ThinFrac™ PW FRP-1 Proves Successful in High TDS Water at Lower Surface Pressure

**OVERVIEW & CHALLENGE**

An operator in the Brushy Canyon formation needed to improve fracturing efficiency by reducing friction pressure and minimizing horsepower requirements. The operator was using produced water with more than 241,000 ppm (241,000 mg/L) total dissolved solids (TDS) and experienced varying treating pressures as the stages approached the heel of the lateral. The operation required a friction reducer that would not only work effectively with the available water sources, but also reduce the required amount of fresh water and decrease water disposal costs.

**SOLUTION**

BJ Services recommended ThinFrac PW FRP-1, a water-based polyacrylamide polymer friction reducer. This fracturing fluid is specially designed to deliver predictable, effective performance when using produced water from the wellsite. It also allows flexibility in the treatment pressures by making minor adjustments to the fluid concentration. A side-by-side comparison of FRP-1 and a conventional friction reducer was done on the last two stages of the well. Both stages were treated at 6,900 psi (47.57 MPa) and 49 bpm (8 m³/min). All fluid specifications remained the same except for the friction reducer used.
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RESULTS

FRP-1 was used on stage 15 at 8,676 HHP (6,470 kW) and saw acceptable pressures. As treatment progressed, the impact of this cost-effective friction reducer was seen at every attempt to drop the concentration. The FRP-1 concentration was reduced by 0.5 gpt (0.5 L/m³) and still maintained the desired rate and a manageable pressure of approximately 5,900 psi (40.68 MPa).

A conventional friction reducer was used on stage 16 at 8,287 HHP (6,180 kW) and saw a significant pressure increase of 7,500 psi (51.71 MPa), which also caused a reduction in design rate. If the rate had been maintained at 60 bpm (10 m³/min), the pressure would have continued to climb and require a significantly higher hydraulic horsepower.

The use of FRP-1 allowed for a manageable pressure at the desired design rate over the conventional friction reducer. The operator was also able to achieve greater efficiency with minimal horsepower requirements and reduce the overall usage of fresh water on the wellsite.

Figure 1: This chart shows the increase in treating pressure and decrease in rate when FRP-1 friction reducer was replaced with a conventional friction reducer.