

# Illusion<sup>®</sup> Plug Saves Operator Approximately USD \$515,000

## INTERVENTIONLESS SOLUTION ALLOWS MULTIPLE WELLS TO BE PLACED ON PRODUCTION AFTER STIMULATION

VACA MUERTA FORMATION, ARGENTINA

### CHALLENGES

- » Eliminate intervention to lower operator's cost per BOE
- » Minimize millout times
- » Provide viable solution for remote locations with long intervals

### SOLUTION

Illusion<sup>®</sup> dissolvable frac plugs, which provide:

- » Interventionless solution with field-proven success
- » Optimal dissolution while maintaining isolation

### RESULTS

- » Reduced operator's costs by USD \$515,000
- » Omitted coiled tubing from operation
- » Reduced well complexity

### OVERVIEW

Continuous improvement is a critical component of a company's sustainability. With the need to actualize improvements by leveraging new technologies, many companies are reaching out to service leaders, like Halliburton, to provide solutions that lower the cost per BOE and increase production.

Halliburton utilized its new technologies, along with its local experience and lessons learned from prior success, to provide a solution for lowering the customer's cost per BOE.

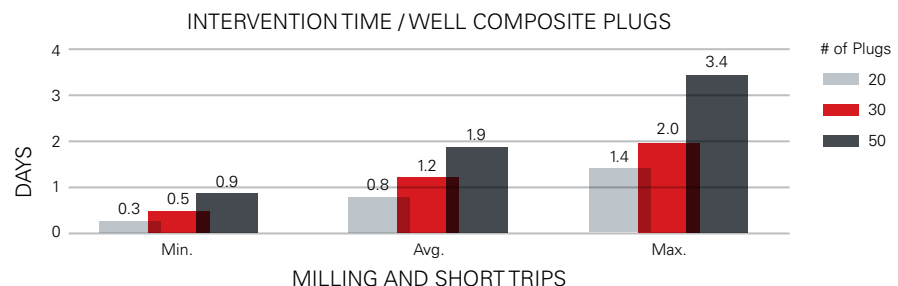
### CHALLENGES

This major customer in the Vaca Muerta shale play was using 20 to 28 composite frac plugs in its completion design. Although efficient and low cost in nature, composite plugs must be removed before wells can be placed online for production. Seeking an alternative solution that does not require intervention, the customer looked to Halliburton for assistance.

Milling composite plugs requires the availability and logistics coordination of coiled tubing, which can be a challenge in remote locations. To complicate this further, operators are extending the laterals in their wells, increasing the complexity of finding available coiled tubing that can reach the composite plugs and supply sufficient force to mill them out.

Once milling begins, operators usually incur an average of 20–40 minutes of millout time per composite plug. Hybrid plugs, composite plugs with cast slips, or brass mandrel plugs with cast slips can greatly increase the mill times. Short trips in hole are also necessary in order to reduce the risk of sticking coiled tubing in the well by allowing circulation of larger milling debris to surface, instead of cumulating behind the mill and the bottomhole assembly (BHA). The chart below illustrates intervention time estimates based on input from Argentina. Based on the values reflected, intervention time, on average, can take 12 hours, 29 hours, and 48 hours for 30 composite plugs. On four-well pads, for example, intervention can take anywhere from two days up to eight days to complete.

Ancillary equipment is not included in the estimates shown, but the impact will increase total cost, time, and risks due to the additional work and personnel required to perform these interventions.

















**SOLUTION**

Understanding the challenges that operators face and leveraging experience and success within country, Halliburton recommended its Illusion® dissolvable frac plug. The plug’s design is based on the field-proven Fas Drill® Ultra and Obsidian® frac plugs with pumpdown rates that exceed that of many competitors. The metallurgy used in our Illusion plug is value-engineered to provide the optimal dissolution while maintaining isolation integrity prior to and during the frac. Our proprietary Illusion dissolvable metal has several variants that allow us to offer a semi-customized product solution based on well conditions. As one of the pioneers in promoting dissolvable frac plugs in this region, our knowledge and experience enabled us to choose the optimal solution for this operator.















**RESULTS**

Initially, the customer used coiled tubing to validate that the plugs had dissolved as predicted in simulations. After validating that the Illusion plugs did in fact disappear from the wellbore, and after following Halliburton best practices, the customer omitted coiled tubing intervention and successfully placed several wells on production shortly after the frac crew moved off location. This achievement allowed the customer to place its wells on production faster, and also eliminated the risk and complexity that comes with having to perform interventions on multiple wells. Ultimately, using Illusion dissolvable frac plugs saved the operator approximately USD \$515,000.

**CALENDAR SHOWING REDUCED TIME TO PRODUCTION**

Sun.	Mon.	Tues.	Weds.	Thurs.	Fri.	Sat.
						
						

Before vs. After

Sun.	Mon.	Tues.	Weds.	Thurs.	Fri.	Sat.
						
						

**CUSTOMER SAVED USD \$515,000**

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