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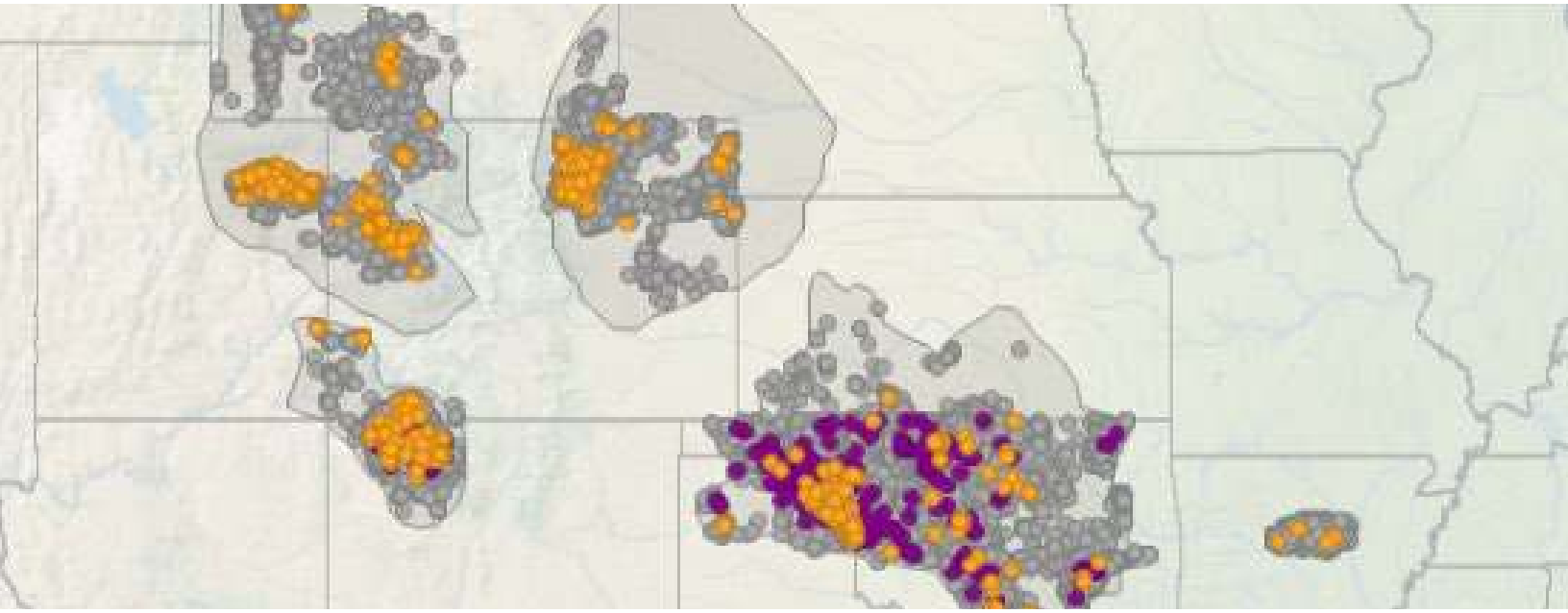
better, faster decisions

IDENTIFY AND ANALYZE THE BEST REFRACS.

Read About How Drillinginfo Can Guide You to Better Refracs



Case Study

Drillinginfo helps companies find the refrac information they need to achieve successful results

The Challenge

Planning a refrac can often feel like being in a black box. There is little published information about refrac best practices and techniques, and even finding the locations of these wells can mean multiple manual searches through individual state databases and associated Frac Focus filings. Despite this lack of information, companies remain highly interested in refracs, especially in low-price environments. How can companies that are interested in refracs find the information they need to achieve successful results?

In this example, we will follow an E&P company that holds acreage in the Delaware Basin. Infill drilling is too expensive for this company's current situation, so they would like to explore any opportunities for refracs. They would like to know which operators have had success refracturing in and around their area and identify the best practices of the top producers.

The Solution

Using Drillinginfo and DI Refrac Analysis, the company can follow an intuitive step-by-step process that identifies recompletions and refracs in an area of interest (AOI) and the completion techniques used for each one. The company can also use the data to run an analysis on the economics of a proposed refrac within the same application.

Normally, this would mean deep dives through multiple datasets to find the relevant information, and then time and effort (and the risk of human error that comes with manual tasks) to clean, integrate, and analyze the data. This is a slow, tedious, labor-intensive process that would likely provide incomplete or possibly inaccurate results.

The company begins by selecting their AOI in the Delaware Basin and moving on to the first tab of the workflow—the Refrac Dashboard. This tab displays charts that allow the company to easily identify the operators performing the most refracs in the area and the counties and reservoirs that have seen the most activity. They can also view a timeline to get an idea of how refracs in the area are trending over time.

The company is only interested in horizontal wells, however, and wants to understand the impact of the latest refrac technology that is being used, so they filter further to only horizontal wells refractured in the past two years. Immediately, they identify Operator X as the top player in the area, that Eddy County in New Mexico is the county with the most refracs, and, that within that county, the Bone Springs formation is most prevalent.

Are geography or completion techniques affecting the production results? The company can begin to gather benchmarks from this information.

Using the Graded Acreage map layer of the Bone Springs formation, the company can view the acreage quality down to the square mile. Interestingly, the refracs in Eddy County are not occurring in the best acreage. What was the

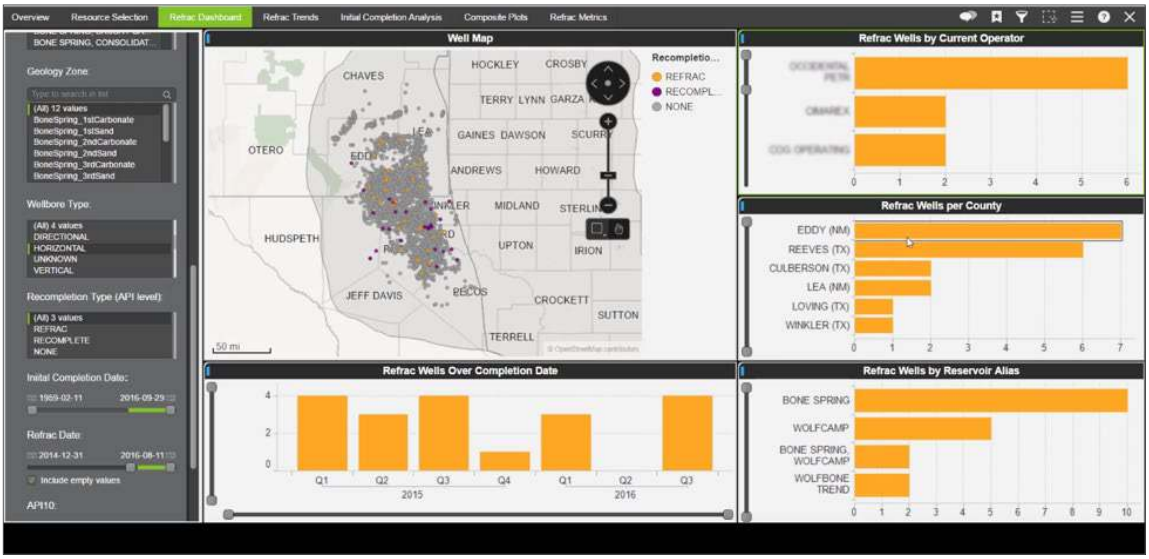


Figure 1: The Refrac Dashboard reports refracs by operator, county, reservoir, and more

operator's strategy? Perhaps Operator X thinks there is extra potential that can be exploited through a refrac, even though it is not in the best quality acreage. However, this may turn out to be a risky proposition in the current low-price environment. The company is now interested in finding out how these refracs were chosen by Operator X and, ultimately, how they performed.

Next, the company moves over to the Initial Completions tab to compare performances of all wells in the AOI, including initial recompletions of the refrac'd wells. They can quickly generate a scatterplot that shows a strong correlation between higher proppant and fluid and higher initial production (IP). This is indicative of how receptive the geological formation is to the type of proppant and fluid used in the initial completions.

How did Operator X select wells to be refrac'd? Through studying the Cumulative Distribution Function (CDF) plot on this tab, the E&P company can start understanding the strategy of Operator X in choosing potential refracs in this area. They can see that Operator X chose wells with initial production performance above the median, but that declined drastically over the life of the well, as refrac targets.

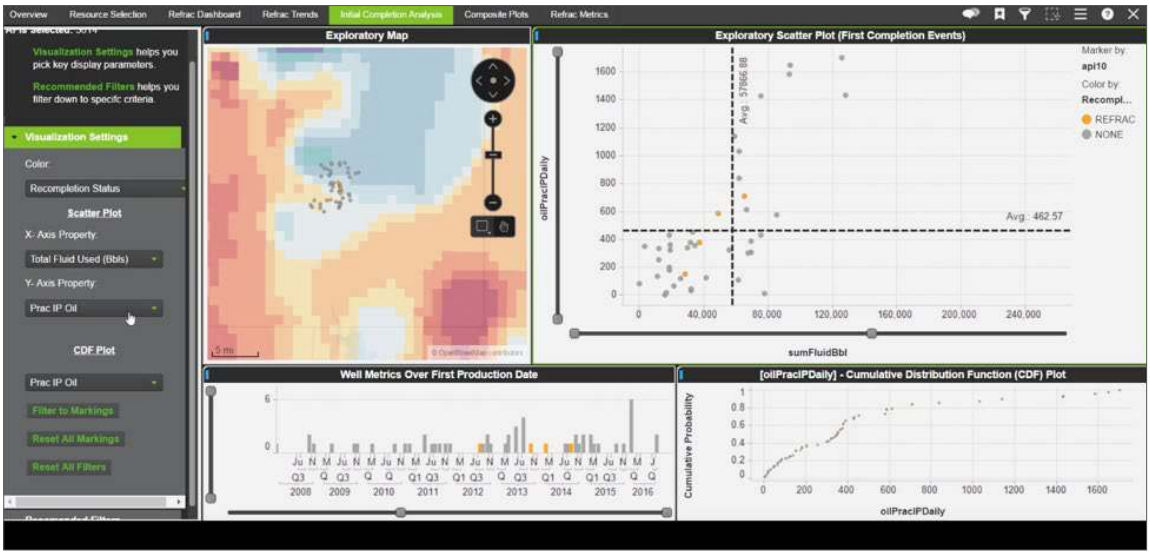


Figure 2: The Initial Completions tab shows a correlation between higher fluid and higher IP

How did these refracs perform and how can we quantify their performance? In the Refrac Metrics tab, the company can easily quantify the performance of these refracs using pre-calculated metrics such as IP ratio (comparing initial production to post-refrac production), incremental production volumes, and estimated ultimate recovery (EUR). For example, through the scatterplot analyzing IP ratio and the time taken to refrac, the company can see that the refrac with the highest IP ratio was refractured within 23 months of initial completion, while the well with the worst IP ratio was not refractured until much longer after its initial completion date.

In a few steps, the E&P company has identified where the most productive refracs are occurring and narrowed in on key metrics that may lead to maximum production: in this case, the volumes of proppant and fluid used, the timing of the planned refrac activity, and the reservoir quality. These inferences give the company an outline of strategies that were both successful and unsuccessful in this basin. In a fraction of the time and effort it would have otherwise taken, the company has a set of best practices and potential strategies for pursuing a successful refrac in the Delaware Basin.