



# Radial Drilling Delivers Major Productivity Increase exceeding 120% for Lukoil Perm

Lateral jetting technique significantly increases completion effectiveness compared with conventional fracturing.

## CHALLENGE

During well work-over, improve production in conventional completions in the Perm region.

## SOLUTION

Apply a sequence of laterals placed to effectively maximize both transfer of fracturing horsepower and subsequent additional fluid migration & flow.

## RESULTS

Increased annual hydrocarbon production rates of between 100% to 150%, recovering in excess of 261,000 additional barrels.



## Large percentage of unproductive & under performing wells

Operating in the Middle - Lower Carboniferous, Lukoil Perm needed to improve production through work-over optimization of cased vertical wells. Forty-nine under performing wells in the Perm region were chosen.

Surface core tests and analysis indicated good formation response to stimulation fluids, opening additional flow channels not normally seen with their conventional completion.

## Effective solution through sequenced lateral placement.

The operator decided to evaluate the effectiveness of sequential placement of laterals in addressing low production rates associated with conventional completions.

The laterals were systematically placed to allow delivery of maximum natural flow returns to the main wellbore and to surface.

Specialty chemicals were utilized in the laterals to provide formation protection and increase permeability.

Laterals were achieved using fluid volumes no more than 1,000 liters per lateral and configured for zero formation invasion.

## 100% - 150% higher production without loss of efficiency or added cost.

Following lateral placement, the wells flowed back and produced using similar choke sizes. After one year, a comparison cumulative oil volumes normalized by lateral length, showed that placement of the laterals had increased production of between 100% - 150%, far exceeding the operators original expectations. As a result, Lukoil continues to apply the technique on additional wells.

