

Rystad Energy Newsletter 22 August 2017

Fracking activity on the rise in 1H 2017, but proppant intensity is slowing down

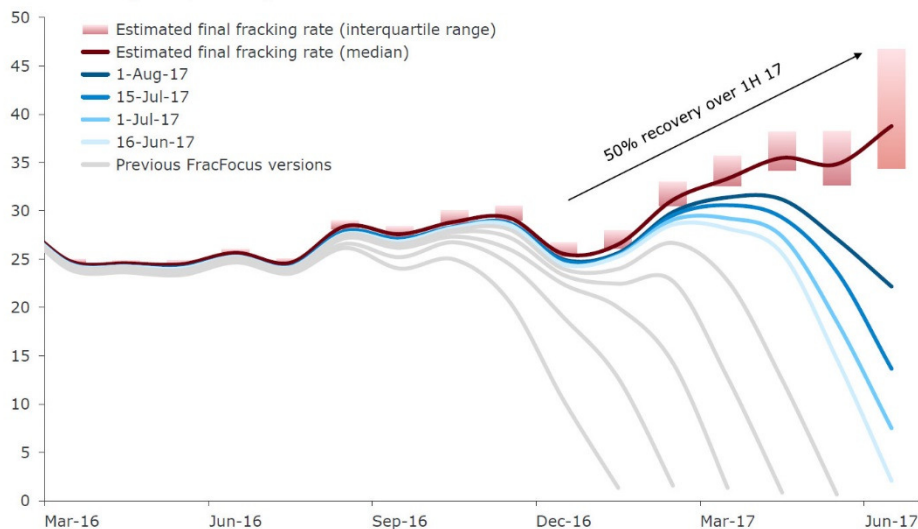
<https://www.rystadenergy.com/newsevents/news/newsletters/UsArchive/shale-newsletter-august2017/>

Although rig counts are an important predictor of short-term supply that is widely used in the industry, it is rather completion activity that has the most predictive power when it comes to short-term production forecasting. For instance, **shale recovery in rig counts has persisted since mid-2016, but completions were flat in 2H 2016, resulting in accumulation of inventory of drilled but uncompleted (DUC) wells rather than new wells turned-in-line straight away.** Therefore, completion activity plays a primary role when it comes to short-term production trends.

As data from many state authorities is subject to a reporting and processing lag, the **FracFocus Chemical Disclosure Registry – a database on pressure pumping operations in the US – appears to be one of the most up-to-date sources when it comes to recent trends in completion activity, which Rystad Energy follows closely.** It provides a wealth of insights into chemicals used in the hydraulic fracturing operations. Moreover, with more than 90% of recent frac jobs reported to FracFocus, it is also representative of the fracking activity in the entire US.

Figure 1. US fracking rate by month and FracFocus database time stamp

Number of jobs per day



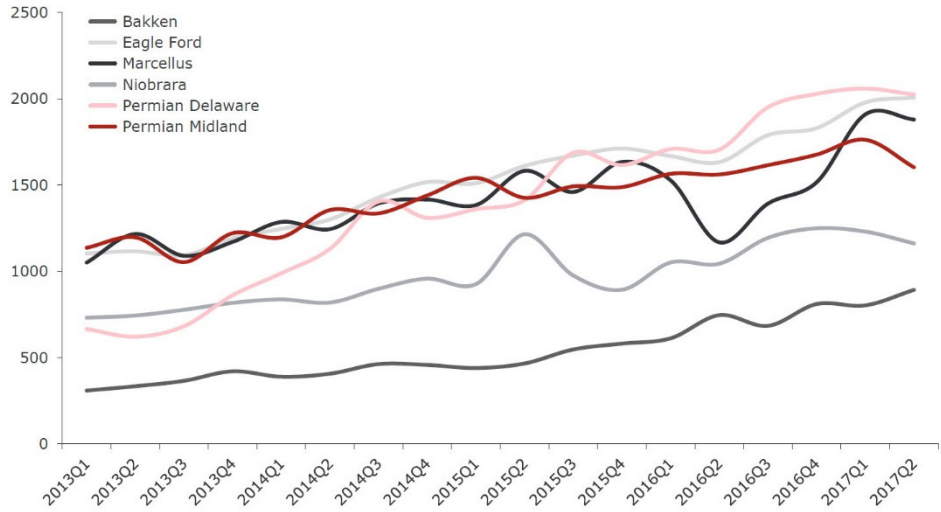
Source: FracFocus, Rystad Energy Research and Analysis

Figure 1 depicts the total US fracking rate – defined as the number of hydraulic fracturing job per day – along with an estimate of the final fracking activity based on the analysis of typical delays in reporting. **Fracking activity has bottomed out during mid-2016 with slightly less than 25 jobs per day, and then stayed at a relatively flat level, improving slightly in 2H 2016. In 1H 2017, completion activity realized a sharp increase after a significant reactivation of stacked pressure pumping equipment.** The completion activity increase has been driven primarily by a growing number of completions in the Permian Basin, South Texas, and the DJ Basin.

The data suggest that fracking activity has likely reached the level of around 35 frac jobs per day in April-May 2017. Although there is a higher degree of uncertainty when it comes to the most recent months, **June 2017 has a potential for a further increase in the number of frac jobs, up to 39, which would constitute a 50% growth since December 2016.** This level of completion activity is seen as sustainable in the short-term, and completion

activity is set to remain strong in 2H 2017. However, further recovery requires an improvement in the market sentiment.

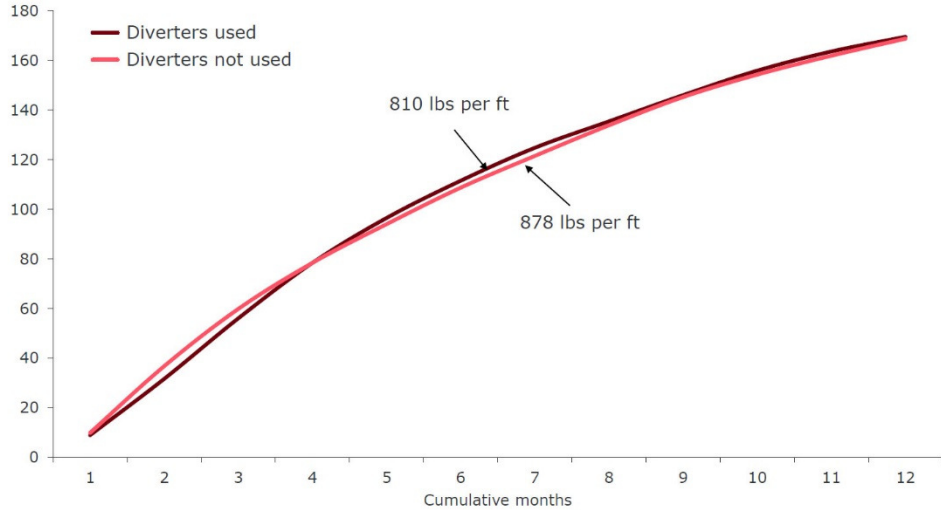
Figure 2. Average proppant intensity by quarter and play
Pounds per foot



Source: Rystad Energy NASWellCube

Along with the completion activity picking up in 1H 2017, proppant intensity has been on an increasing trend until recently. Figure 2 shows the average proppant loading per lateral foot among the major US plays. **Proppant intensity has been growing steadily in all major plays, with Permian Delaware and Bakken exhibiting the largest increase since 1Q 2013 and almost tripling average proppant loading. While Bakken and Eagle Ford are still on an upward trend in 2Q 2017, all other major plays show a decline in proppant intensity.** Permian Midland is declining by almost 10% as some operators are questioning the improvement of well economics from higher proppant intensity in the light of the recent uptick in frac sand prices.

Figure 3. Average cumulative oil well curves for WLL Bakken wells* by completion type
Thousand barrels



Source: Rystad Energy NASWellCube

*Includes wells completed in 2016-2017; normalized per 10,000 feet lateral

Although proppant and water constitute more than 99% of hydraulic fracturing fluid by mass, there is also a variety of other chemicals being used during well stimulation. **Recent interest has been focused on the use of diverting agents – chemicals added into the hydraulic fracturing fluid with the aim of increasing fracturing efficiency and reducing well stimulation cost due to the decreased number of perforation runs and frac plugs required.** A recent rise in systematic use of diverters has been particularly seen in Bakken, where two dedicated players –

Whiting Petroleum and Continental Resources – have initiated the use of diverting agents in their stimulation jobs.

Figure 3 shows average cumulative oil well curves for Whiting's Bakken wells completed in 2016-2017, split by wells where diverting agents were used during the frac job, and wells that were stimulated using the fluid without diverting agents. While we observe a very limited improvement in well productivity in the first 12 months on production, it is evident that **the use of diverting agents allowed Whiting to achieve the same normalized curve with an 8% lower proppant loading per foot of lateral. This is due to a seemingly improved proppant suspension on average in the treated wells as a result of the use of diverter technology. When cost reduction is taken into account on top of the lack of degradation in well productivity, the use of diverters turns into a natural decision from an economic perspective.**