



Appalachian Geological Society
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AGS March 12, 2014 Meeting Announcement

Hosted by - Appalachian Geological Society and
Marshall University, Department of Geology



Speaker – David C. Harris, Kentucky Geological Survey,
University of Kentucky, Lexington, KY



Title – **Berea Sandstone Horizontal Oil Play, Northeastern Kentucky**

Abstract - The Upper Devonian Berea Sandstone is a major natural gas and oil reservoir in eastern Kentucky. Oil and gas production dates back to the early 1900's. Production is from siltstone and very fine-grained sandstone reservoirs interpreted to have been deposited in an outer shelf and upper-slope marine environment. Average Berea core porosity is 13 percent, but permeability is very low (less than 2 md). During the late 2000's, horizontal drilling technology and multistage nitrogen-foam fracture stimulation was used to improve Berea gas production. At least 75 horizontal Berea gas completions were drilled in Pike County. Current low prices for natural gas have shifted interest in the Berea to shallower, more oil-prone areas in northeastern Kentucky. Since 2011, horizontal infill development with multistage hydraulic fracture stimulation in Greenup and Lawrence Counties has resulted in Berea oil production at rates significantly higher than in older vertical wells. Some of this oil production is in older Berea gas fields, suggesting that fracture stimulation enhances relative oil permeability in the Berea.



The regional distribution of well completions in the Berea indicates a predominance of gas production in southeastern Kentucky, with oil production much more common in northeastern Kentucky. This trend reflects the increasing thermal maturity of the adjacent source rocks (Devonian Ohio Shale and Mississippian Sunbury Shale) in deeper parts of the basin to the southeast. However, much of the Berea oil production in northeastern Kentucky occurs in areas where the source rocks appear to be thermally immature, based on vitrinite reflectance data.

Determining the economic success of the play awaits longer-term production data, but drilling activity continued to increase in 2013. One hundred thirteen horizontal Berea well permits have been issued: 43 in Greenup County and 70 in Lawrence County. Twenty-four wells in Greenup County were reported as oil completions, with no dry holes. Completion records for Lawrence County reported 20 oil wells, two gas wells, one oil and gas well, and one dry hole. Horizontal laterals are typically 2,000 to 3,000 ft long, with true vertical depths around 1,150 ft in Greenup County and 1,600 ft in Lawrence County. Oil pay zones range from 10 to 30 ft thick. **Accurate structural and stratigraphic models are key factors in keeping laterals within pay zones during drilling.**

Research is under way at the Kentucky Geological Survey to better characterize the Berea horizontal oil play. This work includes regional structure and isopach maps, field studies, and hydrocarbon geochemistry to identify source rocks and improve maturity maps. Numerous cores of the Berea are available at KGS, and excellent Berea outcrops occur updip (west) of the producing area. These will be used to refine reservoir stratigraphy, depositional models, and controls on porosity and permeability.

When: Wednesday, March 12, 2014
Where: Marshall University Student Center, Shawkey Room
Registration: 10:45 AM - 11:15 AM
Speaker: 11:15 AM - 11:50 AM
Questions: 11:50 AM - 12:00 PM
Lunch: 12:00 PM - 1:00 PM

Cost: Members: \$25.00
Non - members: \$30.00
Students: \$10.00

Pre registration required via RSVP to
appgeosoc@gmail.com

Payment at door

There will be Marshall geology students attending the meeting. If you are interested in students for employment, either internships or full-time positions, please contact Dr. Ron Martino at martinor@marshall.edu. Dr. Martino will get you student resumes and you can meet the students at the meeting.

Buffet Style Lunch Menu:

Pecan Crusted Tilapia, Pineapple Glazed Ham, Portobello Mushroom Stacker, Candied Yams, Brussels Sprouts, Seasoned Cauliflower, Lime Tortilla Soup and Broccoli Cheddar Soup. There is also a Salad Bar and Dessert Bar.

Location: Memorial Student Center, Marshall University, 5th Avenue & John Marshall Drive, Huntington, WV (see map). Parking is available in the parking garage on John Marshall Drive (see map).

The meeting will be in the Shawkey Room in the Student Center, on the 2nd floor (through the glass doors at the top of the stairs, down the hallway and the Shawkey Room is on the left).

Directions: From I-64, exit 11, Hal Greer Blvd (16th Street) and drive north towards Marshall University and the Ohio River. Go 2.6 miles on Hal Greer Blvd and turn right onto 5th Ave. Parking garage is first right turn, John Marshall Drive. Parking building is on the left. Student center is on 5th Ave.

Marshall geology department will be handing out parking validation tickets at the meeting for parking. Please bring your parking ticket to the meeting and you will receive a validation ticket.

Campus Map:

