

A dash of saltwater could make fracturing more palatable

By Ryan Holeywell, Houston Chronicle

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HOUSTON — In a part of Texas where freshwater is especially precious, some oil and gas producers are learning to do without it in their hydraulic fracturing.

It's a dramatic advance, considering that fracturing — a big part of the technology behind the country's domestic energy boom — also requires about 2.5 million gallons of water per well, by some estimates, and takes a toll on water resources.

Houston-based Apache Corp. and others are turning to brackish water — slightly salty and unfit for consumption — and other alternatives to freshwater as they try to figure out a different way to fracture.

“I think in areas where we have a lot of concentrated activity, it will become the norm,” said Cal Cooper, Apache's director of emerging technology.

Apache hasn't used freshwater for its fracturing in Irion County, in the heart of West Texas' Permian Basin, since it started drilling there in 2012.

For a water-intensive industry, it's a major feat: Apache has drilled 109 wells in Irion County — all of which required fracturing — and has plans for more in 2014. “It's probably some of the most concentrated drilling that we have going on in Apache,” Cooper said.

Hydraulic fracturing is a well completion process that involves injecting water, sand and chemicals under high pressure into a reservoir to free oil and gas from tight rocks.

In Irion County fracturing last year, Apache used 10 million barrels of brackish water and another 3.1 million barrels of what the industry calls produced water, which emerges from wells along with oil and gas.

The technique has reduced Apache's use of freshwater in the dry region, and it also makes financial sense, since trucking in freshwater is costly, and produced water has to be disposed of if it isn't recycled. "It's really driven by availability and economics," Cooper said. "Contrary to what people imagine, West Texas is afloat in brackish water."

Apache Corp.

Houston-based Apache Corp. treats water that emerges from wells along with oil and gas and then recycles it for use in hydraulic fracturing of Wolfcamp Shale wells in Irion County.

Brackish water comes from underground aquifers, often much deeper than freshwater.

Today, Apache is among a number of energy producers and services companies experimenting with fracturing that doesn't require freshwater. They're being driven by the high cost of using and transporting freshwater, as well as increased pressure from critics who complain the water-intensive industry is exacerbating water scarcity.

Earlier this year, a report from Ceres, a Boston-based investor group that focuses on the environment, found that 28 percent of wells in the Eagle Ford of South Texas were in areas considered under "high" or "extreme" water stress.

In the Permian Basin, 87 percent of wells were in such areas.

The energy industry accounts for less than 1 percent of statewide water use, according to a 2012 study by the Texas Water Development Board, but the rate is higher in some parts of the state, and fracturing is increasing.

Peter Galusky, a consulting engineer who works with exploration and production companies on water sourcing, said the industry historically has preferred hydraulic fracturing with freshwater because it was comparatively cheap and easy.

Other sources

Today, they're experimenting with other sources of water. These include flowback, a portion of the liquid used in fracturing that comes up out of the well in the immediate aftermath of the process; produced water, which

emerges at the wellhead along with oil and gas; and brackish water, found in underground aquifers, often much deeper than freshwater.

J.P. Nicot, a research scientist with the Bureau of Economic Geology at the University of Texas, said brackish water is the most promising of the three because it's less complicated than recycling water that comes from existing oil wells.

Still, he cautions, brackish water isn't a silver bullet. Some small towns are considering desalinating brackish water for consumption, which would put the industry in competition with residents.

And brackish water isn't always easily accessible, Nicot said.

But it appears to hold promise. John Tintera, president of the Texas Water Recycling Association, said his organization doesn't track the number of companies that are using brackish or recycled water for fracturing.

Anecdotally, however, it appears more companies are experimenting with the technology, said Tintera, a former executive director of the Texas Railroad Commission, which regulates the oil and gas industry in Texas.

He said companies are exploring the technology because they see potential cost savings and because they want to be good neighbors. "I think there's a growing recognition that, in all industries, everybody needs to play a role to avoid over-competition for what is, at this time, a limited resource," Tintera said.

Two approaches

Companies are trying at least two approaches as they seek substitutes for freshwater fracturing.

One technique treats the alternative water to reduce substances in it that might interfere with fracturing chemicals.

Another tweaks the fracturing chemicals themselves so they work in liquids other than freshwater, said Walter Dale, strategic business manager for water solutions at Halliburton.

Meanwhile, state officials are working to support the industry in the search for freshwater alternatives.

State regulations that took effect in 2013 eliminated some of the special permit requirements for using recycled and brackish water, Tintera said. Meanwhile, the Texas Water Development Board is collecting data on underground brackish water reservoirs to share with the energy industry and municipalities, said Robert Mace, the agency's deputy executive administrator.

He said the agency typically has focused its limited resources on freshwater, but sees growing value in information on brackish water too.

“In the old days, if you drilled a water well and you came up with salt water, it was a bad day,” Mace said. “These days, folks are pretty interested in that as a potential water supply.”

The board is using well logs that drillers file with the Texas Railroad Commission to try to piece together information on brackish aquifers that until now mostly have been ignored.

But companies often are reluctant to elaborate on the basic data they file in the well logs because information on underground water can provide a competitive edge.

Environmental groups

The brackish water push creates a dilemma for environmental groups that criticize the energy industry's water consumption.

While the use of salty or recycled water reduces the use of freshwater per well, it also facilitates hydraulic fracturing, which many environmentalists oppose as a pollution threat and because it produces fossil fuels that emit greenhouse gases.

Luke Metzger, director of Environment Texas, said use of non-freshwater can reduce hydraulic fracturing's impact. But he contends that the industry's efforts so far seem more about public relations than seriously addressing the issue of water consumption.

Whether use of the technology grows probably comes down to whether it saves money.

“We are driven by economy over anything else,” said Cooper of Apache. Producers say the technology has the most economic potential in areas of concentrated production where freshwater is scarce and shipping it in is costly.

“It's not a big money maker,” Cooper says, even in dry Irion County. “We're not losing money either.”

Galusky, the consulting engineer, said the technology won't become widespread until water shortages pinch energy producers. “Operators who have access to plentiful freshwater, they're not yet under as much pressure to recycle flowback or treat brackish or saline waters until they hit the wall,” Galusky says. “That wall is coming. There's not an infinite supply of freshwater.”

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