

# DatCI<sup>SM</sup> Process Helps Reduce Well Construction Time Up To 43.5 Percent

## MEGAFORCE™ DRILL BITS ACHIEVE RECORD ROP ACROSS RUSSIA'S PERMIAN REGION

PERMIAN REGION, RUSSIA

### CHALLENGES

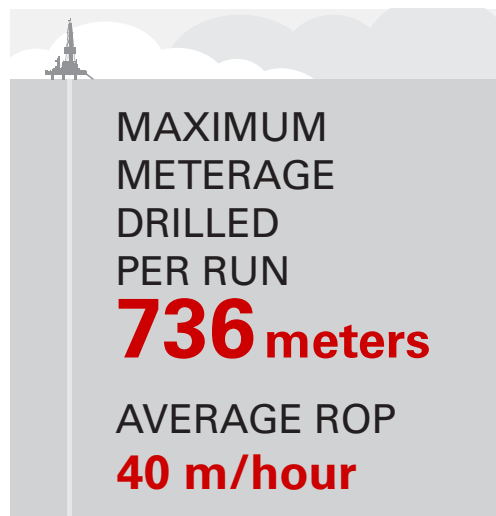
- » Reduce well construction time
- » Penetrate intervals of highly interbedded Permian rocks

### SOLUTION

- » Application of MegaForce™ MM65R bit, developed in collaboration with the customer through the Halliburton Design at the Customer Interface (DatCI<sup>SM</sup>) process

### RESULTS

- » Maximum meters drilled per run: 736 meters (2,415 feet)
- » Average ROP: 40 meters/hour (131 feet/hour)
- » Maximum decreasing of the well drilling time: 43.5 percent vs. planned drilling time
- » The average reduction in well drilling time across the field: 20 percent



MAXIMUM REDUCTION OF DRILLING TIME  
**43.5%**

### OVERVIEW

In 2013, Halliburton Drill Bits and Services started operations in Russia's Permian territory at a challenging field for one of the world's largest oilfield companies. Halliburton provides supplies and engineering support of drill bits for hole sections measuring 295.3 millimeters (mm), 215.9 mm, and 149.2 mm. More than 60,000 meters (196,850 feet) have been drilled since 2013.

The production casing sections are drilled with 215.9-mm polycrystalline diamond compact (PDC) cutter bits. The main challenges while drilling are the inclination angle build in the Permian carboniferous siliceous rocks, and low rate of penetration.

### CHALLENGE

The operator's challenge was to penetrate intervals of highly interbedded Permian rocks, while also reducing well construction time.

### SOLUTION

Halliburton experts applied the MegaForce™ MM65R bit, developed in collaboration with the customer, using the Halliburton Design at the Customer Interface (DatCI<sup>SM</sup>) process.

The main challenges while drilling were the inclination angle build in the Permian region, the carboniferous siliceous rocks, and low ROP.

Before operations began in 2013 in the Permian region, Halliburton Drill Bits and Services experts performed numerous assessments and tests:

- » Evaluation of rock properties (lithology and strength)
- » Analysis of specific drilling conditions
- » Hydrodynamic analysis
- » Calculation of forces and efficiency of bit cutting structure
- » Simulation of swirl limits to minimize vibrations
- » Analysis of design solutions and the effect of drilling mode on bit steerability
- » Spatial toolface orientation

These processes were followed by the screening of available bit designs suitable for the conditions of the southern Permian region. The 215.9-mm FX65R bit was selected for drilling of the production string section. Even after the first runs, the FX65R bit demonstrated excellent rate of penetration (ROP) and wear results, acknowledged by directional drilling specialists, and was steerable in angle build/drop intervals. One of the features of the 215.9-mm FX65R bit is the auxiliary active cutters, which reduce the reactive force and limit the cutting structure depth of penetration into the formation. This is particularly important for drilling in highly interbedded Permian rocks.

As the result of further improvement and optimization of the selected bit – including comprehensive DatCI research in collaboration with the customer’s geologists and drilling specialists – the 215.9-mm MM65R bit was eventually designed based on state-of-the-art technologies and materials of MegaForce™ series.

### RESULTS

During application of the MM65R bit with Halliburton bits, in 215.9-mm sections, the ROP nearly doubled.

The 215.9-mm MM65R bit established a record ROP across the southern group of fields in the Permian region. The actual ROP was 40 meters (131 feet) per hour, double the planned ROP of 20 meters (66 feet) per hour. With the well profile goals achieved, the retrieved bit had only minor signs of wear.



*Drill bit comparison. The retrieved drill bit showed only minor signs of wear.*

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