



Well Enhancement Services, LLC

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WES employs flexible hose to blast production laterals in US

Water jets send wells sideways...

By Upstream staff

A patented water jetting technology aims to blast horizontal drilling as a quicker and cost-effective alternative for boosting oil and gas recovery in new and existing wells, writes Anthony Guegel.

Production can be increased as much as tenfold from the use of water jetting, according to Well Enhancement Services (WES), headquartered in The Woodlands, Texas.

The company calls the technology Radial Jet Enhancement (RJE), a method for jetting laterals from the wellbore into the formation.

The first step is to go in the well with an elbow or deflector shoe made up to the well tubing string.

Next, a drillbit powered by a mud motor is lowered into the wellbore to cut a pilot hole measuring around one inch in diameter into the casing for the insertion of the jetting nozzle.

Once the hole is milled, the jetting nozzle affixed to the end of a high-pressure, flexible rubber hose is inserted to blast water into the formation at a pressure ranging anywhere from 3000 psi to a maximum 6000 psi.

Backward facing jets propel the nozzle, widening the hole as it blasts a lateral out to 300 feet from the wellbore, a limit due to the length of the rubber hoses.

Sheathed in Kevlar for extra strength, the hoses on WES' s coiled tubing units come in lengths of 350 feet.

"Longer laterals have been done with longer hoses but at some point the frictional forces will overcome the propulsion forces and you end up stopping," says Stephen Bowen, executive vice president and director of marketing and administration. The jetting process goes through four gallons a minute and ultimately consumes around 600 gallons of water or more, penetrating through most rock types at roughly 50 feet per minute.

"Generally we ask the operator to budget for about 300 gallons per lateral, and that' s mostly going to be consumed by the mud motor to mill out the window. The actual jetting uses a lot less," says Bowen.

"We have also jetted with diesel fuel for highly water-sensitive formations," he adds.

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Well Enhancement Services, LLC

WES has jetted laterals at a vertical depth of some 5000 feet, a mechanical limit of its three existing coiled tubing units.

The technology, however, has been deployed to 9000 feet of total depth outside the US, particularly in South America and Indonesia.

"We could go deeper. We would just have to build the equipment," says Bowen.

A horizontal lateral can be drilled at much greater distances, but at higher cost and increased time than RJE, leading to WES's claims of a cost advantage.

Bowen says Radial Jet Enhancement can jet four laterals in two days, from rig-up to demobilisation, and at a total cost of \$25,000 to \$30,000.

"That is one of the reasons why it is faster and cheaper than a traditional horizontal drilling job," he explains.

"That procedure (horizontal drilling) is a lot more expensive and takes a lot longer. But, of course, you can drill 1000 feet in one direction with a traditional horizontal job."

Ideal candidates for this application are wells that have damage near the wellbore or are simply in need of workover to boost production.

It also does not make a difference whether the well is an oil or gas producer, says Bowen: "Any well where you need to improve the conductivity to the wellbore."

According to the company, RJE works well in a variety of lithology types, including limestone, sandstone and dolomite reservoirs.

WES has worked on about 25 to 30 wells so far since it introduced its brand of technology last year.

The first well was tested in January 2005 in the Austin Chalk near Luling, Texas. The company has trained crews ready to go with its coiled tubing units.

It has not licensed the technology, preferring instead to enter into joint ventures with potential users.

"We'd be happy to talk to people," Bowen says.