

Case study: Greene County, Pennsylvania

# Optimized performance leads to two back-to-back ‘mile-a-day’ wells

The Baker Hughes Drilling Services and Drill Bits teams have been consistently drilling “mile-a-day” wells in the Marcellus and Utica shale plays in the Northeast US. From 2015 to the end of August 2017, Baker Hughes had drilled 100 wells exceeding 1 mile (1.6 km) in length in less than one 24-hour period.

Of the 100 “mile-a-day” wells, 30 have been drilled for Rice Energy, a long-standing customer with Baker Hughes. It has been a mission for Baker Hughes to continuously improve the operator’s performance, all while experimenting with new ideas and technology, including, but not limited to, the implementation of the **Navi-Drill™ Ultra™ XL45 high-performance positive displacement motor** in the Marcellus shale, trying out different bit nozzle configurations, and using remote operations to not only decrease cost, but also improve knowledge-share abilities.

In August, the Baker Hughes and Rice Energy teams raised the bar and drilled not only one—but two—back-to-back mile-a-day wells (5,280 ft [1609 m] on both of those days) in Greene County, Pennsylvania, drilling more than 10,560 ft (3,219 m) in a 48-hour period.

Reducing days on well to 4.6 days or less, each well drilled with an average lateral on-bottom ROP of 232 ft/hour or greater, attributing to average lateral footage/day of 5,570+ ft/day (1,698+ m/day).

## The ‘go to’ tool for reducing days on well

Continued teamwork between Baker Hughes, as well as optimized BHA and parameters for the area contributed to these results. On one well, the **AutoTrak™ Curve rotary steerable system (RSS)** and the Navi-Drill Ultra XL45 motor, which provides more torque at the bit, as well as higher differential pressure, helped enhance ROP. The other well (the first one to achieve this accomplishment) utilized the standard **Navi-Drill™ Ultra™ XL/LS positive displacement motor** with AutoTrak Curve RSS. Both BHAs used the 8½-in. AT505FX PDC bit.

The AutoTrak Curve RSS is the go-to tool for this operator to drill the smoothest wellbore possible, increasing performance, and easing casing runs.

The XL/45 motor provided more torque and higher differential pressure, and therefore higher sustained ROP, all contributing to the operator’s goal to reduce days on well possible.

Using the Baker Hughes Remote Operations team located in Mt. Pleasant, Pennsylvania, it was proven that excellent, consistent performance can be achieved, even with fewer people at the well site.

## Challenges

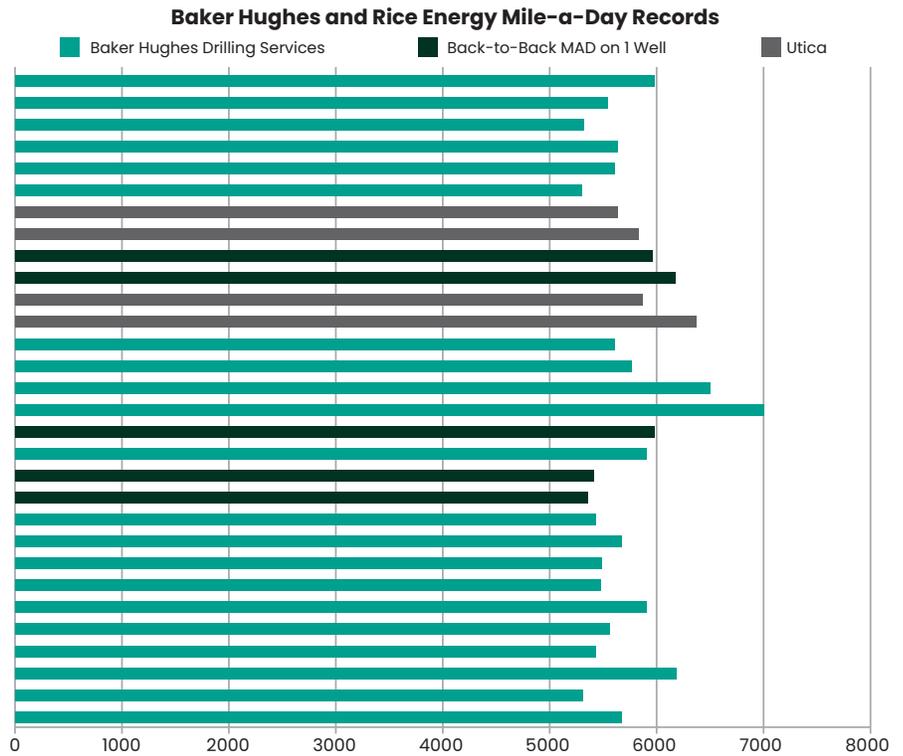
- Reduce days on well
- Achieve maximum performance with standard equipment used in this play
- Improve operator’s record drilling performance

## Results

- Drilled 11,472 ft and 12,222 ft in a 48-hour period on two different wells (a Northeast US drilling record)
- Reduced days on well by 33% compared to other wells on the pad
- Reduced operator’s total day rate

This is one achievement that has not been accomplished with any other operator in the Northeast region, and has reshaped the mold for record-breaking performance.

Rice Energy was very motivated to have a performance record that no other operator had accomplished in the region. By helping them achieve this record, Baker Hughes reaffirmed its status as the drilling service provider of choice for this customer. In knowing that Rice Energy had a goal to succeed in doing something no other operator has done, the Baker Hughes team worked together to fine-tune the lessons learned from other operators, and to introduce solutions to achieve the goal.



Baker Hughes and Rice Energy have achieved a mile-a-day 30 times.