

Traceable proppant provides propped fracture height to improve performance in low-permeability reservoir

Pilot study uses neutron log detection to identify near-wellbore proppant location.

Putumayo basin, Juanambù field, Colombia, S.A.

The challenge

Fractures designed to bypass skin created from migrating formation fines were breaking into water-bearing zones, reducing well production. The operator needed a better understanding of fracture height growth to maximize formation productivity.

A 16/20 low-density ceramic proppant was selected for the treatment and tagged during the manufacturing process using inert tracer technology. The inert, high thermal neutron capture compound (HTNCC) can be included in any CARBO proppant without altering proppant performance. The fracture treatment was pumped, and the propped fracture height was measured using neutron log detection of the proppant in the reservoir.

The solution

A pilot study using CARBONRT was conducted in the field as part of an ongoing geomechanics study that included core samples, dipole sonic logs, image logs and electrical logs.

The results

Fracture height measurements acquired with the tagged proppant were compared to simulator measurements in order to achieve a better understanding of fracture geometry. This understanding was useful in explaining production behavior after stimulation and provided a valuable tool for stimulation design optimization. As a result of the pilot study, modifications to the stimulation criteria have been applied in future fracture treatment designs.

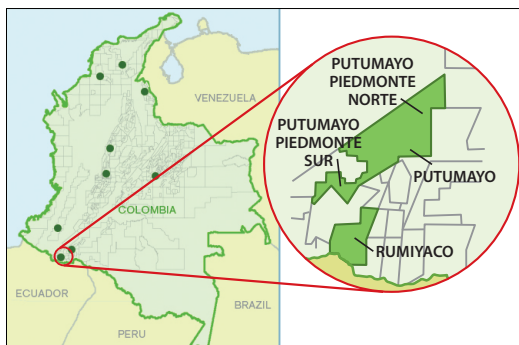
Well Data

Location: Putumayo basin, Colombia, S.A. Juanambù field

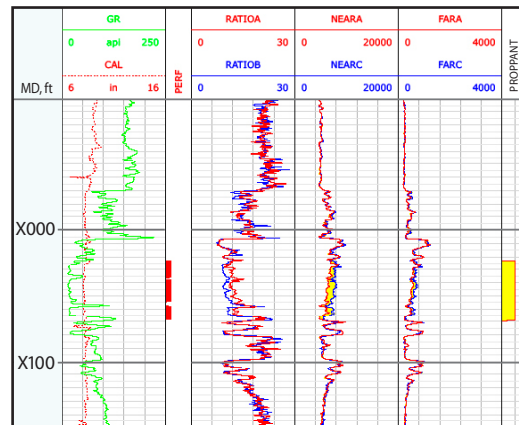
Well Type: Oil

Proppant: CARBONRT® inert tracer technology

Well Conditions: 8,890 - 9,020 ft TVD
 2-stage vertical well
 44 ft and 156 ft gross sand
 3,250 psi and 3,350 psi reservoir pressure
 11% and 13% porosity
 50 mD and 350 mD absolute permeability



Map of Putumayo basin located in the southwestern region of Colombia, S.A.



CARBONRT revealed stage 2 fracture had good height control with fifty feet of fracture height growth.

Source: SPE 152251

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