

Petroleum Geologist Meets With Local Landowners Group

by Sue Smith-Heavenrich

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About 400 landowners from Tioga County and the surrounding region gathered at the Tioga Center Middle School auditorium on August 12 to learn more about natural gas exploration in upstate New York. The meeting, sponsored by the Tioga County Landowners Group, was the second in what they hope will be a series of educational meetings.

Don Zaengle, a petroleum geologist with 20 years of experience, spoke at length about natural gas exploration in the shale deposits in the Appalachians and across the United States. Zaengle worked for Shell Oil Company before retiring to upstate New York. Now he shares his passion for sedimentary geology as a science teacher and serves as a consultant to oil and gas attorney Chris Denton.

“Sedimentary rocks are layers like a birthday cake: sandstones, limestone, organic shale,” Zaengle said. There are about 11,000 feet of layered sediments, he explained, laid down from the Ordovician, Silurian, and Devonian periods.

“There are a number of targets energy exploration companies are interested in,” Zaengle said. The Trenton-Black River formation lies in the lowest rock deposited some 600 million years ago. Closer to the surface- about a mile down – are the Utica and Marcellus shales, black carbonaceous rock rich in hydrocarbons.

Pick up a chunk of Marcellus shale and you’ll understand why energy companies are interested in it: it’s dark, like coal, and leaves a greasy smear on your hand. Like all sedimentary rock, the Marcellus shale was created by compressing layers of sediment – in this case tiny clay-sized particles.

“This happened 450 to 380 million years ago, before plants existed on the planet,” Zaengle explained. The organic matter comes from microorganisms trapped within the sediments. Deposited in deep water, the organic matter was decomposed in an anaerobic (lacking oxygen) environment. The result is a sedimentary rock with a high amount of hydrocarbon trapped in it.

This is where particle size becomes important. As the sediments built up beneath the ancient sea, the pressure squeezed lower layers into solids. Sediments with large grains, such as sandstones, have more spaces (pores) within them. But the shales, composed of clay, have very tiny spaces. It is within these tiny spaces that the hydrocarbons – natural gas – are trapped.

“Since 1821 folks have know there was gas trapped in rocks,” Zaengle said. “In fact, Fredonia, NY used natural gas from a well to power the street lights. Remember, this is when Thomas Jefferson was still alive.”

The problem with the black shales is not the lack of gas, but the difficulty of getting it out of the rock. Because of the particle size, the low porosity and low permeability make it hard to extract the gas trapped inside. But the price at the wellhead, rising to nearly \$8.50 per 1000 cubic feet (mcf), makes the resource more attractive to energy companies.

“The advances in exploration technology make it cheaper and easier to go after these resources,” Zaengle explained. Recent technological advances include 3-D seismic testing and horizontal drilling.

“Also, these deposits (Marcellus and Utica) are close to the high-demand east coast markets,” Zaengle pointed out. “That adds another dollar or so per mcf to the price.” In addition to price, a recent publication estimated the reserves to be higher than previously thought. Geologists now believe they can recover 50 trillion cubic feet of gas from the Marcellus formation.

After describing how seismic testing works, Zaengle walked the audience through the details of hydraulic fracturing.

“If the layer of shale is 400 feet thick, and you drill a vertical well, you only access 400 feet of the rock,” Zaengle explained. “But if you drill within that layer, you can drill up to 10,000 feet if you want.” The problem is breaking the rock apart to extract the bubbles of gas trapped in the small pores.

This is where hydraulic fracturing (fracking) comes into play. To break apart the shale, the drillers pour a mix of water, sand, and other ingredients into the borehole. The sand acts as a “proppant” – it helps prop up the rock so the water can go through.

“The geologists are as precise as NASA scientists,” Zaengle said. “They can control the fracture length and direction, putting it where they want to go.”

There are significant implications with this type of drilling, Zaengle explained, including water use. “It takes 1 – 3 million gallons of water to do a frack job for a single bore,” he said.

Zaengle emphasized a number of times that the economic promise from this region will place a lot of pressure on landowners to lease. Landowners lucky enough to be part of a well unit may see royalty checks in the hundreds of thousands of dollars. Not to mention the bonuses that landmen are waving around to entice landowners to sign a lease.

“You need to remember that if they drill, and if they find gas, that well may be producing for many years,” Zaengle said. “You’re not buying a refrigerator; you’re not buying a car. This is a big business decision.” He pointed out that for a landowner with 100 acres in a drilling unit every one percent increase in royalty adds \$1 million to the royalty over the lifetime of the well.

In summarizing he told the landowners that the geology in Tioga County looks good and the technology exists to extract the resource. His advice: don't rush to sign a lease. If one company takes an offer off the table someone else will be by later with a better offer. The gas isn't going anywhere.

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Sidebar:

The Tioga County Landowners Group was formed to join landowners in Tioga County together to obtain the best possible gas lease compatible with their ownership goals.

“Our purpose is to join landowners in Tioga County together to increase our bargaining power,” said the group’s spokesman Nick Schoonover. He explained that the group’s goal is to help Tioga County landowners achieve the most desirable gas lease agreement they can get. Schoonover emphasized that they are seeking strong protection of personal property, conditions that protect the environment and communities, and increased compensation and royalty. As of August 10 they had 18,000 acres signed up and were adding about 500 acres a day.

Their website, www.tiogagaslease.org, contains valuable information for local landowners – everything from notices on future meetings and videos on hydraulic fracturing to links to DEC websites and a list of local exploration companies. For more information send an e-mail to tiogagaslease@aol.com or call 607-687-2800.