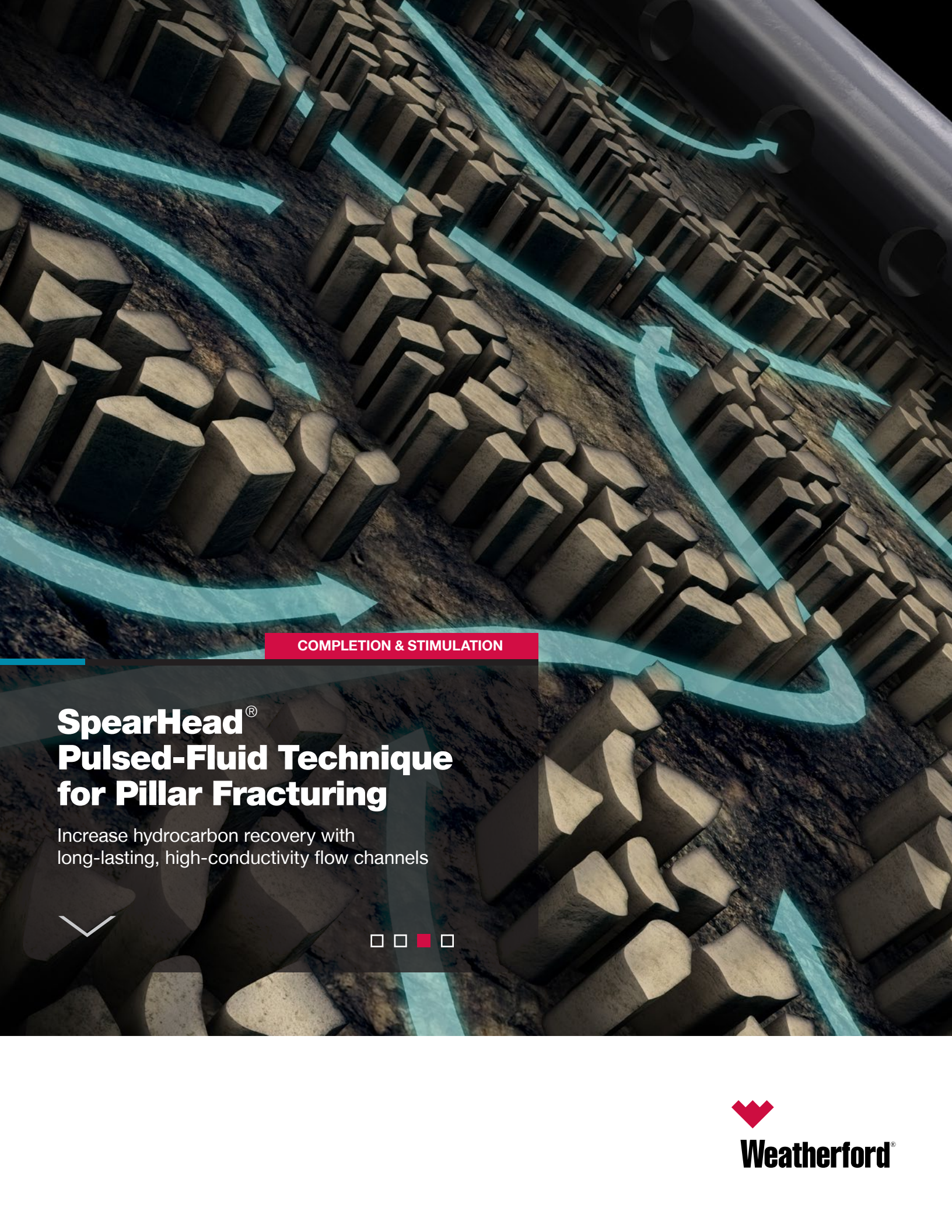




COMPLETION & STIMULATION

SpearHead[®] **Pulsed-Fluid Technique** **for Pillar Fracturing**

Increase hydrocarbon recovery with
long-lasting, high-conductivity flow channels



Create flow channels that stay open longer.

Compared to conventional fracturing techniques, pillar fracturing creates more stable, highly conductive flow channels that enable you to increase production rates and lower material costs. The problem with most pillar-fracturing systems is that these benefits are too short-lived to be fully realized. In many cases, the fractures close prematurely—sometimes within just a few months.

Weatherford SpearHead technology forms more permeable, durable, and long-lasting fractures. Using our proprietary pulsed-fluid technique in combination with our chemical treatment to enhance proppant agglomeration and sustain pillar cohesion, we create fractures that stay open significantly longer than fractures created by other systems. It's just another way that we help you get more out of your assets while improving field economics.

How the SpearHead Technique Works

The pillars are created by pumping waves of proppant and fluid downhole in a series of timed pulses—the frequency of which is dictated by formation geomechanical properties, perforation strategy, pumping rate, fluid, and proppant type. This process helps to produce fractures with consistent layers of agglomerated proppant and fracturing fluid. The fracturing fluid flows back while the proppant clusters—which take the form of pillars or islands—remain firmly in place to hold fractures open for long-term, maximum reservoir drainage.

The Science Behind Effective Proppant Agglomeration

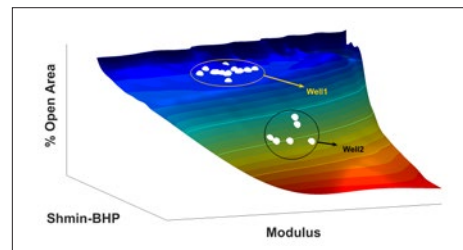
The longevity of our proppant clusters is the result of our unique, environmentally safe surface-modification agent (SMA), which dramatically improves proppant agglomeration. A key addition to the proppant pumped downhole, our SMA helps to bind particles together while reducing proppant embedment and providing more even treatment coverage. This improves the stability and crush-resistance of the proppant pack. As a result, the SpearHead system enables you to use less proppant and water during fracturing, which helps reduce your material costs.

When applied to the proppant, the SMA coats the proppant surface and stops movement between the particles. Then, the particles bind together into long-lasting clusters that hold fractures open and create a highly conductive channel for hydrocarbons to flow freely through the fracture path to the wellbore. Additionally, the hydrocarbons that flow through the chemically treated clusters tend to have reduced water and sand content.

Comprehensive Pillar-Fracturing Services

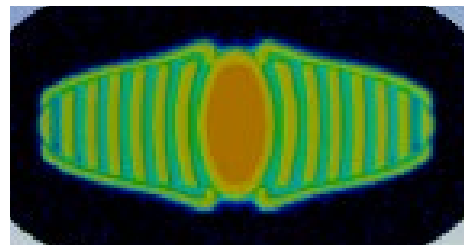
Candidate Selection*

Using our prescreening process—including geomechanics and flow modeling, fracture conductivity mapping, risk assessments, and production forecasting—we analyze your formation to help you decide whether pillar fracturing is the right stimulation method for your reservoir.



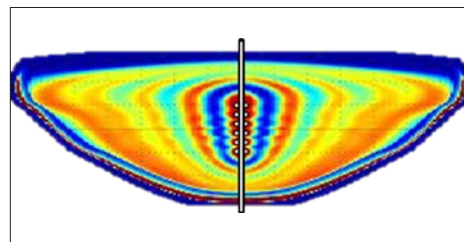
Fracture Design*

Following our unique workflow, we customize each SpearHead treatment—including perforation, proppant, pulse and rate, and bottomhole pressure design—according to your formation data for maximum effectiveness.



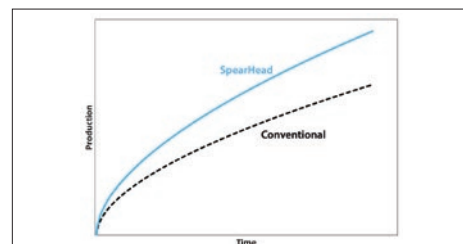
Execution

We combine our surface pumping equipment and specialized blender software—which automatically controls the pulsing of proppant and fluid—with a proprietary additive that promotes proppant agglomeration.



Post-Fracture Evaluation

After each fracturing interval, we study the stability and conductivity of the pillars so you can be confident they will last as long as possible to yield a high-volume hydrocarbon flow. We also monitor production response and wellhead pressure on an ongoing basis to prevent premature closure.



Engineering Support – Provided with all services above.

* **Weatherford FracAdvisor™ Service** – We provide near-real-time, expert guidance for enhanced fracture design. By combining petrophysical and geomechanical analysis, our FracAdvisor service reduces reservoir uncertainty, optimizes completions, and improves production.

More production

**~25%
less fresh water**

**~25 to 40%
less use of proppant**

Compared to conventional fracturing techniques

Keep your fractures open longer with the Weatherford SpearHead® pulsed-fluid technique for pillar-fracturing operations. Our full range of services covers each operational phase, from formation analysis to post-fracture evaluation, and it can help you get more out of your reservoir while reducing material requirements, intervention, and costs. For more information, visit weatherford.force.com/cpp and request that a Weatherford representative contact you, or visit weatherford.com/fracture



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