

Inert tracer signals validate refracturing efficacy

Non-radioactive CARBONRT ULTRA provides fracture height insight to advance planned horizontal well development

Onshore, Colombia

The challenge

To optimize its future horizontal well program, an operator conducted intensive formation testing of multiple shale intervals in a key vertical exploration well in Colombia. The main objective was to determine fracture height using both pre- and post-frac logs with a pulsed neutron capture (PNC) tool, which would be used in conjunction with injection tests to determine reservoir production capacity and formation closure pressure. Radioactive tracers would typically be added into the proppant slurry to perform a similar evaluation but due to environmental restrictions with their associated half-lives, an alternate solution was needed to acquire the necessary reservoir data.

The solution

To comply with HSE requirements and meet its operational objectives, the operator selected CARBONRT ULTRA inert tracer technology, which is one of the products within FRACTUREVISION proppant-delivered fracture evaluation platform. Engineered to deliver cost-effective fracture evaluation of sand-completed wells, CARBONRT ULTRA 30/50 was blended on-the-fly using a custom designed hopper at 5% weight by volume to ensure effective detection.

Well Data


Location: Colombia

Well type: Vertical, multi-stage exploration oil well

Reservoir: Shaly limestone

Proppant: CARBONRT ULTRA 30/50

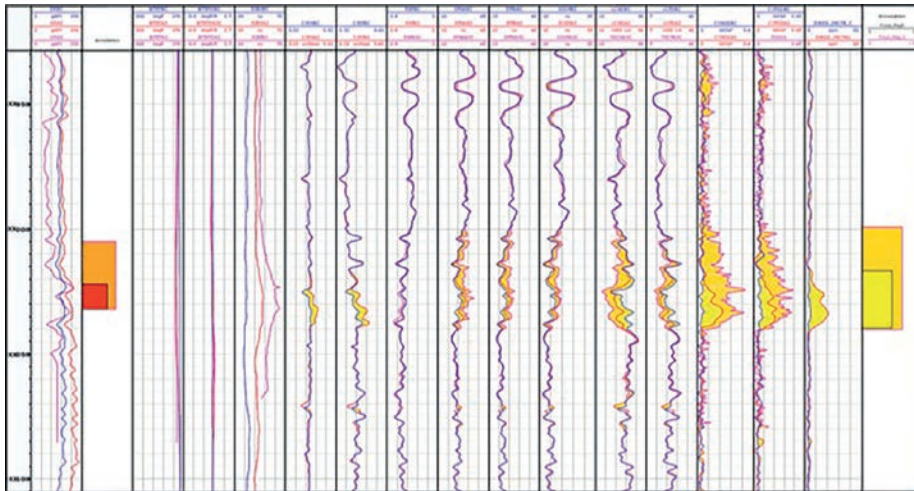
Detection tools: Pulsed neutron capture (PNC) tool



To help the operator optimize future horizontal fracture development CARBONRT ULTRA was deployed in the initial fracturing treatment to determine fracture height.

The results

A comparison of the first pre- and post- fracturing logs with CARBONRT ULTRA revealed that the initial fracturing treatment resulted in limited fracture height growth around the perforation interval. The operator was concerned about possible near-wellbore restrictions and decided to add perforation clusters above the initial interval and refracture with increased proppant volume in an attempt to add fracture height. The evaluation of the second post-fracture logs was not only able to distinguish between the initial and refractured height but also indicated successful initiation of fractures in the targeted zone. The fracture height information, in conjunction with fracture modeling and injection tests, will provide valuable insight to develop and optimize a horizontal well program in this reservoir.



Comparison of CARBONRT ULTRA signals observed in initial fracturing treatment (red perforation flag and yellow proppant flag) and refracturing treatment (orange perforation flag to left and green proppant flag to the right). The blue and red logs are the pre- and post logs for the initial fracture and the pink logs are the post log data after refracturing. The changes in each variable are consistent with normal CARBONRT ULTRA responses.

For more information contact:

Lee Reynaud
Lee.Reynaud@carboceramics.com

Talk to CARBO to find out how we can help you enhance your production.

carboceramics.com