated reservoir targets perfect for horizontal drilling. Multistage stimulation techniques bring the state-of-the-art completion technology necessary for effectively stimulating these tight reservoirs and producing highly economic volumes of oil.

The Bakken reservoir rocks are highly complicated and variable. There are many stratigraphic targets and sweet spots for lateral drilling around the basin. Variables such as thermal maturity and facies distribution are primary controls on the distribution of the overall play. Natural fracturing of the reservoir is also key to success, and ranges from microfracturing, diagenetically-enhanced fracturing, hydraulic fracturing due to hydrocarbon generation, and tectonic fracturing of brittle rock types. Facies controlled lithologies and subsequent diagenesis also play a role in reservoir quality. Finally, reservoir pressure and water saturation play a role in the ultimate recoveries. Understandably, these variables yield a wide range of reservoir targets and production characteristics around the Williston Basin. Case studies from several of these areas will be presented. The Bakken System at Elm Coulee, Parshall Field, and the Nesson Anticline will be presented, showing how each of these areas varies in terms of reservoir specifics and recoveries.

Robert Sterling –BIO

Robert Sterling is a Senior Geologist at Cirque Resources LP in Denver. Prior positions include EOG Resources Inc as a Division Geologic Advisor, Nahama & Weagant Energy Company as Vice President Exploration, Challenger Minerals Inc as Division Geologic Manager. He holds a BS in Geology from California State Polytechnic University Pomona and an MS in Geology from California State University Los Angeles.

Anne Grau is a Senior Exploration Geologist for Fidelity Exploration and Production Company in Denver. Previous positions include Exploration Lead at Newfield Rocky Mountains, Project Geologist at EOG Resources, Geologist II at Marathon's former research facility in Littleton, CO. Anne received her Ph.D. in Geology from the Colorado School of Mines, and holds a B.S. and M.S. in Geology from Baylor University.

*** RSVP ***

By: Friday December 7th, 2012

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