Session IV: Well Placement and Construction
“Drilling or Well Building?”

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“To extract maximum value tomorrow, we need to build better wells than we currently do today.”

Challenges have Technical and Non-Technical aspects:

• Minimizing Footprint (fewer surface locations)
• Efficiency (higher ROP, lower flat time, lower NPT)
• Well Integrity / Quality (fewer train wrecks)
• Alignment (behavior is driven by incentives)
• Competence ("Houston, we have a problem...")
Minimizing Footprint

- Extending lateral length could be a game changer
  - Environmental Impact
  - PR Implications
  - Cost/BBL (lots of surface locations are a nuisance)

Bakken (±11000’ Lateral)
Haynesville (±7500’ Lateral)
Barnett (±8000’ Lateral)
Qatar (±35,000’ Lateral)
In 2012, we drill wells we can’t complete (properly):

– Installation
  • Need to be able to rotate to overcome drag/buckling
  • Open Hole packer systems don’t like to be rotated
  • Casing design must be fit for purpose

– Intervention
  • Beyond a certain point coil tubing requires a tractor
  • Jointed pipe has a multitude of benefits, but is slow and expensive
  • We need completions that don’t need to be intervened into

– Monitoring
  • Accessories need to be rotatable too

How are we going to address this in the future?
Efficiency

- How much **hidden** NPT is there in the drilling process?
- What is the root cause?
- How do we attack this?

![Haynesville Shale Horizontal Learning Curve](image)
Well Integrity / Quality

• Are we getting what we need out of our wellbores?
  – “Optimum” completion on bottom every time
  – Effective zonal isolation
  – Contribution from the entire lateral
  – Long term integrity

• If not, why?
  – Cost of current technology?
  – Gaps in current technology?
  – Maybe it doesn’t have anything to do with technology...
Alignment

• Do you consider the “drillers” to be anything more than a cost control measure?

• Are your “drillers” incentivized on the right KPI’s?
  – Focused on cost or value?
  – Bonus based on cost/ft, cost/bbl, or capital efficiency?

• Are your “drillers” and completers in the same group?
Competence

• Major misconceptions about important topics;
  – Hole Cleaning
  – Torque, Drag, and Buckling
  – Annular Friction Pressure (aka, ECD)
  – Wellbore Instability

• Academia: What is preventing us from producing technically competent well builders?

• Industry: Do we need a “horizontal well construction” certification standard?