DCS

TECHNICAL CASE STUDY

HAYNESVILLE BASIN, LOUISIANA · FEB 2023 – SEPT 2025

DriFlow 4™ Replaces Guar Gel for Exceptional Pressure Relief in High-Pressure Bossier Wells

Two-year field validation across Customer A and Sabine Parish wells proves dry FR can fully replace guar gel — with superior pressure performance

1,500–2,000
PSI PRESSURE DROP (2025)

0
GUAR REQUIRED (2023 CUSTOMER A)

20–30#
GEL EQUIVALENT VISCOSITY

3+
OPERATORS NOW ADOPTED

1 **FEBRUARY 2023**
Customer A Wells — First Validation
6→8 PPT real-time ramp eliminates guar entirely

2 **SEPTEMBER 2025**
Sabine Parish Bossier Wells
1,500–2,000 psi drop vs. liquid FR at same loading

3 **NOW — APRIL 2026**
Industry Standard Practice
Customer B, Customer C, Customer A all adopted

DRIFLOW 4™ | GEL REPLACEMENT | BOSSIER FORMATION | HAYNESVILLE | GUAR ELIMINATION | PRESSURE RELIEF | HIGH MW POLYMER

01 Executive Summary

> In high-pressure Bossier formations, operators have long struggled with rising treating pressures that restrict cluster efficiency and force reliance on **costly, particulate-laden guar gels**. DCS's proprietary DriFlow 4™ dry friction reducer has proven to be a highly effective gel replacement across two major field trials spanning 2023 to 2025.

In the pioneering **February 2023 Customer A wells**, real-time concentration adjustments (stepping from 6 PPT to 8 PPT) immediately stabilized treating pressure as proppant hit the formation — enabling full cluster entry and complete stage placement **without any guar**. Building on that success, the **September 2025 Bossier wells** in Sabine Parish delivered even more dramatic results: stages switched from liquid FR to DriFlow 4 at equivalent loading experienced a consistent

1,500–2,000 psi pressure drop, while a comparable liquid-only stage at 3.25 GPT showed no relief and pressure actually increased.

Together, these trials demonstrate that DriFlow 4 consistently delivers gel-like downhole viscosity — equivalent to **20–30# linear gel** — while eliminating or significantly reducing guar usage, lowering chemical costs, and avoiding dirty-fluid complications.

02 Objective

Operators needed a cleaner, more responsive solution to control treating pressures in extreme high-pressure Bossier zones without the cost, residue, or operational complexity of guar gel. Specifically, the goal was to determine whether a high-molecular-weight dry FR could:

Produce Viscosity

Match 20–30# linear gel performance to overcome formation resistance and maintain fracture width

Ensure Cluster Entry

Deliver uniform proppant placement across all clusters without restricting pressure at surface

Reduce Chemical Cost

Eliminate or significantly reduce guar usage, simplify fluid systems, and lower total chemical spend per stage

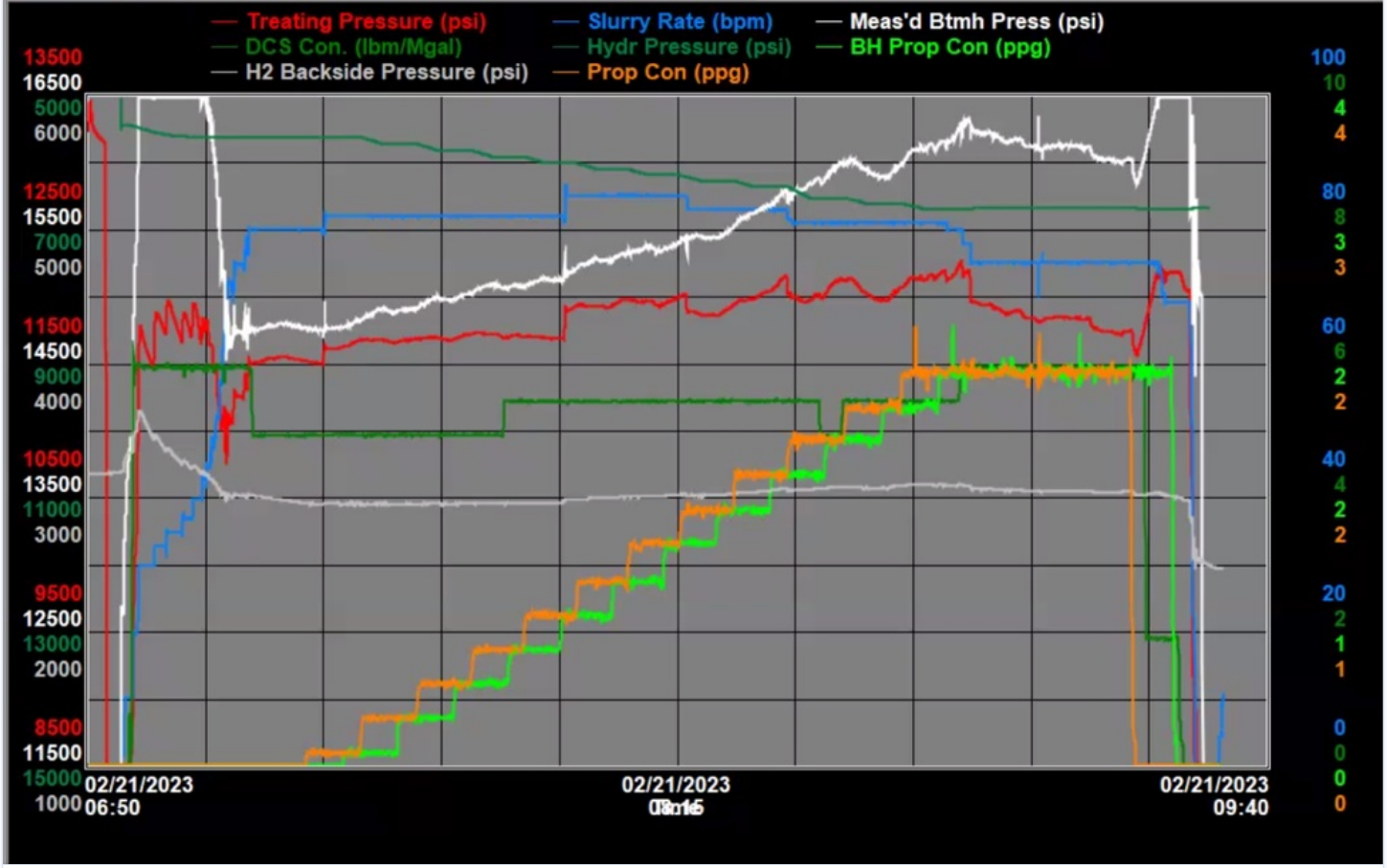
03 Results — Phase 1: Customer A Wells (February 2023)

> **Key finding:** Real-time concentration adjustment from 6 PPT → 8 PPT immediately stabilized treating pressure when sand hit the formation. The stage placed successfully with excellent proppant transport and **zero guar required**.

One of the first applications of this technique occurred on Customer A wells in the Haynesville. In a representative stage (ST8), the job began with DriFlow 4 at 6 PPT. As proppant concentration increased and sand hit the formation, treating pressure began to climb — indicating insufficient width and restricted cluster entry. The team immediately increased concentration to **8 PPT**. Treating pressure stabilized instantly and remained stable for the remainder of the stage, allowing complete proppant placement without any guar assistance. The same optimized approach was repeated on ST9, proving repeatability.

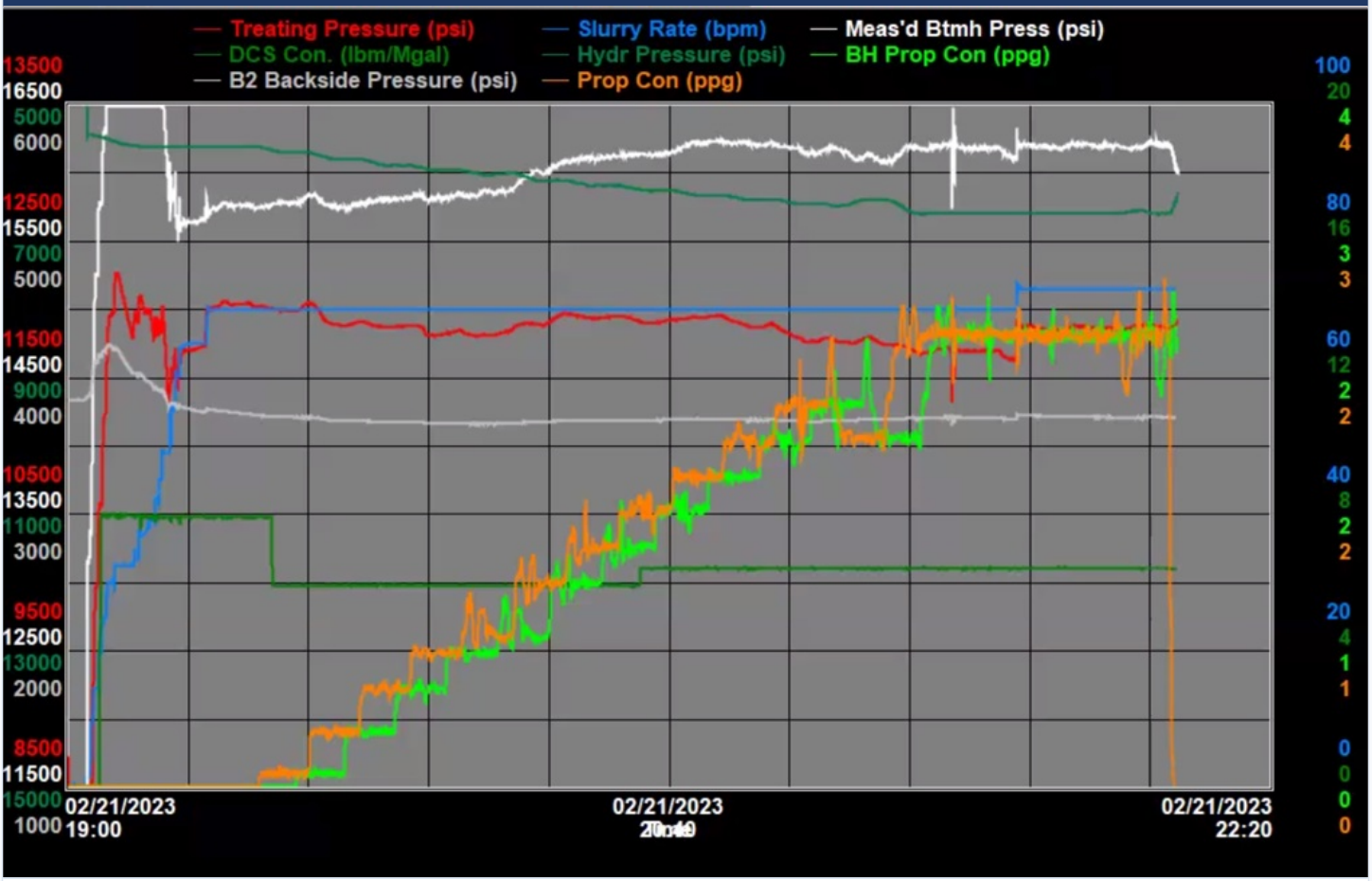
STAGE PLOTS — CUSTOMER A FEBRUARY 2023

FIGURE 4 **Customer A ST8 — 6 PPT → 8 PPT Ramp**



Treating pressure rises as sand concentration increases at 6 PPT DriFlow 4. After stepping up to 8 PPT, pressure stabilises immediately — successful proppant placement with no gel required.

FIGURE 5 **Customer A ST9 — Optimised Concentration**



Consistent pressure control throughout with optimised DriFlow 4 concentration — repeatable performance and successful proppant placement without guar on subsequent stage.

04 Results — Phase 2: Sabine Parish Bossier Wells (September 2025)

Building directly on the 2023 success, DCS and a DriFlow client tested DriFlow 4 more extensively in September 2025 on high-pressure Bossier wells averaging **11,006 psi/stage at 6.5 PPT**.

✓ DRIFLOW 4 — ~2 GPT EQUIVALENT

1,500–2,000 psi

Immediate, repeatable pressure drop the moment DriFlow 4 brought online. Three overlaid sample stages confirmed consistency across the pad.

! LIQUID FR ONLY — 3.25 GPT (2× LOADING)

No Relief

At 3.25 GPT — nearly twice the effective DriFlow 4 loading — liquid FR delivered zero pressure relief. Treating pressure actually trended upward throughout the stage.

FIGURE 1 **Location**

Figure 1. Location of two Bossier wells completed with DriFlow 4 in Sabine Parish, Louisiana.

Two Bossier wells completed with DriFlow 4 in Sabine Parish, Louisiana.

FIGURE 2 **DriFlow 4 Stages — Consistent 1,500–2,000 psi Relief**

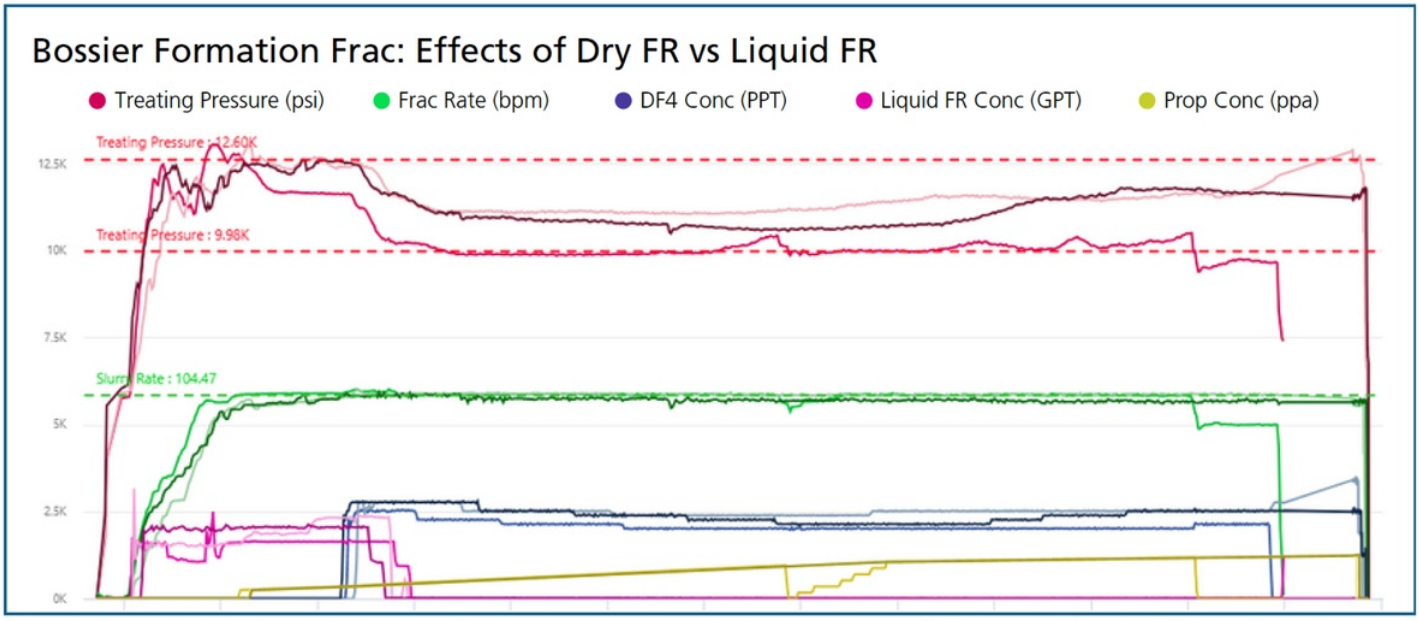


Figure 2. Stage plots depict the consistent pattern where treating pressure is significantly reduced as a result of introducing DriFlow 4 in place of liquid FR at an equivalent loading, in the range of 2 GPT.

Three overlaid stages confirming the consistent pressure relief when DriFlow 4 replaced liquid FR at equivalent loading (~2 GPT), Sabine Parish, Louisiana.

FIGURE 3 **Liquid FR Only Stage — No Pressure Relief at 3.25 GPT**

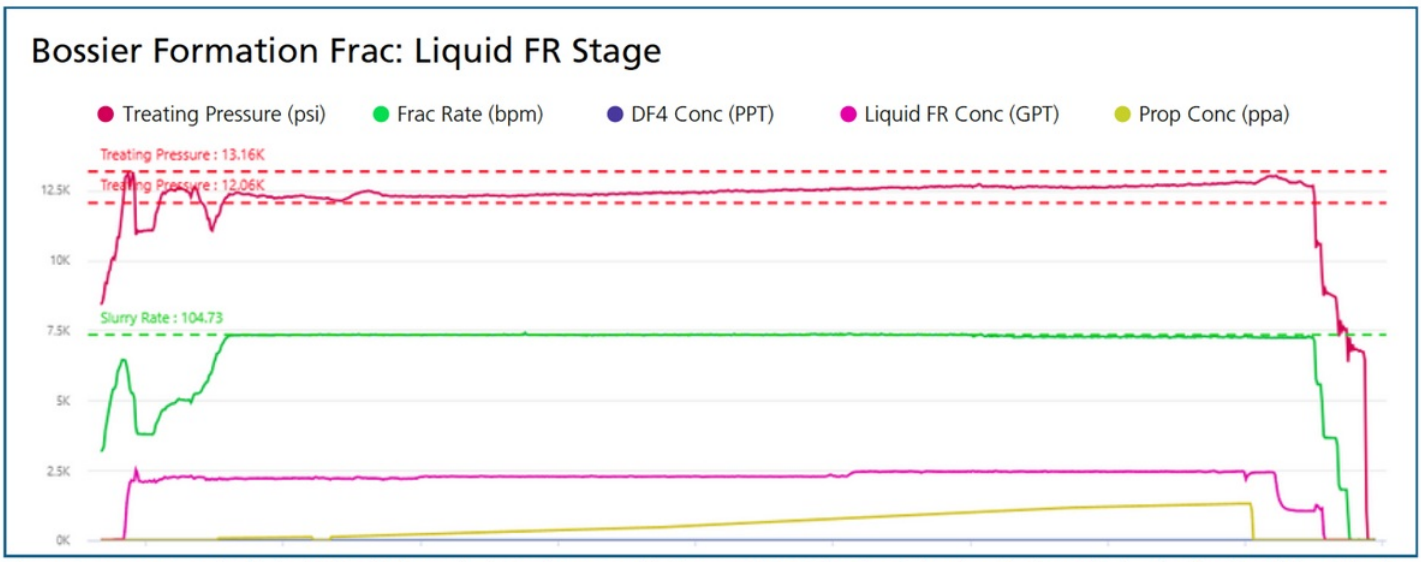


Figure 3. A stage treated with liquid FR only shows the lack of pressure relief from a 3.25 GPT loading (twice the effective equivalent loading for DriFlow 4 for the same bossier wells).

Stage treated solely with liquid FR at 3.25 GPT showing zero pressure relief — treating pressure trended upward despite nearly twice the effective loading of DriFlow 4.

05 Viscosity Data — Gel Equivalency

Fann 35 viscosity testing in freshwater confirmed DriFlow 4 matches or exceeds conventional gel performance across relevant treatment rates:

TREATMENT RATE (PPTG)	FANN 35 @ 300 RPM	GEL EQUIVALENT
8.03	**13.0**	**20# gel**
13.39	**18.0**	**30# gel**
16.07	20.0	—

DriFlow 4 produces downhole viscosity **comparable to 10–20# linear gel systems** — sufficient to overcome formation resistance, maintain fracture width, and ensure uniform proppant placement across all clusters.

20# gel

AT 8.03 PPTG LOADING

30# gel

AT 13.39 PPTG LOADING

11,006 psi

AVERAGE STAGE PRESSURE (2025 BOSSIER)

06 How DriFlow 4™ Achieves This

Highest Molecular Weight

Proprietary dry FR polymer formulated with the highest MW of any commercially available alternative — the primary driver of its superior viscosity-building capability and pressure relief performance.

Patented Dispersion Method

A patented polymer dispersion process protects polymer chain integrity through mixing and hydration — critical for sustained performance in high-temperature, extreme treating-pressure Bossier environments.

Delayed Full Hydration

Larger particle size enabled by the dispersion method delivers delayed full hydration — maximum viscosity builds *downhole*, precisely where it is needed for fracture width development and proppant transport.

07 Industry Adoption

Multiple operators in the Haynesville / Bossier play have now adopted high-PPT dry FR as standard practice for pressure management, replacing or eliminating guar gel programs:

Customer B | **Customer C** | **Customer A**

Additional operators across the basin are actively evaluating high-PPT dry FR programs as the performance data from these field trials becomes more widely known.

08 Key Takeaways

- DriFlow 4 produces downhole viscosity **comparable to 10–20# linear gel** while delivering superior pressure relief — proven in freshwater Fann 35 testing and two independent field campaigns.
- **Real-time concentration adjustments** (e.g., 6 PPT → 8 PPT) overcome formation resistance as proppant hits, enabling full cluster entry and complete stage placement without any guar.
- At equivalent loading, **DriFlow 4 delivered 1,500–2,000 psi more pressure relief** than liquid FR at 3.25 GPT (nearly twice the effective concentration) — demonstrating that molecular weight, not volume, drives the performance.
- Proven on Customer A wells (2023) and multiple Bossier pads (2025) — **now standard practice** for Customer B, Customer C, and Customer A across the Haynesville basin.

DriFlow 4™ — The Gel Replacement Standard in the Haynesville

From the first Customer A trial in February 2023 to widespread adoption across the Haynesville basin in 2025–2026, DriFlow 4 has consistently proven that a properly formulated high-MW dry FR can do what guar gel does — and do it better. Operators that have made the switch report cleaner fluid systems, lower chemical costs, and most importantly, the pressure performance they need to place every stage with confidence.

- 1,500–2,000 psi pressure drop vs. liquid FR at equivalent loading — replicated across multiple stages and pads
- Liquid FR at 2× loading delivers zero benefit — confirming MW and delivery mechanism are what matter
- Guar-free stages achieve full cluster efficiency and excellent proppant transport with zero dirty-fluid complications
- Adopted as standard practice by Customer B, Customer C, and Customer A — with more operators evaluating across the basin