

TOP DATA INNOVATION TRENDS FOR PETROLEUM ENGINEERS: FOUR AREAS TO WATCH



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better, faster decisions

When it comes to big data and data analytics, few areas of engineering have undergone as much upheaval in the last few years as the upstream oil & gas sector. Whether it be reservoir engineers determining geologies, fluids and future field development plans; drilling engineers establishing the best drilling trajectories; completion engineers deciding on proppant and fluid use; or well stimulation engineers putting in place safe and effective fracturing and choosing optimal additive blends; big data is everywhere.

Yet, what should we look out for in the future when it comes to data intelligence and engineering? Here are four of the top data innovation trends for engineers and how they will impact the oil & gas industry.

1.

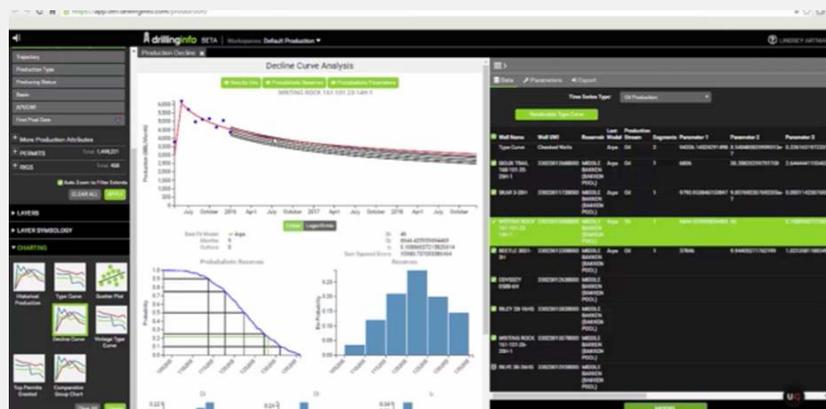
The Growing Role of EURs

For the reservoir engineer, accurate estimated ultimate recovery (EUR) calculations are vital. They determine the regions to target and reservoir engineering strategies to put in place. Such engineers also need to make accurate predictions on the PVT analysis of reservoir fluids, reserves estimates, and production forecasting—sometimes without available proprietary data.

Yet, calculating EUR through the use of decline curve analysis can be susceptible to errors through the assimilation of often incomplete public data, the exporting and importing of data between multiple platforms, the manual selection of a decline curve model and the creation of a single output number to forecast reserves. This number can have a huge influence on future and often expensive field development decisions.

That's why new data analytics and innovations are so important and are set to change reservoir engineering—providing accurate P10, P50, and P70 value estimates, automatically selecting the best decline curve model, and generating accurate EUR calculations. Probabilistic decline curve analysis, type curves and spatial and quantitative analysis tools will also enable reservoir engineers to forecast more EURs, accurately identify acreage positions, and determine whether previous competitor success was due to acreage or innovative engineering practices. Data intelligence tools can also benchmark company performance relative to competitors in a given area.

The figure below shows how a reservoir engineer working for a small E&P company in the Bakken was able to utilize Drillinginfo to simulate production and forecast reserves at P10, P50, and P70 values in an area with no previous data—highly targeted data with a huge impact on the bottom line.



Simulation production and forecasting reserves on the Bakken

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2.

Directional Surveys: Cross-Collaboration and Digital Intelligence Are Key

As part of the drilling engineer's brief to plan and implement drilling processes as safely and efficiently as possible—well paths must be precisely mapped with drilling directional surveys vital as a means of representing the location in 3-Dimensional space. Such surveys, however, are often of poor image quality, in different formats, prone to errors, and highly complex.

Again there is a need for greater digital intelligence supported by cross-department collaboration. Drilling engineers need to access properly mapped, digitized and error-free directional surveys where well files from regulatory agencies are sourced; station points and azimuth, inclination, and measured depth measurements captured; and files are digitized and QCed.

Innovations in digital analytics and intelligence are starting to address these challenges. With Drillinginfo, for example, surveys are mapped within a spatial database, the well's surface location identified, each station point calculated in space, minimum curvature calculations incorporated, and the map then converted into the survey's projected coordinates system. The result is a highly effective dataset that can be incorporated into drilling engineers' daily workflows and can lead to a more effective and profitable drilling.

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3.

The All Important Completion/Production Link

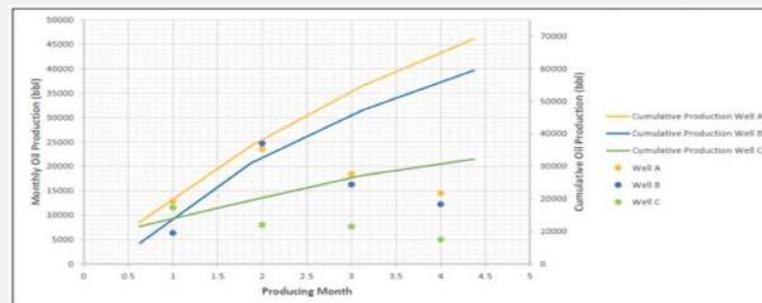
There's no more important step in the engineering lifecycle than that of the completion stage where the ultimate objective is finding an effective correlation between the type of completion and production success.

Too often, however, completion data tends to be limited to a company's proprietary records spanning just a handful of wells and plays. Vital information from neighboring wells and regions, such as lateral length, proppant volume, fluid types, perforation depths, casing details, and formations, are simply not available.

This is changing, however, with one-stop access to the very latest completion and production metrics. Through high-grade data intelligence, completion engineers can understand how each well is drilled, where the casing is set, fracturing detail, perforation depths, well headers, and proppant volume and type in unprecedented detail.

The Impact of Optimized Completion Designs on the Bakken

A multi-disciplinary geoscience and engineering team led by Drillinginfo developed an optimized completion design on two wells in the Middle Bakken and Three Forks formation. The results of the new optimized designs were dramatic—providing a four-month production improvement of 49% on the Middle Bakken well (known as well A) and a 101% increase on the Three Forks well. The Figure below compares three Middle Bakken wells including well A (market in yellow) with different completion designs over a 4-month production period illustrating the impact on production.



Comparing three completions designs over a four-month production period

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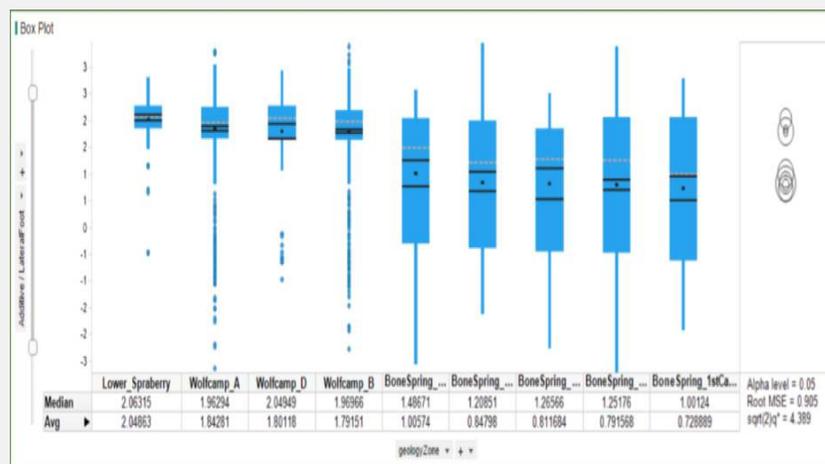
4.

Making Better Use of Additives For Successful and Profitable Hydraulic Fracturing

Finally, well stimulation—and, the process of fracturing—requires the latest in data innovations and insight. In the case of fracturing—and with each operation using on average of 4 to 12 additives—selecting the right additives in order to put in place effective fracture treatment parameters amidst the vast amount of data can be daunting.

Advanced data intelligence has a vital role to play in helping well stimulation engineers navigate the additive selection process, allowing them to understand the different characteristics of each hydraulic fracturing job and what was pumped downhole in unprecedented detail. Valuable data generated includes volumes, masses, chemical composition, the properties of both sand and fluid, proppant type, and fluid chemical composition among others. The growth in machine learning-based routines that identify and reverse-engineer undisclosed proprietary information is also already having a major impact.

Distribution of various fracture treatment types in an Area of Interest (AOI) also gives the operator an understanding of completion technique trends and their impact on production. The figure below, for example, generated by Drillinginfo illustrates additive usage on the Wolfcamp, Spraberry and Bone Spring intervals with distinct differences in additive usage.



Additive usage on the Wolfcamp, Spraberry and Bone Spring intervals

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Making Informed, Data-Driven Engineering Decisions

The oil & gas engineering sector is seeing change like never before, as data analytics and intelligence leads to improved insight and improved decision-making.

It's through a focus on data intelligence and a single source for reservoir, drilling, completions and production data that engineers can understand the full impact of all engineering variables and make confident decisions that maximize production.

For more information on Drillinginfo's engineering capabilities, visit <https://info.drillinginfo.com/products/di-engineering-explorer/>

By monitoring the market, Drillinginfo continuously delivers innovative energy solutions that enable our customers to sustain a competitive advantage in any environment. Drillinginfo customers constantly perform above their competitors because they are more efficient and more proactive than the competition.

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