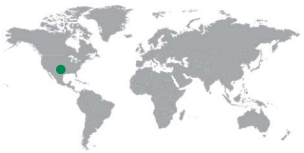
Case History



Transition™ HVFR Chemistry Optimizes Hydraulic Fracturing Performance with Produced Water, Reducing Environmental Impact and Results in 50% Increase in Anticipated Production, Permian Basin

Transition™ High Viscosity Friction Reducers (HVFRs) perform in salty produced water, reducing environmental impact, cutting costs and increasing anticipated well production

CHALLENGE	SOLUTION	RESULT
• **Use of salty produced water instead of freshwater** • **HVFR required to build and maintain 10+cP viscosity, while holding high shear rates** • **No downtime or NPT waiting on product delivery, despite poor weather conditions**	• **Transition™ brine-tolerant High Viscosity Friction Reducer (HVFR) chemistry** • **Pro-active Supply Chain management**	• **10+ cP viscosity achieved and maintained in extremely high shear rates (150 bbls/min) in produced water at 180 deg. F** • **Reduced environmental impact of fracturing operations** • **Under budget due to increased performance of Transition™ HVFR** • **No NPT or Downtime**

OVERVIEW

The process of hydraulically fracturing shale involves pumping large amounts of water at a high rate and pressure to create and propagate cracks or fractures in the rock, while simultaneously filling these cracks with sand or proppant to keep the fractures open for long-term production.

Standard friction reducers (FR) for hydraulic fracturing are designed for use in freshwater, and not compatible with salty brines. If these chemicals are injected into salty produced water, they can cause incompatibility challenges such as equipment plugging and/or extremely high-pumping pressures which can compromise the safe operation of the pumping equipment.

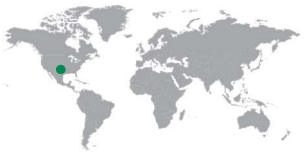
CHALLENGE

A customer operating in the Permian Basin aspired to use produced water instead of freshwater for hydraulic fracturing operations, and the choice of the right friction-reducer chemistry was critical within their tight project budget. Logistics was also an important consideration, to ensure products could be delivered in a timely manner, avoiding costly NPT and downtime.

The customer's stringent performance objectives stated that produced water would need to be pumped at 150 bbls/min, while still being able to maintain a viscosity over 10 cP throughout the entire pump time at bottom hole temperature.

NEWPARK FLUIDS SYSTEMS

Case History



SOLUTION

After extensive laboratory testing, Newpark specialists created a customized chemistry from our Transition range of brine-tolerant friction-reducers that achieved the customer's desired performance objectives. Head-to-head comparisons with multiple other products were also performed to verify the differentiating advantage of the Transition chemistry.

The Transition HVFR offered the following characteristics:

- 10 cP viscosity in production water at 180 degrees Fahrenheit
- Optimal friction reduction, even at high shear rates
- Superior regain permeability even without the use of a breaker
- High performance vs cost, allowing project budgets to be met

The experience and track-record of the Newpark logistics supply chain specialists convinced the customer that product deliver demands could be met.

RESULTS

As simulated in the laboratory analysis, the Transition HVFR enabled produced water to be used for hydraulic fracturing, achieving pump rates of 150 bbls/min, while maintaining a viscosity over 10 cP.

The costs came in under budget due to the effectiveness of the Transition chemistry – a reduced quantity of HVFR loading was required to achieve the optimum performance.

No downtime or NPT was recorded waiting for product delivery, despite operations coinciding with severe and unprecedented winter storms. Over 20,000+ gallons per day was able to be delivered to the pad location in line with the customer's scheduled operations

As a result of the optimized hydraulic fracturing operations with produced water, the completed wells produce at 50% over the anticipated rate.