## Myths Surrounding the Reality of Drilling Automation Development:

**MYTH:** Many of the rig crew are skeptical that the instruments/PLC will replace the man on the rig. We often hear comments like "I guess you won't have anymore need for me", or "if I help you, you will just replace me with an instrument"

**FACT:** We need all the help we can get in understanding the drilling process and how we as a team can optimize it. The better we understand the process, the better we can do at achieving the same common goals of fewer days on well, reduce costs, drill wells safer and more environmentally friendly

Consider this, all of our bonus programs have the same KPI's no matter what level in the company you reside. Who else can we rely on other than the man on the rig to make sure that the process is being done as per planned.

Of course the skills set of the rig crew will have to change somewhat once automation is implemented, but men will still be a critical element in this process. There will be need for instrumentation troubleshooting skills, computer maintenance, etc. but these are skills that every rig hand can learn while on the job. It is far more efficient to teach rig crews how to perform these extra tasks rather than try to teach some tech guru about drilling. The current experience of today's rig crews is very valuable to making this process work.

**MYTH:** Drilling Automation costs too much.

**FACT:** When you look at the process as a whole, Drilling Automation is the cheapest form of insurance you can get. For example a simple basic mass flow meter package costs $150K to install on a rig. Amortize this cost over 10 wells that you will drill this year which is $500/day. Chances are, your rig squanders at least $5000/day in unnecessary sweeps, valuable rig time for clean-up cycles, NPT due to mud pump efficiency, NPT due to lost circulation, NPT due to well control events, NPT due to stuck pipe events, NPT due to ballooning, etc. If you can lower the number of NPT events through Drilling Automation then the equipment all but pays for itself. A good Drilling Automation program shouldn't cost you money, instead it will save you money through efficient monitoring of the drilling process.

**MYTH:** "Every well is different" how can a computer be programmed to drill a well if every well is different?

**FACT:** The simple explanation is the fact that all wells are not different (or at least shouldn't be). In fact every well should be exactly the same. In the past 70 years of drilling, there has not been one drilling event, or drilling phenomena, or drilling anomaly that has happened on any rig in the world that completely stumped all experts and has been classified as being a new drilling event. Simply put, drilling is a batch process, repeatable every time, exactly as you tell the PLC to drill it.

The thing that makes every well different today is the fact that every well is drilled differently. Different drillers drill differently, some with more experience than others. When we get in trouble we tend to lean toward the idea that this must be the "well from hell." The root cause… that the well was being drilled either differently or with less experience is in many cases overlooked. The right solution to preventing stuck pipe and mitigating well control incidents is using process control because the usual process of implementing better training can only do so much. We have continued to train our people for 100 years now, yet we are still hurting our friends & colleagues, we are still having well control incidents and stuck pipe. It is worth noting that industrial factories don't have a problem maintaining exact pressures, temperatures, volumes, concentrations, etc. We can do the same in the field through Drilling Automation.

**MYTH:** ROP is the ultimate measure of performance.

**FACT:** Focusing entirely on ROP can be a result of misunderstanding the holistic management of the entire process. Nearly all experienced drillers know what happens when you just focus on maximum ROP as your key KPI. Drilling automation is optimizing the ROP to achieve the overall best result for costs vs. depth vs. reservoir production, etc. there is a sweet spot that will be what is referred to by some as drilling at the technical limit, to achieve this we need to thoroughly understand the process and utilize instruments to control it.

**MYTH:** Service companies will lose money from Drilling Automation.

**FACT:** Service companies should not be threatened by automation. Yes, instrumentation and process control will result in delivering a totally optimized process, ultimately selling less mud product, less loss circulation, and selling less BHA's due to better cement jobs and better wellbore stability. However, an optimized process places more wells into the drilling budget and what is lost in direct sales will be picked up in the additional volume as a result of automation. Drilling Automation is a Win-Win for everybody.