



Evolution® Water-Based Mud outperforms Oil-Based Mud and provides cost-and-time savings for operators in the Midland Basin

Total fluids cost reduced by 16% over traditional OBM in West Texas Midland Basin

CHALLENGE	SOLUTION	RESULT
<ul style="list-style-type: none"> • Deliver wells on time and on budget • Limit the potential environmental impact • Reduce or eliminate ancillary cost associated with using invert mud systems • Provide the best performance and the most economical fluid 	<ul style="list-style-type: none"> • Evolution® water-based polymer system 	<ul style="list-style-type: none"> • 16% reduction in total fluids cost compared to OBM • 28% reduction in lateral cost per foot • Improved days on well by 4.5 days • Lowered flat time by average of 2 days • Provided additional savings over that incurred when using invert fluids

OVERVIEW

In the West Texas Midland Basin, a data set of 90 wells was selected based on similar target depths and geographic location. The data set was categorized into three separate groups, including 30 wells that were drilled using traditional OBM, 30 wells that used a polymer invert emulsion and 30 wells drilled with Evolution® HPWBM.

CHALLENGES

Aside from the obvious challenge of the need to deliver the wells on time and on or below budget, it was critical that environmental impact be kept to a minimum. Cost savings were also a major factor.

Newpark Fluids Systems analyzed all the wells using the same Key Performance Indicators (KPI's): average ROP, days on well, drilling days, total spend and cost per foot. After a brief review of the data and comparing the KPI's, it became clear that Evolution was the best option for operators drilling in the Midland Basin. Evolution HPWBM is not only the most economical choice, but it also provides the region's best performance and reduces the environmental footprint for the Operator.

SOLUTION

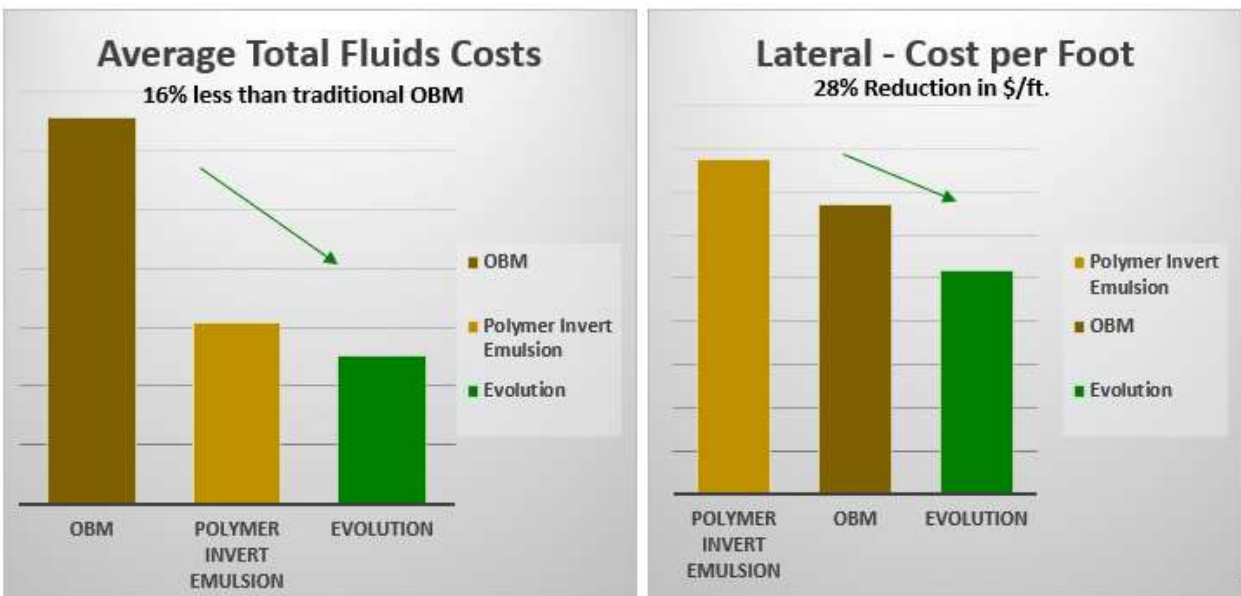


The Evolution system was originally developed to satisfy an operator's demanding unconventional application in an environmentally sound manner, and it continues to be the world's most popular high-performance water-based drilling fluid.

Based on a sound scientific design approach that has been extended using LEAN Six Sigma principles, today's Evolution system continues to lower drilling costs for Newpark customers. For that reason, the Evolution system was chosen for this Midland Basin application.

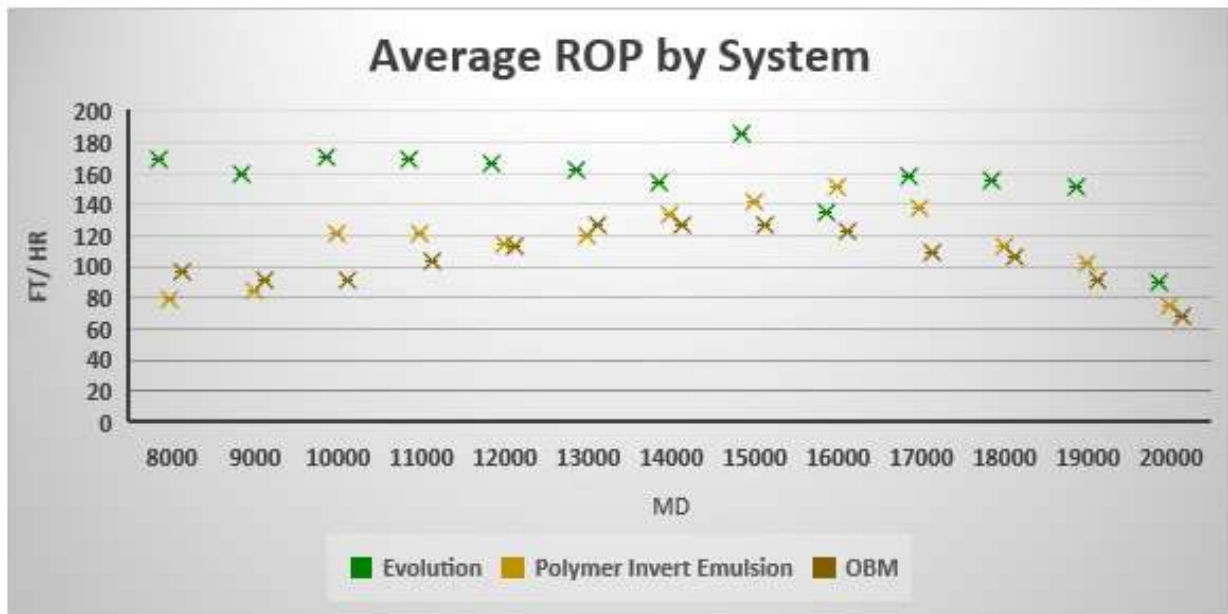
RESULTS

The average cost for wells drilled with Evolution was 16% lower than on wells drilled to similar TVD and MD using invert fluids systems. Laterals drilled with Evolution HPWBM saw an even higher reduction of 28% in the cost-per-foot.

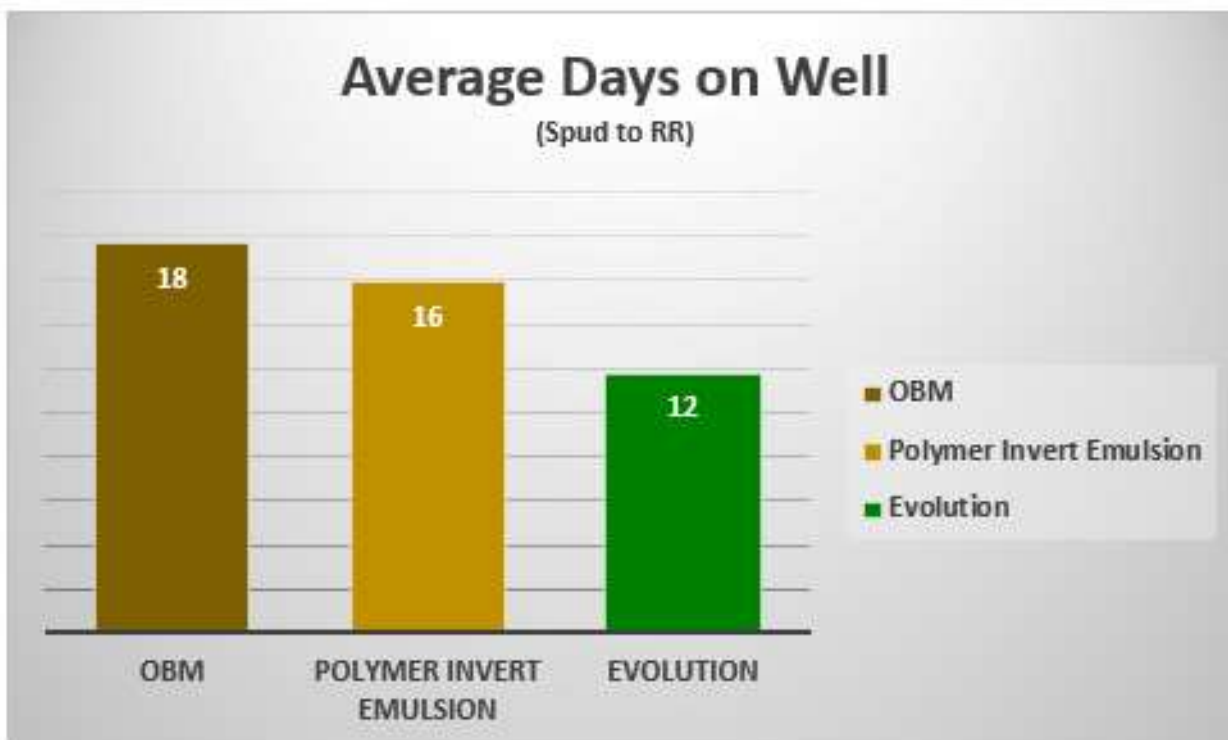


When compared to both traditional OBM and polymer invert emulsion systems, the laterals drilled with Evolution consistently maintained a higher average ROP. This allowed the operator to complete their drilling operations in less time, which also lowered the overall costs. Wells drilled with Evolution were routinely completed ahead of the drilling curve and were ready for completions by an average of 4.5 days sooner than those using the other two fluids systems.

The savings in time were not only attributed to the increase in ROP, but also in reduced flat time associated with batch drilling. Multi-well pads drilled using water-based fluids from top to bottom could be drilled from surface to TD without the need for pit cleaning crews or skidding the rig to isolate the OBM sections and prevent contamination. Wells drilled with Evolution HPWBM were delivered in fewer days from spud to rig release even when compared to wells using invert fluids with similar lateral drilling days.



When not drilling with Evolution, Operators acknowledged the additional spending that is associated with using invert fluids systems. Ancillary costs associated with OBM include daily diesel usage, additional trucking, manned solids control, motor re-align, and pit cleaning, not to mention the environmental impact. Operators agreed, on average, that a savings of approximately \$90,000 per well could be achieved.





Ancillary OBM Cost

Trucking to Location	2000 bbl. = 20 loads x 4 hours per load x \$65.00/hr	= \$5,200.00
Daily:	Diesel: 80 bbl. a day of diesel usage x \$2.15/gal	= \$7,224.00
	Solids Control (Recovery)(Centrifuge, 2 drying shakers, 2 Open Tops, Hands):	= \$2,500.00
	Land Farm:	= \$2,500.00
	Rig Hand OBM Bonus (5 hands per tour x 2 tours = 10 hands x \$20.00/day):	= \$200.00
Addition to but not Daily:	OBM Pit Cleaning:	= \$8,500.00
	Mud Motor Reline per each motor used:	= \$9,500.00
	Additional OBM Delivery for volume at 115 bbl. load x 5 hours RT x \$65.00/hr:	= \$625.00
Trucking From Location:	2000 bbl. = 18 loads x 5 hours RT x \$125.00/hr	= \$5,200.00
Daily:		= \$12,424.00
Additional:		= \$29,025.00

It is straight-forward to quantify the performance savings of using Evolution HPWBM over invert-based fluids with this data, however reducing the risk of environmental impact is an important consideration. Rectifying damages associated with Oil Based Mud spills or containment failures of buried drill cuttings and land farms can reach into the millions of dollars. Using the Evolution environmentally friendly drilling fluid offered the Operators extra assurance of mitigating significant liabilities.