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PLUS

OUR ANNUAL COMPILATION OF INTERESTING INNOVATIONS TO CUT COSTS AND IMPROVE PRODUCTIVITY

NOTLEY'S GAMBLE

ALBERTA IS BETTING RENEWABLE ENERGY CAN MAKE UP 30 PER CENT OF ITS POWER SUPPLY BY 2030. THE EXPERIENCES OF OTHER JURISDICTIONS COULD HELP LOWER THE ODDS OF FAILURE.

SHOCKING INNOVATION

Blue Spark's WASP offers efficient production boost

BY **CARTER HAYDU**

Wireline Applied Stimulation Pulse (WASP) technology can convert, compress and discharge electrical energy as high-powered hydraulic pulses that improve connectivity between the wellbore and reservoir by more than 200 per cent—an electrifying opportunity for oil and gas producers to cut costs and improve productivity.

"We use an electrical storage mechanism. We store up energy inside it, and then in a very brief period of time, we drain that energy, which creates that powerful conversion," says **TODD PARKER**, chief executive officer at Blue Spark Energy. "In physics, power is equal to energy over time. If you use a fixed amount of energy and make the time incredibly brief in which you use it all, you get a big power amplification."

He adds that WASP costs in the order of 20 to 30 per cent of what a company would pay to otherwise remediate on a basic conventional well in Canada.

"Our technique with our proprietary energy conversion—or time conversion—process suddenly changes the range of application our technology works on. You don't need to find the sweet spot or the niche. Because our pulses are so powerful and because we can do this hundreds, if not thousands, of times in the wellbore it means that we can break through far more problems than can traditional methods," says Parker.

Every pulse uses the same electrical energy as is found in a tablespoon of orange juice, yet WASP creates a 250-megawatt pulse at the bottom of the well, says Parker. That repeated pulsing is what allows Blue Spark to dislodge or remove the debris blocking the wellbore. "Mechanically, we are used to that power amplification, and we have now devised a way of doing that electronically," he explains.

A research facility in France that was developing this technology for application in the mining sector to locate deep ore bodies first drew Parker's attention to the method. He realized such a highly efficient way of transmitting power to interact with the rock face and make it give up hydrocarbons could be very beneficial and far cheaper and less environmentally taxing than using chemical, explosive or mechanical methods.

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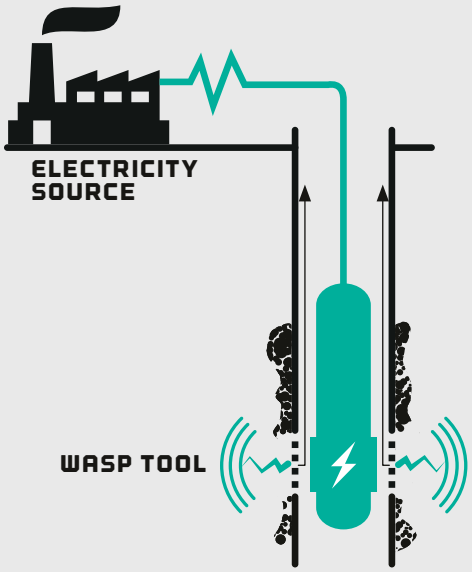
— **Todd Parker**, chief executive officer, Blue Spark Energy

PHOTO: BLUE SPARK ENERGY



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WHERE THE WASP WORKS

New wells: Reduces formation damage caused by well construction activities such as drilling, cementing and perforating.

Producing wells: Clears blockages in completion equipment and perforations as an alternative to ongoing maintenance of marginal wells.

Injection wells: Increases injectivity and reduces injection pressure.

Chemical treatment: Improves effectiveness of chemical treatments by increasing the contact area within the targeted zone.

Scale removal: Removes insoluble scale from both upper and lower completion equipment.

Open hole: Generates radial fractures independent of in situ stress.

"This technology just seemed to be so eloquent. I could trickle small amounts of energy down the wellbore and create these high-power effects exactly where I wanted them and not subject any surface or people to any kind of harm or risk," Parker says.

In January 2011, Parker left his role as vice-president of the Canadian region at Weatherford International to start up Blue Spark. By August of that year he had prototype equipment and a customer. "We went out into the field and started doing our well trials, and we saw right out of the gate that we could initiate production in wells that were blocked—and to some extent blocked to the point where people were willing to abandon them."

Blockage or debris builds up close to the wellbore, sort of like how dirt shows up at the drain in a bathtub.

"What we thought would be of value and of interest to the industry would be something with a very safe, low-level environmental impact and, ultimately, something that was really quite effective in being able to break through or dislodge that ring of debris around the bottom of the oil well, allowing it to again flow economically," Parker says.

In order to dislodge blockages and enable path flows, alternatives to WASP include acids, chemicals or solvents, or possibly explosives, Parker says. These methods not only require more equipment, transportation and manpower, but also carry a certain degree of environmental and safety risk that implies an additional cost. This does not apply to the Blue Spark method.

"There is a very small energy footprint, but because of the nature of the technology, in the sense it is dealing with low amounts of energy, this means that when it goes in the wellbore, the worst thing that could possibly happen is nothing," he adds.

Journey Energy had an injector well in southern Alberta with injection rates that suddenly dropped 80 per cent as the injection pressure tripled. The client stimulated the well through tubing with the Blue Spark tool, and there was an immediate increase in injection rates and injection pressure reduction. Six months later, the well injected at between 60 and 90 bbls/d and at 4,200 kilopascals of pressure.

"I was impressed with how the tool performed and am pleased with being able to stimulate the wells without the expense of a service rig," **RICHARD TRACY**, production engineer at Journey, states in a Blue Spark case study.

With a team of production engineers and petrophysicists, Blue Spark's ongoing research program continuously improves WASP, ensuring it lasts longer, fails less and is more powerful for a broader range of applications. The team is also making the technology smaller so it can fit into more wellbores, and making the technology pulse faster, so the time it takes to go into a wellbore and treat problems is shorter.