The Emerging Renaissance in U.S. Oil Recoveries

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Improving performance of horizontal oil wells in the Bakken Formation in the Williston Basin of North Dakota and increasing oil prices were springboards to launch a dramatic shift in industry's focus from natural gas to oil. Over the last two years as much as 50 Bboe of potentially recoverable oil resource has been identified in a range of self sourced and tight oil reservoirs that span the major North American oil producing provinces. The magnitude of the shift is characterized by statistics:

U.S. oil directed rigs exceeded gas directed rigs for the first time in 18 years
Horizontal drilling exceeded vertical well drilling
U.S. oil production increased for the first time in 24 years
Annual Rocky Mountain oil production increased by 182,000 b/d since 2003

Three general play types characterize the shift toward tight oil.

High oil prices stimulated a shift toward the liquids rich areas of shale gas plays that eventually migrated from wet gas windows into oil windows. The Barnett Combo oil play, the Eagle Ford wet gas and oil window compartments and the recent shift of Granite Wash drilling into oil and liquids dominant compartments are examples.
Success in the Bakken shale – a package of oil rich source rocks and interbedded porous reservoir rocks – has stimulated projects in similar self sourced plays like the Niobrara in the DJ Basin, Heath shale in Montana, Bone Spring in the Permian Basin, the Lower Tuscaloosa in Louisiana, the Collingwood shale in Michigan, Mon-

terey formation in California, Utica shale in Ohio and the Cardium in Alberta.

Horizontal wells and / or multi-stage fracs also are establishing economic recoveries from a spectrum of tight oil reservoirs ranging from thick mature tight sands like the Spraberry – Wolfcamp in the Permian Basin and Wasatch in the Uinta Basin as well as tight carbonates like the Mississippi lime in north central Oklahoma and the San Andres and Clearfork in the Permian Basin.

The oil rich Permian Basin is a hot spot for tight oil developments. The Permian Basin rig count jumped from 68 during June 2009 to 357 by June 2011. The stakes are substantial. One operator estimated that modern Spraberry multi-staged completions could yield 9 billion barrels of recoverable oil. Another noted that the industry is pursuing virtually every reservoir that could yield oil from horizontal wells. Horizontal wells could boost recoveries by 10 to 15 percent from mature reservoirs. Initial potential tests of horizontal wells in the Brushy Canyon, Delaware, Bone Spring and Wolfcamp average more than 400 boe/d and promising results also have been reported for the San Andreas and Clearfork.

The surge in successful oil tests is the leading edge of a renaissance in U.S. tight oil developments. A high case oil supply scenario suggests that U.S. tight oil plays might generate as much as 3 MMb/d in new oil production by 2020. Studies also determined that 1 MMbo/d of new production could generate about 500,000 jobs and $76 billion in annual GDP while offsetting this amount in the balance of payments. The renaissance in tight oil could contribute possible game benefits to the petroleum industry and the U.S. economy.