

Taming Tricky Wells: How NextTier's Solutions Engineering Reduced Treating Pressure via Perforation Redesign



CHALLENGE

A Delaware Basin operator faced unexpectedly high treating pressures, preventing them from reaching designed rate and resulting in longer pump time and higher costs



SOLUTION

NextTier's Solutions Engineering team diagnosed the source of excess pressure and recommended a targeted perforation redesign to reduce near-wellbore friction.



RESULT

The updated perforation design restored efficient execution across the remaining stages and delivered measurable gains in rate, time, and cost.

NextTier's in-house Solutions Engineering team was engaged to address unexpectedly high treating pressures on wells in the Delaware Basin. ISIP and field diagnostics confirmed the wells were treating above design parameters. Additional analysis indicated excess near-wellbore friction and tortuosity, leading the team to recommend a targeted change in perforation design. End-of-stage step-down testing was used as one diagnostic input to validate the source of the pressure response.

NextTier
Solutions
Engineering

DIAGNOSE → INTERPRET → REDESIGN → VALIDATE → SCALE

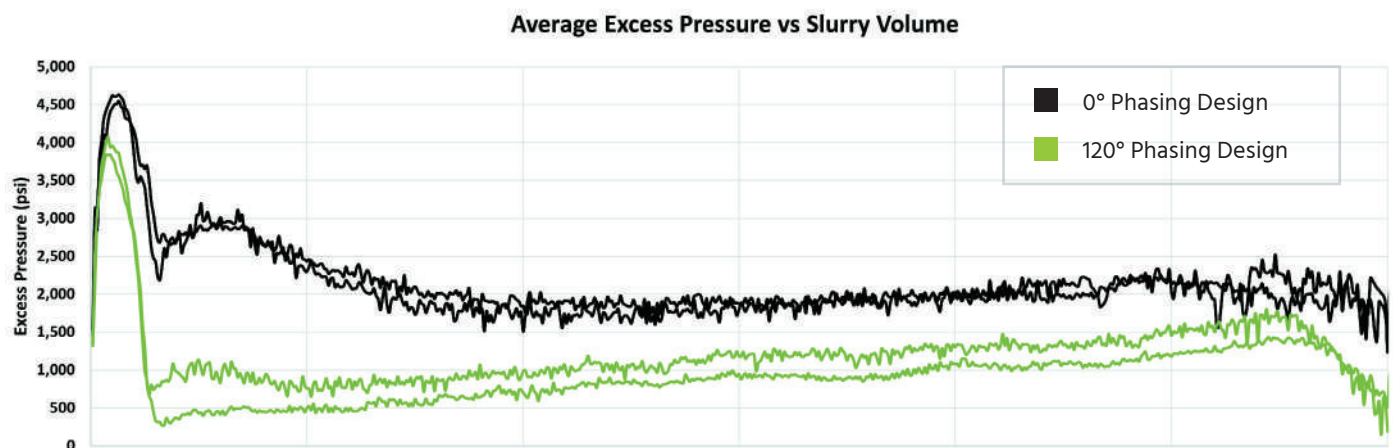


Figure 1. Diagnostic pressure response under the original design indicated elevated near-wellbore friction and tortuosity. Stages completed with 120° radial phasing later showed substantially lower excess pressure within acceptable treating limits.

At the time, the operator was using a 3 shots-per-foot (spf), 0° oriented string. Based on the diagnostic findings, NexTier engineers recommended transitioning to a 120° radial phasing design. Figure 1 shows that stages completed with the 0° tool string exhibited elevated treating pressure consistent with high tortuosity, while stages completed with 120° radial phasing treated within a substantially lower and more acceptable pressure range.

To validate the revised approach, testing was conducted on both wells for three stages each, followed by a confirmation test with the original 0° orientation on one well. The comparison showed that transitioning to 120° radial phasing, while holding other design variables constant, reduced near-wellbore friction and improved time to rate.

Degree Phasing	Number of Stages	Average Rate (bpm)	Average Pump Time (Minutes)	Average Pexcess	Average k-NWB
0-degree	12	64.1	169	2,229	279.3
120-degree	17	77.2	147	1,007	114.6

Figure 2. Comparison of stage performance under the 0° oriented string and 120° radial phasing, with other key design variables held constant.

The revised perforation scheme reduced near-wellbore friction to manageable levels and restored efficient target-rate execution. Figure 3 highlights the improvement in time to rate after transitioning from the 0° tool string to 120° radial phasing.

Across the remainder of the six-well program, the operator achieved:

- **72.5% reduction in time to rate**
- **\$1.24MM in total savings**, driven by reductions in fuel consumption, stage execution times, hourly rates, pressure brackets, and overall day rate

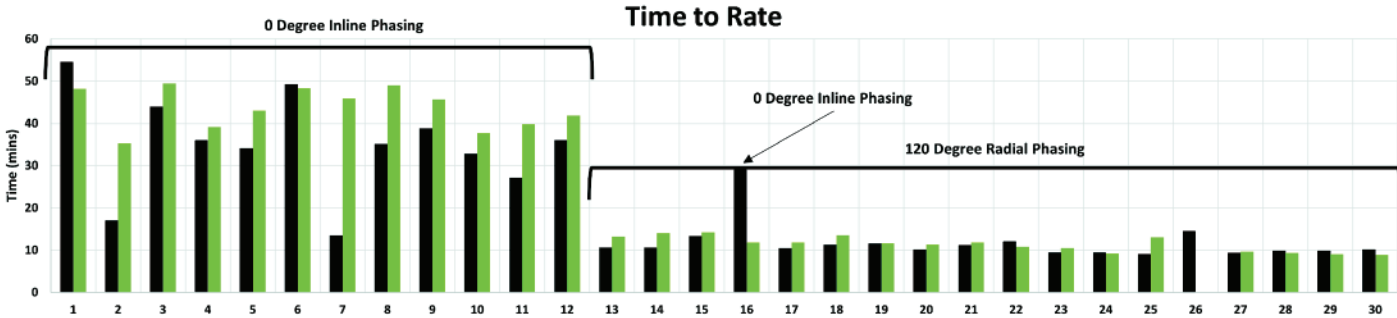


Figure 3. Time to rate improved materially after transitioning from the 0° tool string to 120° radial phasing.