

Fayetteville,

Thousands of feet below Arkansas hay fields and cow pastures, a newly tapped reservoir of natural gas is quietly giving up its bounty. After 300 million years trapped in hard, black shale, gas now flows into pipelines headed for market to ultimately warm homes and businesses.



AP

In the flicker of five years, the Fayetteville Shale has gone from "just sort of a geologic oddity" to a significant industrial development. Investors, so far, are satisfied with early production and a university study says the newly tapped energy source could have a \$5.5 billion impact on Arkansas by the end of 2008.

Cleburne County Judge Claude Dill says business at the county courthouse, where mineral rights transactions are recorded, had been so brisk that clerks had to bring in extra tables. Dill himself negotiated a five-year lease on his 60 acres. Leases cover 4,000 square miles across north-central Arkansas, an area just smaller than the 5,000-square-mile Barnett Shale field in northern Texas, which produced 1.2 billion cubic feet of gas per day last year.

A gas transmission company plans a pipeline across Arkansas that would carry 1.1 billion cubic feet daily, but developers won't make predictions about the Fayetteville Shale. Houston-based

Southwestern Energy Co. did not discover the Fayetteville Shale nor invent the technology to shatter its hold on a buried treasure, but it and its Arkansas subsidiary, SEECO Inc., discovered that it held commercial potential like the Barnett.

Also important, Southwestern Energy was willing to place a bet – up to \$700 million by the end of last year and another \$900 million in 2007 – that new "frac treatment" technology used in the Barnett could also be used here.

"We 'discovered' an idea," says Harold M. Korell, Southwestern Energy's chairman, president and chief executive officer. "But until we started drilling wells, we didn't know it would produce gas. I was very excited in 2002 as the pieces were coming together."

That year, SEECO was a relatively small company, with its principal area of operation in the Arkoma Basin of Arkansas and Oklahoma. For 60 years, the company had been exploring and producing gas from conventional sources – porous rock thousands of feet underground. Gathering gas from unconventional sources like shale was new to the industry.

For Southwestern Energy, the Arkoma Basin represented about half the company's gas reserves – "our bread and butter," says John D. Thaeler, a petroleum geologist and SEECO senior vice president.

As SEECO drilled in the tighter Wedington sandstones of the Arkoma Basin, the company came across some unexpected findings. After analyzing data from 21 wells, Thaeler and his team couldn't explain the numbers.

"We estimated it should contain about 2.2 billion cubic feet (of natural gas). But when we looked at the well performance, we realized those 21 completions were going to produce upward of 17.3 billion cubic feet," Thaeler says. "What it meant to us is that we didn't understand as well as we thought we did where the gas was coming from."

At a brainstorming session at SEECO's Fayetteville offices, the lights went on. Thaeler and his team realized the gas in the 30-50 foot thick sandstone could be coming from the surrounding Fayetteville Shale and wondered if the formation could be another Barnett.

The team poured over Barnett data and studied drilling records and maps. Samples of the Fayetteville Shale were sent to the same company that had analyzed Barnett, but the team didn't say where the rock came from. In late summer 2002, Thaeler recalls getting the test results back. "Wow! This looks an awful lot like the Barnett," analysts told him. "Where is it?"

The response was encouraging, but the SEECO crew knew the Barnett was hundreds of feet thick while the Fayetteville Shale in the basin was not. Over the next year, the company quietly embarked on a campaign to acquire surface and mineral rights beyond the Arkoma Basin.

The company used out-of-state land brokers unknown to locals at county courthouses and abstract offices, putting them up in motels off-the-beaten path or near SEECO's Fayetteville offices. The brokers, sworn to secrecy, negotiated the deals and bought the rights for the company while the company remained anonymous.

By the end of 2003, Southwestern Energy had spent about \$11 million and acquired the rights to about 3,300 acres. With more drilling, the company learned the thicker shale outside the Arkoma Basin was the quality needed for commercial production.

"I see them (Southwestern Energy) as very smart from an entrepreneurial standpoint and to a certain extent from a scientific standpoint," says Ratchford, the state geology commission's fossil fuel resources expert. "The other energy companies were basically asleep at the wheel."

In the fall of 2004, Thaeler was in the field at a well in Jerusalem, 72 miles northwest of Little Rock, when the company used the new technology to tap natural gas from shale. The rock was fractured and the gas was released. Above ground, a small pilot light flared. Thaeler couldn't get through by cell phone to Texas headquarters so he hurried off to make the call.

"Houston, we have gas!" he announced.

"There was no Wedington sand out there so we knew the Fayetteville Shale had the potential to be productive," Thaeler recalls. "Naturally, we started leasing like crazy."

Southwestern's public announcement of the well set off a frenzy. Although not as large as the Barnett, the Fayetteville Shale held great promise. Dill's deal gives him a minimum of \$100 an acre if no gas is produced, and 12.5 percent royalties if drillers hit gas.

Over 21/2 years, about 2.5 million acres were leased. Since then, some 180 wells at an average cost of \$2.2 million each have been completed, and Texas Gas Transmission plans to build a 167-mile pipeline to carry 1.1 billion cubic feet of gas a day.

Southwestern plans to drill 400-450 wells in 2007 and may eventually have 8,000 operating in the Fayetteville Shale. In all, the company estimates its leases hold 11 trillion cubic feet of natural gas for production. Arkansas has not traditionally been a major gas producer.

Meanwhile, the much larger Chesapeake Energy Corp., based in Oklahoma City, plans to drill 50-75 wells in 2007 and open a field office in White County. Schlumberger, a world leader in servicing oil and gas companies, is building a 31,000-square-foot facility in Conway, where Southwestern also has opened up an office and formed DeSoto Drilling Inc.

According to the Arkansas Oil and Gas Commission, mineral rights owners could receive as much as \$3,750 a month in royalties in the first year of production on 160 acres. Also, a University of Arkansas study, partially funded by Southwestern Energy, predicts the shale play from 2005-2008 will mean an additional 9,683 jobs in Arkansas and \$358 million in taxes for state and local governments. The \$5.5 billion impact by the end of next year, forecast by the study, includes total labor income, property income, state and local taxes, and the purchase of goods and services.

Still, for the Fayetteville Shale venture to work, gas prices and demand will have to remain high and drilling costs and skilled workers will have to be within reach. Production throughout the play will have to be good. And new costly transmission lines will have to be built in time to take advantage of all these variables.

"It's one thing going out and punching a hole in the ground, saying 'I've got gas,'" Ratchford says. "It's another thing, more difficult, to get a delivery system in place to where you have a gathering system from the well head to a gas transmission line and bringing that resource all the way into a person's home or business."

But Thaeler says those are the risks of the oil and gas business.

Fayetteville Shale: Quick Facts

The Fayetteville Shale in Arkansas is a recently tapped unconventional source of natural gas. The tight, finely grained rock formation, 300 million years old, ranges in thickness from 50 to 550 feet and in depth from 1,500 to 6,500 feet.

The "sweet spot," where geologists believe the rock holds the greatest reserve, is in five central Arkansas counties: Cleburne, Conway, Faulkner, Van Buren and White.

A study by the University of Arkansas at Fayetteville, funded by Southwestern Energy Co., said the economic impact from 2005-2008 on the state would be \$5.5 billion, 9,683 additional jobs, and \$358 million more in taxes for state and local governments.

Houston-based Southwestern Energy began exploration in 2002. The company holds mineral rights on about 887,000 acres and estimates those properties could produce 11 trillion cubic feet of natural gas. Southwestern says it may drill as many as 8,000 wells.

Other companies in the shale play and their approximate acreage include:

- Chesapeake Energy, 1 million acres.
- Hallwood Energy, 480,000 acres.
- Maverick Oil & Gas, 125,000 acres.
- Shell Exploration & Production Co., 70,000 acres.

By the end of 2006, about 180 wells were completed in the Fayetteville Shale.

Natural gas production in the United States amounts to about 18-19 trillion cubic feet a year. Arkansas production, before the tapping of the shale, amounted to about 1 percent of the total.