



## D2F Questions from Webinar

### “A Paradigm Shift to Real-Time, Data-Driven Frac Completions”

1. **How can this data be used to help identify natural fractures?**
  - a. There are two primary ways that natural fractures can be identified using drilling data. Firstly, if there is depletion associated with the natural fractures, these can be identified with Drill2Frac’s “Depleted Fracture Identification” (DFI) service. Secondly, Drill2Frac is developing methods that use a combination of multiple data streams acquired from the drilling process to identify areas that are likely affected by natural fractures.
2. **You mention that you can identify fractures using drilling data. How exactly are you able to do that?**
  - a. Specifically, we are identifying localized depletion which is associated with fractures. A decrease in the pore pressure results in more energy required to drill that section. This in turn results in an increase in the RockMSE that Drill2Frac calculates.
3. **What cluster spacing tolerance ( /- ft) is necessary to obtain optimum results? With "shooting on the fly" and complex line stretch, is it very difficult to get very accurate positioning?**
  - a. It is very important to note that all the data being generated in the D2F process is done using drillers depth. Typically plug and perf companies do not tie in their wireline to drillers depth. That is why Drill2Frac offers to do wireline depth to drillers depth conversion for every well. When wireline depth is tied back to drillers depth we have seen that perforation accuracy is typically in the range of +/- 2'. To help account for this, our PerfAct engine is the only completion design software that automatically avoids putting perforations in areas where there are wide swings in rock properties. This ensures that even with a slight depth uncertainty, clusters will be placed in the appropriate rock.
4. **How is geological/petrophysical heterogeneity factored into predicted treating pressures?**
  - a. Downhole treating pressures are made up of two main components. There is the far field fracture component which is typically influenced by 3D stresses of the surrounding rock, and there is the near wellbore effect which is comprised mainly of perforation friction and tortuosity. Heterogeneity has the largest effect on the near wellbore parameter. Large heterogeneity results in fewer clusters taking fluid which results in higher perforation friction. Drill2Frac simulates all these effects when simulating fluid distribution
5. **Optimized completion is usually seen as uneconomical compared to a standard geometric completion. Do you see a change coming in the near future?**
  - a. Drill2Frac uses data that clients already have already acquired during the drilling of the well, and as such is one of the most economical methods to improve well productivity on the market. It typically will cost \$1/ft or less to design a fully engineered completion which has shown production improvements that range from 5%-40%. Often the reduced water and chemical costs that result from an engineered completion are enough to justify a Drill2Frac designed completion without the associated production gains.
6. **Is it worthwhile to do engineered completions in wells that have high cluster density?**
  - a. Yes. Around half of the completions that D2F designs have tight cluster spacing (<20'). In addition to placing clusters in the optimal location, our engineered diversion service is ideal for ensuring all clusters take equal fluid.