

## Oil, Water and Huge Pumps

The Hunton dewatering play in Oklahoma attracts new interest.

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Oil is the ticket these days, and an unconventional oil play that's attracting revived interest is the so-called Hunton dewatering play. The concept has been around for years—the Oklahoma Geological Survey reports that some 1,000 wells have been drilled in the Sooner State in Hunton/Misener reservoirs since 2000.

Oklahoma operators have been particularly active in dewatering ventures, led by Tulsa-based New Dominion LLC. “If you think conventionally, water is your enemy. If you think unconventionally, water is your friend,” says David Chernicky, president and chief executive. The company targets Hunton, Arbuckle and Cleveland reservoirs, mainly in central Oklahoma.

Chernicky has been working in dewatering for 26 years. “Dewatering is more like mining than traditional oil production. Dewatering is all about infrastructure and economies of scale,” he says.

The theory of dewatering is simple. High-quality reservoirs exhibit classic three-phase gravity separation, with gas, oil and water stacked one on another. Recovery factors are robust and traditional production methods work beautifully.

Low-quality reservoirs, however, are often a mishmash of facies, and their oil, gas and saltwater are distributed in various concentrations throughout. It's these heterogeneous, difficult reservoirs that are preferred targets of dewatering ventures.

As it happens, horizontal wells are particularly good at dewatering dual-porosity oil reservoirs, because of their ability to contact so much rock. In dual-porosity reservoirs, water preferentially flows through high-porosity pathways, while less mobile oil gets stuck in small and isolated pores. When high-capacity pumps are installed, reservoir pressures drop over time and the associated gas can expand and push trapped oil toward the wellbore.

Naturally, actual operations are considerably more complicated.

“You need scale—abundant power, substantial gas gathering and processing facilities and high-volume water disposal infrastructure,” says Chernicky. “And you need to drill enough wells. It's a very large-scale endeavor.”

And, unlike traditional oil operations, flush production will be mostly water. These wells have present-value challenges, so investors have to be patient and savvy and wait out initial dewatering periods.

An individual well may make 4,500 barrels of water per day when it's placed on pump; daily oil volume might be 50 barrels along with 200,000 cubic feet of gas. A year later, the same well might make 1,500 barrels of water, 40 barrels of oil and 1 million cubic feet of gas a day. The product mix skews toward

liquids, as gas produced during dewatering tends to be extremely rich.

Additionally, lots of wells are needed because dewatering is not a one-off venture. Banks of wells pumping together work best to create the pressure drop essential to economic production.

Typically, wells are drilled on one-section spacing and feature one to five laterals that are completed open hole with no stimulation. Submersible pumps are used until water rates drop below 400 barrels a day, and then wells are shifted to beam pumps.

It's a margin business, and New Dominion works diligently to reduce costs and increase efficiencies. Last year, it slashed completed well costs by 20% and overall costs by 25%.

At present, New Dominion is running two rigs in Oklahoma. It plans to spend \$130 million this year on its projects.

Since 2002, when New Dominion adopted its existing structure, the company has grown annual net production 24% per year, from some 2.5 billion cubic feet equivalent (Bcfe) to nearly 9 Bcfe. It operates more than 250 wells and mans field offices in Oklahoma City and Prague, Oklahoma.

"Instead of looking for individual fields, I invest in infrastructure," says Chernicky. "The only variables in dewatering are the cost of services and the price of the product. The geologic risk is less than 10%, because we are working in areas with long drilling histories and lots of data."

Without doubt, Chernicky believes that lots of reservoirs across the Patch could respond to dewatering. "We know that dewatering techniques work in Oklahoma, and we think that they will work in many additional areas."