

# BroadBand Precision Service Reduces Stimulation Time by 64% for RITEK-Beloyarskneft

Fracturing with coiled tubing in the well improves efficiency of operations, and completion design reduces water cut for wells in northern Russia

## CHALLENGE

- Reduce multistage completion time while increasing the number of stages per well to optimize production.
- Reduce water cut by avoiding fracturing into nearby water zones.

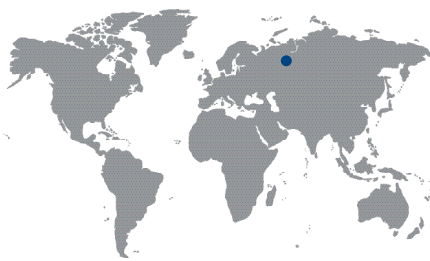
## SOLUTION

Design BroadBand Precision\* integrated completion service with

- sliding sleeves
- targeted hydraulic fracturing treatments designed to minimize out-of-zone fracture growth
- treatments pumped while coiled tubing is in the well.

## RESULTS

- Reduced the average stage completion time by 64% for each frac port.
- Increased the average number of stages per well by 56%.
- Reduced water cut compared with prior wells.



## Slow completion reduces operational efficiency and delays production

Vinogradova field in northern Russia contains oil reserves estimated at more than 75 million tons. Most reserves are classified as tight oil with a thin, low-permeability, undersaturated reservoir.

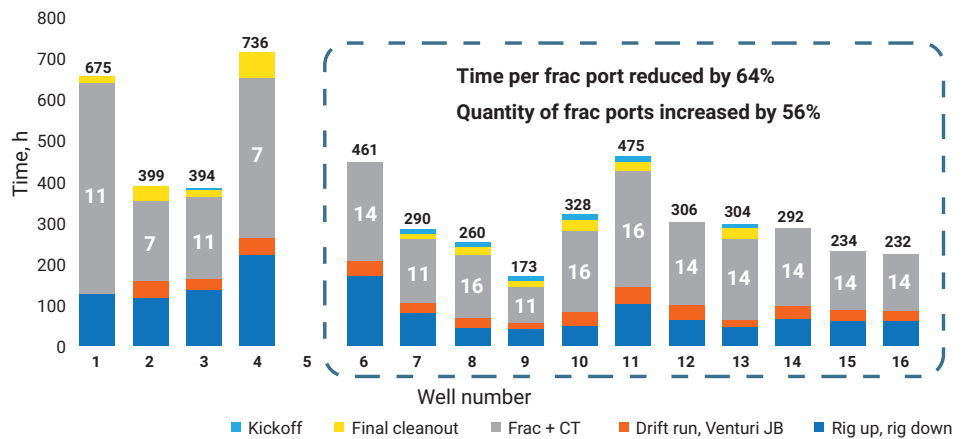
Another service provider completed four wells in the field for RITEK-Beloyarskneft, but the stimulation operations were lengthy. The wells were completed with sliding sleeves that were run into the well with the liner. During the stimulation operation, each sleeve was opened using a specialized bottomhole assembly run on coiled tubing (CT). However, the service company was unable to leave the CT in the well during the fracturing operations, which meant that each frac port required two CT runs: one to clean out the well and one to close the previous port and open the next port. As a result, the average completion time for the three wells, with an average of 8.3 stages per well, was more than 61 hours per stage or 23 days per well.

For the next several wells, RITEK-Beloyarskneft wanted a faster solution to reduce the nonproductive time related to waiting for CT runs.

## CT options improve efficiency and stimulation design

Schlumberger proposed an integrated BroadBand Precision service to optimize the completion and fracturing operations for well productivity, operational efficiency, and quality.

The completion was designed with reclosable CT fracturing sleeve technology as part of the casing string. During the stimulation operation, CT would be used to open and close each sleeve, stage by stage, as in the earlier wells. However, because the service was integrated, the fracture stimulation operation could be designed for pumping down the CT-to-liner annulus, enabling the CT to remain in the well and significantly reducing the completion time.



Compared with wells completed and stimulated by another service company, wells treated with integrated, optimized BroadBand Precision services were completed more rapidly, with more zones, and produced with lower water cut. Black text is the total time of operations; white text indicates the number of frac ports.

Furthermore, the fracturing design could be adjusted from stage to stage based on iterative reservoir response. Because CT was already in the well to expedite screenout recovery, engineers designed the fractures with more aggressive proppant schedules, increasing concentrations from the conventional 300 kg/m<sup>3</sup> [2.5 lbm/USgal] to 450 kg/m<sup>3</sup> [3.8 lbm/USgal] in linear gel to maximize post-fracture conductivity.

In addition, the formation net pay thickness is approximately 4 to 5 m. A fracture design simulation determined that the conventional fracture designs placed up to 80% of the proppant in unproductive and undesirable parts of reservoir. Schlumberger engineers developed a new design to decrease the volumes of fluid and proppant in each stage—thus keeping fracture growth and proppant in the most productive part of the reservoir and out of nearby water zones—but compensate for this by increasing the number of stages.

### **Targeted treatments save time and extend stimulation**

All the fracturing treatments were performed in the AS3 horizon at the Vinogradova field from February through October 2017. Each well was completed with 11 to 16 fracturing ports (14 on average) for a total of 154 hydraulic fracturing operations—56% more than the earlier operations. The operations in 11 wells used 2,334.5 t [5,147,000 lbm] of proppant at 12 to 15 t [26,400 to 33,000 lbm] per stage.

The average duration of the well stimulation operations, from rig up to rig down, was 12.5 days, or approximately 22 hours per stage—64% less time per stage compared with the 61 hours per stage for the earlier operations. In addition, the operator found that water cut was no longer a problem in the wells.

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