



Posted on Sun, Jan. 16, 2011

Wichita driller hopes new technique opens oil fields

BY DAN VOORHIS

The Wichita Eagle

PEABODY — In a snow-covered field two miles northwest of town, a crew is trying to bring a nearly dead oil field back to life.

The crew is using advanced horizontal drilling technology to bore a hole that will become horizontal at 2,850 feet and run 1,900 feet through subterranean rock five to 10 feet high.

Rarely does drilling in Kansas have to be so precise and expensive. Well owner American Energies of Wichita hopes to increase oil production from an average of 2.2 barrels a day to, in the best case, 60 to 100 barrels a day.

Alan DeGood, president of American, is spending about \$500,000 on the project — more than twice the usual cost of a well in that part of Kansas. But he estimates that if he can push production to 100 barrels of oil a day, he can recoup his investment in four months. Normally, he said, a producer will act if he can make his investment back in 24 months.

But the project is a bit of a science experiment, as well. Kansas Geological Survey geologists are monitoring it closely, and the federal government chipped in with a \$248,000 grant beyond American's contribution to the project. The hope is that the data gathered will help other Kansas producers if they attempt something similar elsewhere.

High oil prices — now about \$80 a barrel for Kansas Common crude — have led to a burgeoning use of new technology and techniques to extract more oil from old fields.

"Oil is not played out in the U.S.," said petroleum market analyst James Williams. "\$30 a barrel oil is played out in the U.S. \$80 a dollar barrel oil is not."

Partly because of such secondary and enhanced techniques, Kansas' oil production has enjoyed a renaissance in the past three years. Production has risen above 39 million barrels the past three years, the highest levels since 1997. Until then Kansas oil production had slowly declined from its peak of 122 million barrels in 1956.

The potential high rewards drew Kevin Murphy of Colorado-based Black Hawk Exploration to lease mineral rights for 2,500 acres of Cowley County. He plans to hire crews to pump a water and chemical mixture called "slickwater" at high pressure down the old wells to fracture the rock in an attempt to free more oil. Companies have found a lot of new oil in Texas and Oklahoma, and they are now working their way north.

"Basically, there's been a new land rush in southern Kansas where major companies have been leasing up land at a prodigious rate," he said.

Thin stratum

The field near Peabody, called the Unger Field, has been in production since 1955. Producers have extracted 8 million to 9 million barrels of oil from the 4-square-mile field in Marion County. As the oil was removed, water filtered underneath it.

American is the only producer working the Unger Field and has 16 wells working. Today, it must pump 100 barrels of fluid out of the ground to get one barrel of oil. The fluid is pumped to a tank to separate the water, which is then pumped back into the ground.

Vertical wells are quicker and less expensive — \$200,000 to \$250,000 for a finished well in that area — but they leave a lot of oil behind, said geologist Doug Davis, who is working with American.

Davis estimates vertical wells draw 10 to 20 percent of the oil out of formations. Using secondary recovery techniques such as pumping water, CO2 or nitrogen under pressure to fracture the rock can double that.

"That gets us to, maybe, 40 percent," Davis said. "The rest of it's still down there. Wouldn't it be good to be able to

get it all out?"

That's where horizontal drilling can come in. Because the bore hole runs horizontally through formations rather than puncturing them, it can create tremendous initial flows, unlocking liquids in gas fields and can even prove less intrusive at the surface, such as drilling for oil below Oklahoma City and gas in shale under Fort Worth.

Steering the bit

At the Unger site, Scott Crosby and John Daniel of Pan American Drilling Services of Oklahoma City sit in a trailer monitoring a screen that tells them in real time where the drill bit is.

But it's not easy to see for a novice. Their screen shows readings of gamma ray emanations, rock porosity and electrical resistance from sensors placed behind the drill bit. The readings reveal what kind of rock the bit is traveling through, so they can steer the bit into the right formation.

Since oil floats on water, the remaining oil migrates to the top of the formation. It's called "attic oil."

As drilling technology has improved, the chances of hitting those formations in Kansas have increased.

The plan is to run the bore hole along the top of the formation, through the oil, and pump it gently to minimize the amount of water drawn in. The goal is to increase the efficiency in pumping from 1 percent oil to 50 to 70 percent.

Davis estimated the well will start producing in two weeks. DeGood said he won't have a good feel for the success of the project for three months to see how it flows over time.

The potential

There has been a lot of disappointment with horizontal drilling in Kansas, said KGS geologist Lynn Watney. Only 8 percent of 238 horizontal wells have been successful.

One of the reasons is because of the thinness of some of the Kansas formations, Watney said. The hope is that the data gathered in the Unger Field will help other geologists understand better how to drill in similar Kansas fields.

On completion, the data will be available on the KGS website. Already, he is lined up to speak at several industry group meetings.

"It opens up a lot of possibilities," Watney said. "It's another tool for oil recovery."

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