CASE STUDY



Evolution[®] Water-Based Drilling Fluid System customized with novel polymer chemistry overcomes reactive shales to deliver 22% reduction in total well cost

Moftinu region, Romania

Evolution[®]

As operators explore sustainable solutions to overcome unconventional challenges and improve drilling performance – our field-proven Evolution® Water-Based Drilling Fluid System is the natural next step.



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Cleaner, faster and smarter drilling of unconventional and conventional wells

Engineered to meet the demands of unconventional drilling, the Evolution high-performance water-based drilling fluid system (HPWBM) has been engineered to deliver exceptional drilling performance with reduced costs and improve the environmental profile compared to OBM.

Due to the severity of the drilling challenges in Romania's notoriously Moftinu region, Newpark specialists customized our Evolution HPWBM to overcome a wide range of drilling challenges due to the unique nature of this field.



The Evolution system customized with Ntegral polymers results in dry, firm cuttings that are easily removed by the cuttings screens.

For an operator facing a wide range of drilling challenges due to the unique nature of this field – Evolution offered fresh reason for optimism.

A fresh approach to old challenges

On previous wells in the area, the operator encountered several problems while drilling the 8½-in. section from 400 - 1000m with a traditional KCl-PHPA (Partially Hydrolyzed Polyacrylamide) water-based fluid system. The swelling of problematic shales resulted in excessive torque and drag (5-10 tons at tight spots) requiring unplanned backreaming while tripping out of the hole. This also resulted in a low rate of penetration (ROP) and consequently a substantial increase in drilling time. This non-productive time negatively affected the customer's well delivery performance as well as increased overall well costs.



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Overcoming 5-10 tons of torque and drag

A customized solution from the fluids experts

When it comes to overcoming the specific challenges in this unconventional well, our fluids knowledge and rigorous assurance testing is critical to success. Following a thorough review, our fluids specialists proposed a customized Evolution water-based drilling fluid system formulated with Ntegral[™] polymers.

A departure from the traditional polymer WBM system typically favored by the customer, Ntegral polymers are a novel chemistry delivering excellent low-shearrate viscosity. Mitigating fluid loss and providing cuttings encapsulation from a single product. These polymers create an exceptionally thin, pliable filtercake and firm cuttings (Figure 1), which slows the hydration of reactive clays.



Figure 1

Ntegral I and Ntegral V polymers were used at concentrations of 0.35 and 2.1 lb/bbl respectively coupled with 8 wt/vol% KCl for drilling the $8\frac{1}{2}$ -in. section from 396 to 1,002 m.

Raising the bar with impressive reductions

The tailored approach delivered exceptional results.

Compared to previous wells drilled with conventional KCI-PHPA (Partially Hydrolyzed Polyacrylamide), the total drill time decreased from 70 to 39 hours – an impressive 44% reduction in drill time.

An approximately 30% increase in ROP from 9-10 to 15.7 m/hr was a noticeable improvement due to better weight transmission to the bit, as weight on the bit (WOB) was reduced by 50% from 2-8 to 1-4 tons by lowering torque and drag.

Seeing torque and drag reduce considerably from 5-10 tons to a max of 5 tons in tight spots. In addition, the time required to perform wiper trips and POOH after drilling the section decreased from 37 to 16 hours (approximately 57% reduction in drill time).

Improved solids control efficiency and cuttings encapsulation resulted in the added benefit of reducing the average waste management volumes and cost. Cuttings observed on the shakers were intact and dry inside without any sign of dispersion. This in turn resulted in a cost benefit of reduced trucking costs for both materials and waste.

Combining improved ROP, reduced WOB, reduced drilling time, and reduced trucking – among other benefits of using the Evolution system – resulted in a reduced total well cost of 22%.



ROP 9 increased to 15.7 m/h







Contact Newpark fluids specialists for more information nfs@newpark.com or visit newpark.com/fluids