

Case study: Vostochno-Messoyakhskoe field, Russia

Mudzyme filter cake breaker system increased production rate 34% on average, saved estimated USD 2.3 Million

In early 2016, production in Russia's Vostochno-Messoyakhskoe field was not meeting the operator's expectations. Average production rates were 17% of plan.

Drill-in fluids, provided by two competitors, had consisted of potassium chloride biopolymer systems. Suspecting that the competitors' mud had not provided proper filtration control, in addition to low formation temperatures (which can decrease the efficiency of enzyme breaker systems), Baker Hughes suggested the application of a customized filter cake breaker system.

The Baker Hughes **Mudzyme™ enzymatic filter cake breaker system** attacks starch and xanthan gum in water-based, drill-in fluid filter cakes. It is pumped downhole as a pill and left to soak for a period of time, allowing the enzyme to work on removing the filter cake from the wellbore. It is then circulated to the surface. The Mudzyme breaker system is most often used in openhole reservoirs to increase production rates.

The Mudzyme system is custom formulated based on the particular application and provides an efficient and effective alternative to traditional low-pH acid breakers.

Baker Hughes worked with the operator on reverse permeability tests and formation fluids compatibility tests, then designed a custom Mudzyme breaker treatment. The Mudzyme breaker was placed in the well's 6¼-in. openhole section, then allowed to soak for 24 hours to degrade the filter cake in a single treatment.

After the application, the operator evaluated the treatment, deemed it a high-performing system, and approved its use in other wells. Throughout 2016, Baker Hughes treated a total of 20 wells up to 2600 m (8,530 ft) measured depth with Mudzyme treatments of 20 to 23 m³ (168 to 193 bbl) each.

Average production rate after using the Mudzyme system was 51% compared to plan. Baker Hughes subsequently won a tender to treat all 118 wells on this project.

Challenges

- Highly permeable reservoir
- Low formation temperatures (16°C [61°F])
- Previous water-based drill-in fluid provided by competitors
- Thick filter cake blocking the formation

Results

- Efficient and uniform filter cake removal
- Production rate increased 34% on average (from 17% to 51%)
- Production increased 300% in some cases (from 59 bbl per day to 176 bbl per day)
- Operator saved an estimated USD 2.3 million per year

