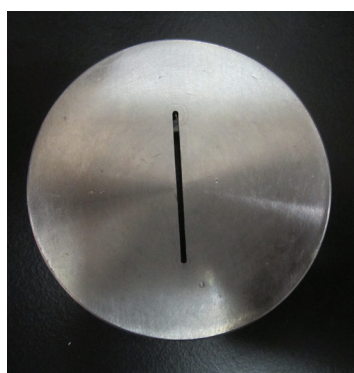


## Recovering Horizontal Lateral Sections with Trican's TriVert™ Diverting Agent



Slotted disk representing the fracture opening.



Slotted disk bridged/sealed-off in less than 10 seconds after the application of TriVert™ at a 500 psi differential.

### Business Needs

A customer operating in the Haynesville Shale needed to recover a portion of the lateral after a perforation gun stuck and discharged prematurely 750 ft (228.6 m) from the toe. The option to continue running plug-and-perf guns through the damaged section was ruled out. Consequently, the operator was in jeopardy of losing two stages near the toe section.

### Trican Solution

To meet our customer's objective, Trican used our TriVert™ diverting agent. TriVert products are temporary bridging agents designed to redirect fluids from dominant perforations or fractures into different sections along the wellbore. Using a range of particle sizes, TriVert enables larger particles to bridge off at the fracture opening, allowing smaller particles to occupy the remaining voids, filling in the perforation tunnel back to the casing.

The customer's initial design required two stages and 90 perforations using the plug-and-perf method. Using tubing-conveyed perforation (TCP) guns, 130 perforations were performed in the toe section. TriVert replaced the plugs between stages, allowing the operator to treat the toe section in four minor stages, in order to cover the normal two plug-and-perf stages within the damaged toe section. This allowed the customer to accomplish the original design.

### Results

TriVert allowed the operator to finish the well from the toe to the heel as originally intended. The operator was assured the 750 ft (228.6 m) toe section was salvaged and was able to secure anticipated production.

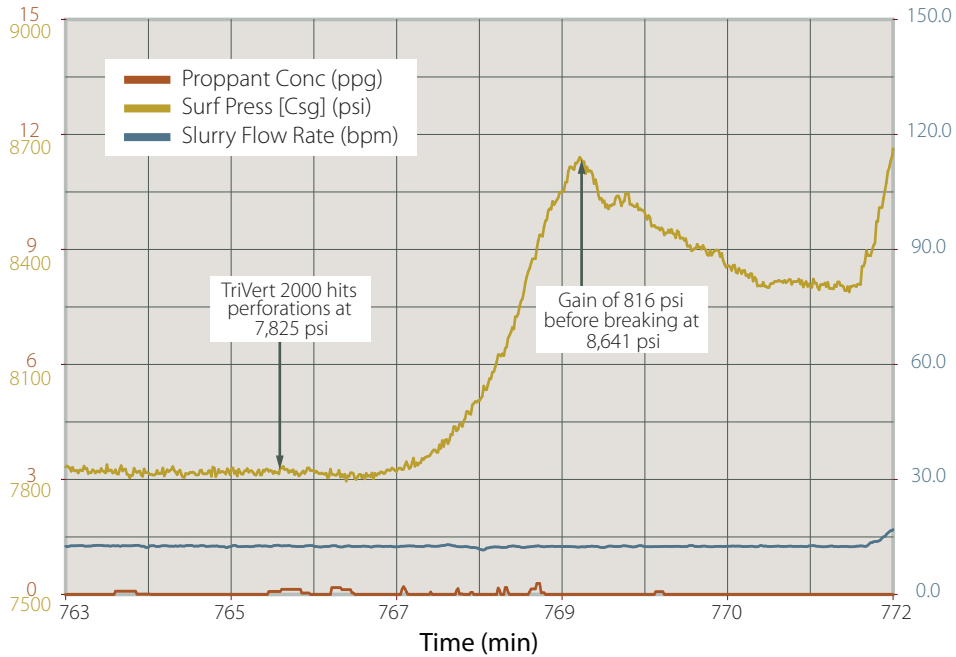
TriVert decreased the downtime experienced during a typical plug-and-perf run, and eliminated the need to mill out the plug. This allowed the customer to get the well onto production sooner than conventional Haynesville completions. The success of this treatment convinced the operator to incorporate TriVert into every new completion design in the Haynesville Shale.

Pressure responses showed that diversion was accomplished during the treatment:

- The first TriVert pill saw a pressure increase of 816 psi (5.63 MPa) (Figure 1)
- The second TriVert pill saw a pressure increase of 804 psi (5.54 MPa) (Figure 2)
- The third TriVert pill saw a pressure increase of 1,021 psi (7.04 MPa) (Figure 3)

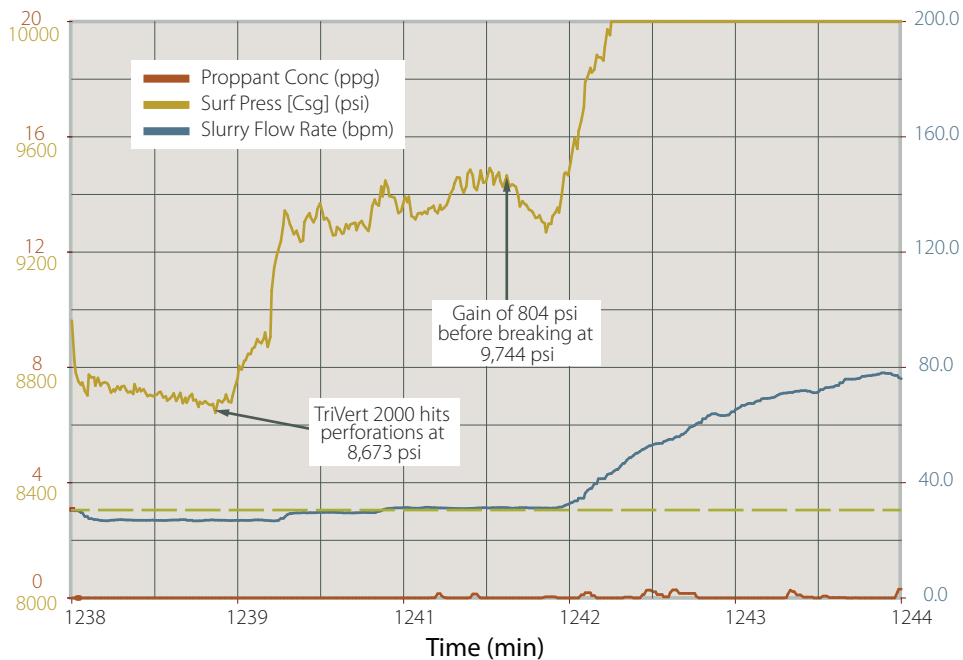
### TriVert 2000 Haynesville Troubled Toe Section

Figure 1: Pressure response of 816 psi (5.63 MPa)



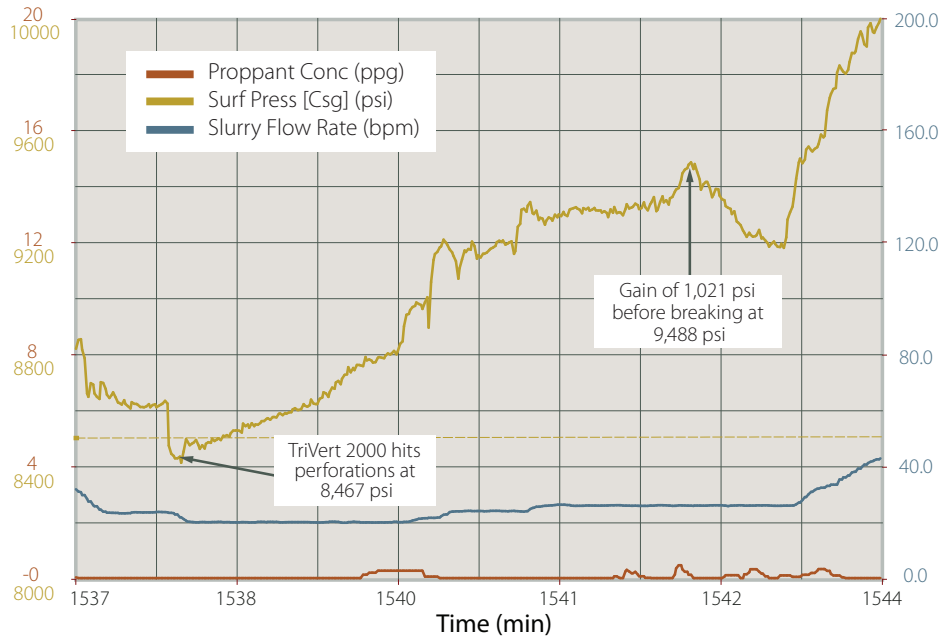
### TriVert 2000 Haynesville Troubled Toe Section

Figure 2: Pressure response of 804 psi (5.54 MPa)



## TriVert 2000 Haynesville Troubled Toe Section

Figure 3: Pressure response of 1,021 psi (7.04 MPa)



## Case Study Snapshot

**Date:** 12/2012

**Location:** Haynesville Shale

**Product:** TriVert™

### Challenge:

- Recover a portion of the lateral after a perforation gun discharged prematurely.

### Trican Solution:

- Trican's TriVert diverting agent, a temporary bridging agent designed to redirect fluids from dominant perforations or fractures into different sections along the wellbore.

### Results:

- Allowed the operator to finish the well from heel to toe as originally planned, and secure anticipated production.
- Decreased the downtime experienced during a typical plug-and-perf run, and eliminated the need to mill out the plug.
- The operator decided to incorporate TriVert into every new completion design in the Haynesville Shale.



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