A 5-Minute Guide to Well Engineering

The dirtiest part of drilling for fossil fuels might not be the equipment, the oil and gas, or even the drilling mud. What's too often the dirtiest, meanest part might be extracting data and refining it for critical insights with data tools unfit for the job.

The problems begin when the data can't be accessed with "black box" applications. Then we have colleagues who every day manually create their own documents with graphs, tables, and text. This just tells us that the reporting model we have is a failure. And then managers try to consolidate what they know in spreadsheets, or, when relevant analyses can't be found, reach out and ask a lot of questions that the reports should have told them already.

To look after a rig or an entire drilling site, you need a tool that immediately updates information as you change wells or filter conditions. Crews wait, and non-productive time mounts, when suppliers fail, mud is mismanaged, when equipment arrives late or breaks down from missed maintenance. Why print a mass of paper reports to get the complete picture of one operation? Drilling and well reporting of the future needs to keep engineers informed of their entire operation, as well as management, geology, reservoir, and other specialists touching the well construction process.

Selecting one of the rigs/jobs should instantly deliver an array of tables and graphs covering time, cost, bits, surveys, fluid properties, and more. If you are to help your employer avoid thousands of dollars in non-productive time, ensure that they always select the right equipment for the job, and always report accurately against drilling targets and AFEs, then you need a modern analytics tool that can mash-up the numerous data sources for you and help spark instantaneous insight.

And then the same analytics platform can work for management too: finance, supply chain, and regulatory reporting people. Using the same data, you can focus on the jobs finished and the jobs still active in the given period regarding AFEs versus actuals. Incidentally, the cost of such analytic tools may be covered immediately by the cost savings in licenses of expensive operations reporting software.

IMPROVE OPERATIONS WITH DATA

An efficient drilling operation runs on analysis of all relevant data. Drilling engineers use the analysis to ensure that suitable equipment arrives when it's supposed to arrive, that drilling risks are mitigated, and that past performance helps guide decisions.

The VP of drilling will want to monitor fluids and hydraulics to ensure they are cleaning properly and that cuttings that may cause stuck pipe incidents are not building up.

A data mashup provides a single analysis of disparate sources, such as spreadsheets, well reporting systems, data warehouses, and enterprise applications such as finance, all without IT help. Having all the data, fully integrated, is sometimes the only way to discover the unknown in your data—for example, what is the root cause of non-productive time (NPT)? In an oil field, the potential causes are vast. Further insight comes from powerful predictive models that help you foresee the wide variety of factors that affect operations. Predictive analytics helps anticipate the efficacy of drilling mud and other choices, as well as strategic decisions on advanced recovery techniques and work-overs. Further, statistical models can be built to promote continuous improvement in maintenance scheduling so that asset integrity can be assured and equipment failure and other unplanned events (that can contribute to catastrophic NPT) can be avoided.

BOOST PERFORMANCE

Nothing boosts productivity like competition, even from within the organization. Benchmark (or "best composite") wells, show the optimal time for each phase of the drilling process and can establish standards by which all wells and all phases are judged. The race begins with a data mashup that displays standings in one glance. Analytics can use this set of standards against known rig rates to highlight real opportunities for cost savings.

Overall cost, drilling speed, equipment performance and reliability, waiting time, and other metrics become clear at a glance in richly visualized data. This can be achieved as part of a daily well surveillance regime, not having to wait days or even weeks to see a complete picture of operations. What factors are contributing to NPT? Bad tools, supplier issues, MWD problems? Even factors such as wave height and other climatic conditions can be mashed-in.

Contextual collaboration socializes and records moments of insight, ideas, and hypotheses for faster, more informed, and more transparent decisions. How have these bits performed in similar geological conditions worldwide? How are we tracking against overall budgets and reporting requirements? The drilling organization that can answer these types of questions immediately has the best insight and can be first to take action to boost performance.

Collaboration can also preserve best practices. Though personnel come and go, an enterprise-grade analytics platform supports the repetition, learning, and improvement of past success with detailed history.

These rich discussions and analyses provide critical context for decisions. They help you make more informed and transparent decisions sooner, with an auditable record that's preserved over time, an important subject in today's oil and gas industry.