

Argentina

Improved cement bond integrity in Vaca Muerta with advanced spacer design

Tuned® Defense™ E cement spacer delivers consistent cement bond log quality across mature field wells

CHALLENGE

- Improve CBL quality
- Achieve consistent results
- Mitigate lost circulation

SOLUTION

- Deploy Tuned® Defense™ cement spacer
- Optimize lead slurry design

RESULT

- Achieved planned TOC
- Improved cement bonding
- Reduced remedial work risk
- Strengthened well integrity
- Increased operational efficiency

Overview

The Vaca Muerta formation in Argentina is one of the world's largest unconventional hydrocarbon deposits. However, operators in this region face persistent cementing challenges, particularly in mature fields where lost circulation and variable formation characteristics can compromise zonal isolation. Achieving the planned top of cement (TOC) is critical for long-term well integrity, especially ahead of hydraulic fracturing operations.

In this environment, cement bond log (CBL) quality serves as a key indicator of successful cement placement and well integrity. Inconsistent CBL responses, often driven by fluid losses during cementing, create uncertainty, elevate risk, and increase the likelihood of remedial operations. The operator required a reliable, repeatable solution that could improve cement placement and deliver consistent CBL results across multiple wells.

Challenge

During cementing of the 9 5/8-in. intermediate section, the operator encountered severe circulation losses during the initial pad stage. These losses reduced cement placement quality and resulted in poor zonal isolation. While formation integrity at the casing shoe was confirmed, post-cementing evaluations revealed poor cement placement in the upper intervals.

Poor cement placement resulted in low-quality CBL responses, often exceeding 20 mV, indicating weak bonding between casing and formation. This introduced significant uncertainty regarding well integrity and posed long-term risks for hydraulic fracturing and production performance. The operator needed to mitigate fluid losses, improve slurry placement, and achieve consistent cement bonding across wells in a challenging, loss-prone environment.



Solution

Halliburton deployed Tuned® Defense™ E, a cement spacer designed to help minimize the risk of lost circulation by reducing the permeability of pores and fractures while minimizing environmental impact. The spacer was integrated into the cementing program to address fluid losses during critical placement stages.

In addition, the lead slurry design was optimized to complement spacer performance and improve cement placement efficiency. This combined approach improved fluid displacement, stabilized the wellbore environment, and supported more effective cement coverage across the target interval.

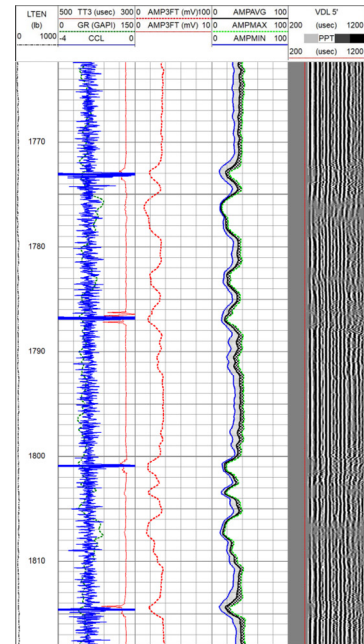
The tailored solution minimized losses, supported consistent pump rates, and improved zonal isolation in intervals prone to fluid loss. This integrated cementing strategy allowed the operator to achieve more reliable and repeatable outcomes across multiple wells.

Result

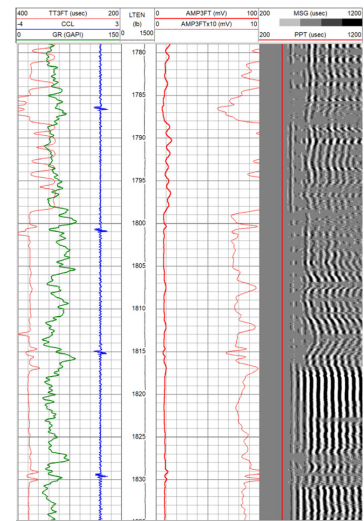
The deployment of the Tuned Defense E spacer improved cement placement and bonding performance across the operator’s wells. The solution mitigated circulation losses, which supported successful placement of the cement column and achievement of the planned TOC.

CBL responses improved, with measurements reduced to 10 mV or less, indicating strong cement bonding compared to previous results exceeding 20 mV. This improvement provided confidence in zonal isolation and reduced uncertainty in well integrity ahead of completion activities.

By improving cementing performance, the operator reduced the risk of remedial work and strengthened long-term well reliability. Improved operational efficiency allowed consistent execution across wells and supported more predictable outcomes in a complex and mature field environment.



Without Tuned® Defense™ E cement spacer. CBL with 20+ mV.



With Tuned® Defense™ E cement spacer. CBL with 10 mV or less.

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