Retrenching and Rethinking

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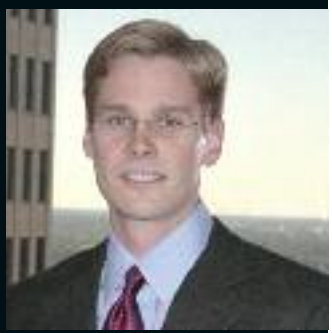

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Over the past several years, the oil and gas industry has experienced a mass entrance into resource plays. In my view, too many companies have operated with a land-grab mentality, paying little attention to the technical merits and risked economics, as well as the massive capital and human resource requirements needed to properly execute on their acquired acreage. Record amounts of capital have been invested in acreage at record prices under ultra-aggressive lease terms. At the same time, investors were practically giving away equity and debt to these companies to invest in resource plays and record commodity prices super-charged corporate cash flows. Greed won; fear lost.

My biggest concern is that with the precipitous fall in commodity prices, coupled with the fact that the capital markets are in a global ice age, the tide has now gone out and exposed a naked king.

The industry is now facing a looming crisis of staggering proportions due to several factors. It doesn't have near enough people with the proper experience to execute all the resource plays that have been leased. The clock on lease expirations is ticking, and many companies will lose substantial portions of their land holdings. Many resource plays, if economic at all (which many are not), are not economic at current commodity prices. And, most companies do not have the capital available to carry out their business plans.

The solution is not easy or clear, but probably involves the following: a significant consolidation of the current players as scale and human capital are huge competitive advantages; a renewed discipline by management teams and investors to high-grade opportunities based on technical and operational merits as well as full-cycle economics; and the injection of private equity into the system in creative ways in order to bridge the financing gap. ■

HORIZONTAL OIL PLAYS

The newest and most unusual of the resource endeavors in the forefront of activity are the oily horizontal shale plays.

Recently, the U.S. Geological Survey estimated the Williston Basin's Bakken formation contains mean undiscovered volumes of 3.65 billion bbl of oil, 1.85 Tcf of gas and 148 million bbl of natural gas liquids. These are technically recoverable volumes, spread across a resource covering some 25,000 sq miles (64,750 sq km) of western North Dakota and eastern Montana.

The Bakken is booming: more than 60 rigs are at work on the North Dakota side of the play. Two areas are under scrutiny: the eastern expulsion area, centered on Parshall and Sanish fields in Mountrail County, and to the Nesson Anticline to the west.

Operators are legion: Brigham Exploration Co., ConocoPhillips, Continental Resources, EOG Resources, Hess Corp., Marathon and Whiting Petroleum are among the active drillers.

Bakken wells are drilled vertically to some 10,000ft (3,050m) and laterally to lengths between 5,000ft (1,525m) and 9,000ft (2,745m). They are stimulated along the laterals with multiple frac stages. Per-well costs run about $5.5 million, and recoveries can be as much as 900,000 barrels of oil equivalent (BOE).

Although the Bakken is thought of as a shale play, the reservoirs are actually dolomitic siltstones and silty dolomites in the Middle Bakken. The low-permeability, clastic and carbonate interval is sandwiched between rich, black shales.

Nonetheless, success in the Bakken has led to a fresh look at other oil-prone shales. Three sister plays are in development: Barnett Shale in the oil window in Texas' Fort Worth Basin; Cane Creek shales and clastics in Utah's Paradox Basin; and Niobrara shales in Colorado's North Park Basin. All use horizontal drilling and are in early stages of exploitation.

EOG Resources is active in the Texas and Colorado plays, and Fidelity Exploration & Production works Utah's Cane Creek.

ENHANCED RECOVERIES

Interest in enhanced oil recovery (EOR) has skyrocketed. Today's growing national awareness of climate change has thrust carbon dioxide (CO_2) recovery and sequestration technologies to the forefront.

According to an assessment of U.S. oil resources by Advanced Resources International for the U.S. Department of Energy, more than a trillion bbl of undeveloped domestic oil resources are still in the ground. The application of EOR technology could add 240 billion bbl to U.S. potentially recoverable oil resources.

At present, some 680,000 b/d of oil are pumped from EOR projects in the United States; that's a decline from 1992, when 761,000 b/d were made. The drop comes from the decline in oil produced from thermal methods, which has fallen from 480,000 b/d in 1986 to about 300,000 daily in 2006.

In 2006, miscible CO_2 production volumes surpassed thermal yields to reach 348,000 b/d. According to the National Petroleum Council, CO_2 floods have the potential to eventually recover 89 billion BOE.

Miscible CO_2 projects include Colorado's Rangely Field operated by Chevron; Wyoming's Salt Creek operated by Anadarko Petroleum; and SACROC Unit operated by Kinder Morgan. The most productive miscible CO_2 flood is Occidental Petroleum's Wasson Denver Unit in West Texas.

On a smaller scale, chemical and microbial methods are enjoying new attention. A method gaining traction is low-salinity waterflooding. After a conventional secondary flood with high-salinity waters, companies are experimenting with a tertiary phase of low-salinity water injection. Early results indicate recovery factors can be improved.

So, while U.S. natural-gas production will grow steadily on the backs of shale and tight-gas reservoirs, a reversal in the downward trend of oil production will not occur. Still, such plays as the Bakken and a proliferation of EOR efforts will help shallow crude's decline.

Overall, the future of oil and gas E&P in the onshore United States is solid, despite the nation's recent economic stresses. ■