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VOLUME 7, NUMBER 4 — 2004
WORLD ENERGY / ENERGY HOUSTON
3300 SOUTH GESSNER, STE. 200
HOUSTON, TEXAS 77063 USA
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A lot has been said recently about the slow and steady decline in North American oil and gas production. Much of this discussion, particularly in the general press, has an "it's all over" tone: Petroleum is dead. We should turn off the lights, lock the door and go home. Hydrogen, wind, biomass or something else will now power our lives.

Nothing could be further from the truth. We lose sight of the fact that the United States remains the world's second-largest oil producer at just under 9 million barrels per day, behind Saudi Arabia and ahead of Russia. Current proved reserve levels should allow us to sustain production near that level for years to come. The U.S. had proved crude reserves of more than 22 billion barrels at the end of 2002 (the most recent statistics available), of which more than half were onshore in the Lower 48 states. The year 2002 marked the fourth year in a row in which American oil producers had more than replaced their production.

For its part, Canada produces more than 2 million barrels per day and has conventional reserves of nearly 4.5 billion barrels. North American natural gas production also remains high with substantial (and still growing) proved reserves. Gas reserve additions have exceeded production in eight of the past nine years.

Obviously, the North American oil and gas industry is far from dead. But it is changing, and changing dramatically. What we see emerging are new types of oil and gas plays. Coal bed methane and tar sands come to mind. But what I believe will prove more important to the long-term vitality of our industry is what some call "resource plays": low-permeability, large-area formations that can be economically developed and exploited using modern technology.

Geology provides us with many such prospects in the United States and Canada. For a few moments, I'd like to take time to look at just one of these, the Maverick Basin, where The Exploration Company (TXCO) has had a successful exploration and development program under way for more than 10 years. I believe TXCO's success in the Maverick Basin provides an example of where the upstream portion of the industry in North America may be headed right now.

The Maverick Basin

The Maverick is a carbonate basin located approximately 200 miles west of the Gulf of Mexico in southwest Texas. It lies along the Rio Grande River in Texas and Mexico's northern state of Coahuila. It is geologically similar to the East Texas Basin but at a smaller scale. It's composed of approximately 20,000 feet of sedimentary rock, including some 15,000 feet of Cretaceous strata overlaying at least 5,000 feet of Jurassic-age sediments.

It's not a new play by any means. Oil and gas production there dates back to the 1920s, and more than 20 Maverick Basin zones have produced oil or gas during the past 75 years. Currently, we're focused on seven of those plays. Past Maverick Basin exploration and development activity was on a small scale with limited results. It has traditionally been a hit-or-miss hydrocarbon province due to complex geology. Thus it has remained remote from other oil provinces and remains underexplored.

The Exploration Company is committed to organic growth via the drillbit, so the Maverick fits our corporate strategy perfectly. What makes the Maverick Basin exciting now, as opposed to 25 or 50 years ago, are the numerous advances in technology. Our ability to employ 3-D seismic and horizontal drilling allows TXCO to profitably develop formations that left old cable-tool drillers with too many dry holes. Technology is the key to what we do.

We first became interested in the basin in the late 1980s because of the Pearsall formation. We believed the advent of horizontal drilling, which occurred around that time, could prove useful in developing this blanket, gas-bearing formation that lies throughout the basin. Our approach was similar to the horizontal drilling that brought a boom in drilling to the Austin Chalk in southern and central Texas and recently in the Barnett shale in northern Texas.

A Texas Record

What first caught our attention about the Pearsall was that the highest absolute open flow ever achieved by a Texas gas well, an astounding 265 million cubic feet per day, came from the Pearsall in the Maverick Basin in 1979. But true to the hit-or-miss form of the basin, the operator could not repeat that spectacular success and moved on.

We got really excited about the basin's potential in 1993 when we applied the emerging technique of three-dimensional seismic to a portion of our acreage. It clearly revealed scores of small patch reefs in the Glen Rose formation. These reefs had been discovered decades ago but, before 3-D seismic, drillers were flying blind. One well would hit a reef and prove a good gas producer. But the next well over was a dry hole. Without the advanced imaging ability of 3-D seismic, there was no way to reliably predict reef locations. Early operators ended up drilling so many dry holes that they gave up. Technology made the difference, turning the reefs into a dependable producer.

Solving Riddles

We haven't solved all of the Maverick Basin's riddles. For example, interpretation of 3-D seismic identified what we first believed to be more reefs across the southern portion of our lease block. But when we drilled the first well into one of these prospects in 2002, we found something entirely different: an oil-saturated zone geologically unlike the gas-prone Glen Rose reefs. This was the first of our Glen Rose porosity wells, which flowed as much as 5,000 barrels of oil per day.

The challenge faced by TXCO and its partners was how to recover the maximum amount of oil while minimizing water intrusion.

Obviously, we had something. But what? The geology has proved a challenge. We learned the porous structure is highly fractured with a strong water flow through the fractures from a separate, lower zone. The challenge faced by TXCO and its partners was how to recover the maximum amount of oil while minimizing water intrusion.

Technology, once again, is making the difference. Horizontal drilling parallel to fractures identified by 3-D seismic interpretation appears to provide the opportunity to maximize oil recovery. We've drilled only 29 wells to date on a feature that stretches for over 20 miles. Although we're learning more with each well we drill, we've profitably produced more than 1.6 million barrels of 40-gravity crude.

The Glen Rose is not unique. Technology has changed another hit-or-miss play above it, the overlying Georgetown, into a repeatable success. This formation is so fractured and faulted that a 3-D image looks like a broken windshield. Coherency processing of 3-D seismic allows us to spot these fractures. Then, horizontal drilling allows us to penetrate one or more of the gas-bearing fractures on a repeatable basis. That has allowed TXCO to turn yet another basin formation with a 50-50 success record into a dependable, repeatable success. We've completed 15 of 16 wells drilled on the southern portion of our lease block, where the Georgetown is gas prone, since we first employed the coherency processing technique in late 2003. And we project that the Georgetown will keep us busy for many more years. To date, we've identified about 300 potential drilling locations alone, just on this one portion of our 554,000-acre block.

Coal Bed Methane

There's more to the story: The basin offers the only coal bed methane (CBM) play found to date in Texas. Virtually all coal beds in Texas are lignite, which doesn't lend itself to commercial degasification. But the basin's shallow-lying Olmos coal is a more typical bituminous and has been mined in both the United States and Mexico for more than 100 years. The name of the Mexican border city near our acreage block, Piedras Negras, translates as "black rocks," and it remains a center of that nation's coal-mining industry. Mining of Olmos coal on the U.S. side of the border, where it is buried deeper, trailed off after World War II.

Technology has changed a bypassed and overlooked oil and gas province into an exciting and profitable new play.

We stumbled on this CBM play several years ago when a former official of Petróleos Mexicanos dropped by our office for a visit. He happened to mention how Pemex had to drill wells to vent gas from Mexican coal mines located just across the border from our operating area. A light bulb clicked on in the heads of several TXCO engineers.

We soon began a coal gas desorption pilot project in conjunction with the United States Geological Survey. The project is still young and is far from its potential. However, we're optimistic that the basin's coal seam could eventually prove just as successful as CBM projects found elsewhere in North America.

Then there's the Jurassic, which has been a reliable oil and gas producer for years in East Texas, Louisiana and elsewhere around the Gulf of Mexico. But it had never even been drilled in the Maverick Basin. Some of the majors, beginning in the 1950s, came in and drilled wildcat wells targeting the Jurassic. All stopped short before reaching it. The Jurassic lies below 15,000 feet in the Maverick Basin, and the limited abilities of 2-D seismic and magnetics available at the time left them unsure of just where they were headed.

Again, technology changed things. The Exploration Company and a partner spudded the first well to reach the Jurassic in 2003. Testing in early 2004 found high-Btu natural gas present but in uncommercial quantities. We're excited about what that well found, and we plan to start a second Jurassic well shortly. We are hopeful that it will prove to be as prolific as the Cotton Valley, Smackover and other Jurassic-age formations have proved elsewhere.

Technology Made the Difference

There are more examples I could give, but I believe my point is made: Technology has changed a bypassed and overlooked oil and gas province into an exciting and profitable new play. The Exploration Company has prospered and grown by applying that technology. Our proved reserves have grown from 6.9 billion cubic feet of gas equivalent (Bcfe) just five years ago to 34.1 Bcfe today, a compound annual growth rate of more than 37 percent. Virtually all of that growth has come with the drillbit, not acquisitions. And we've hardly scratched the surface. We have identified a growing, multi-year drilling inventory of more than 1,500 locations, and counting.

While the story of the Maverick Basin may be unusual, it is certainly not unique. Technology is making other passed-over areas on this continent worth reconsideration. I suspect many of them also will yield hydrocarbons that couldn't be found or economically produced previously.

Oil and gas are, and will be for the foreseeable future, the two most important energy sources to power the dynamic economies of the United States and Canada. And yes, the bulk of that oil and gas consumed in North America will be produced in North America for a long time to come. Let's assume for a moment that the annual production of oil in the United States falls into a perfect bell curve. If production began in 1859 and peaked in 1970, then we have roughly another 75 years to go before that last oil well goes off production. I suspect, however, it will be far longer than that. Technological progress has taken us far past the witching sticks and creekology of the industry pioneers, then past what was accomplished by early scientific techniques.

I have no doubt that North America will have a robust oil and gas business for many years to come, and that its continued success will be based on technology that does not exist today. ■

James E. Sigmon has been active in the exploration and production business for more than 30 years. He serves as president and chief executive officer of The Exploration Company, an independent exploration and production firm based in San Antonio, Texas. Prior to joining TXCO in 1984, Mr. Sigmon served for six years in senior management positions for private oil and gas companies active in southern Texas. Earlier, he was with Halliburton Energy Services, working on a variety of projects in the Permian Basin of West Texas and New Mexico. Mr. Sigmon earned a bachelor of science degree in electrical engineering from the University of Texas at Arlington in 1971.