



## AlfaVap recycles 80% of fracking flowback water and cuts oilfield water costs by 24%

Fountain Quail Energy Services, Texas, United States

Case story



The Alfa Laval AlfaVap helps a major U.S. shale gas producer recycle water used to extract shale gas.

A major U.S. shale gas producer teamed up with oilfield water management services company Fountain Quail to make hydraulic fracturing (or fracking for short) at the Barnett Shale gas play economically viable. The challenge? Water scarcity and water costs. Huge volumes of freshwater are forced into gas wells under enormous pressure to create fissures in the shale, which allow trapped gas to flow into the well bore and upward to surface. The core of the solution: a tailor-made Alfa Laval AlfaVap heat exchanger, which recycled up to 80% of flowback water, delivered up to 24% in water savings, and made fracking more sustainable.

For most oil and gas producers, managing water is the most critical and costliest input to the extraction process. Water recycling and reuse

is therefore one of the biggest challenges.

Roughly 30 percent of all Barnett Shale wells located in northern Texas are managed by the gas producer that is committed to responsible energy production. They turned to Fountain Quail for a smart water management strategy for its fracking operations. Between four to 19 million litres of water was required to frack each Barnett Shale well, and the produced water was pumped into disposal wells beneath the Barnett layer.

### **Sustainable oilfield water management**

Treating oilfield produced water with evaporation technology is challenging due to high corrosion potential and high concentrations of salt and scale-forming solids. To reduce the amount

of water required for extraction, Fountain Quail incorporated the Alfa Laval AlfaVap rising film evaporator into its patented NOMAD™ technology. This mobile mechanical vapour re-compression evaporator showed great potential to generate freshwater from highly variable fracking flowback water. However, it required a compact, two-phase heat exchanger that could withstand the rigours of gas production, ensure water conservation and maximize yields.

That heat exchanger was the Alfa Laval AlfaVap, a robust, wide-gap two-phase plate heat exchanger that proved much more efficient in recycling flowback water than traditional shell-and-tube evaporators. Fountain Quail knew that the NOMAD technology would make good business sense and make the fracking water cycle more sustainable.

Fountain Quail's Brent Halldorson reviews clean flowback water that has been recycled using equipment with the Alfa Laval AlfaVap.



litres of flowback water per day into highly pure distilled water.

### Looking back, looking ahead

These companies contributed to making hydraulic fracturing economically viable and more sustainable through flowback water recycling. Over a decade, Fountain Quail set up 14 NOMAD sites for the shale gas producer, each employing two to four NOMAD units. More than 20 million barrels of flowback water were recycled to freshwater from produced water otherwise destined for disposal, thereby saving 3.2 billion litres of potable water.

While water recycling in the Barnett Shale gives Fountain Quail plenty of room for future expansion, the company is also looking to apply its NOMAD technology as other fields open.

"We're looking at almost unlimited opportunities over the coming decades," says Halldorson. "Once we discovered Alfa Laval's AlfaVap technology and saw what it could do for our patented process technology, we've never looked back."

The NOMAD technology with AlfaVap is capable of concentrating NaCl-produced water to saturation (approximately 28wt%). Alfa Laval's new AlfaFlash technology can concentrate past saturation and precipitate salts for zero-liquid discharge applications. Fountain Quail now also uses AlfaFlash technology in their new Excel ZLD Crystallizer.

### About the company

#### Fountain Quail Energy Services

Based in Irving, Texas, this company is dedicated to providing innovative water management solutions to North American oil and gas producers.

"Our success hinged on having a serviceable evaporator exchanger that could handle the rigours of oilfield wastewater," noted Fountain Quail's Brent Halldorson. "The Alfa Laval AlfaVap gave us the robust, powerful, efficient and easy-to-service heat exchanger technology we needed, and we've had a great working partnership ever since."

Compact yet versatile, the AlfaVap is particularly well suited for use in gas and oil fields. Its titanium plates make the AlfaVap immune to the highly caustic briny conditions of gasfield water recycling, cutting maintenance downtime. The design of its plate pattern contributes to increased heat transfer and high turbulence, which reduces fouling and scaling. Plus the AlfaVap is easy to install, operate,

maintain and adapt to changes in capacity requirements.

### Low maintenance, more sustainable operations

Halldorson noted, "Not only is the AlfaVap highly efficient, but it also needs very little, other than routine maintenance and the occasional scale removal."

This contributed to longer service intervals – up to eight months – between mechanical cleanings for the NOMAD units.

"Once you get it fired up, using local gas directly from the site to power a start-up boiler, it's basically an exercise in balancing energy," he said.

"We believe the economics will work out over the long run, because we'll save money by reusing our own water and not having to truck water all over North Texas. Water is a finite resource here," he continued. "This is absolutely the right thing to do, both to provide ourselves with the water we need for fracking and to minimize our impact on the environment."

The shale gas producer moved the three-stage NOMAD mobile evaporator from field to field, boiling highly variable oilfield wastewater, recovering the steam and converting nearly 2.3 million



The Alfa Laval AlfaVap is at the core of Fountain Quail's NOMAD technology, which cleans frack flowback water from gas wells.

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Alfa Laval reserves the right to change specifications without prior notification.

### How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at [www.alfalaval.com](http://www.alfalaval.com)