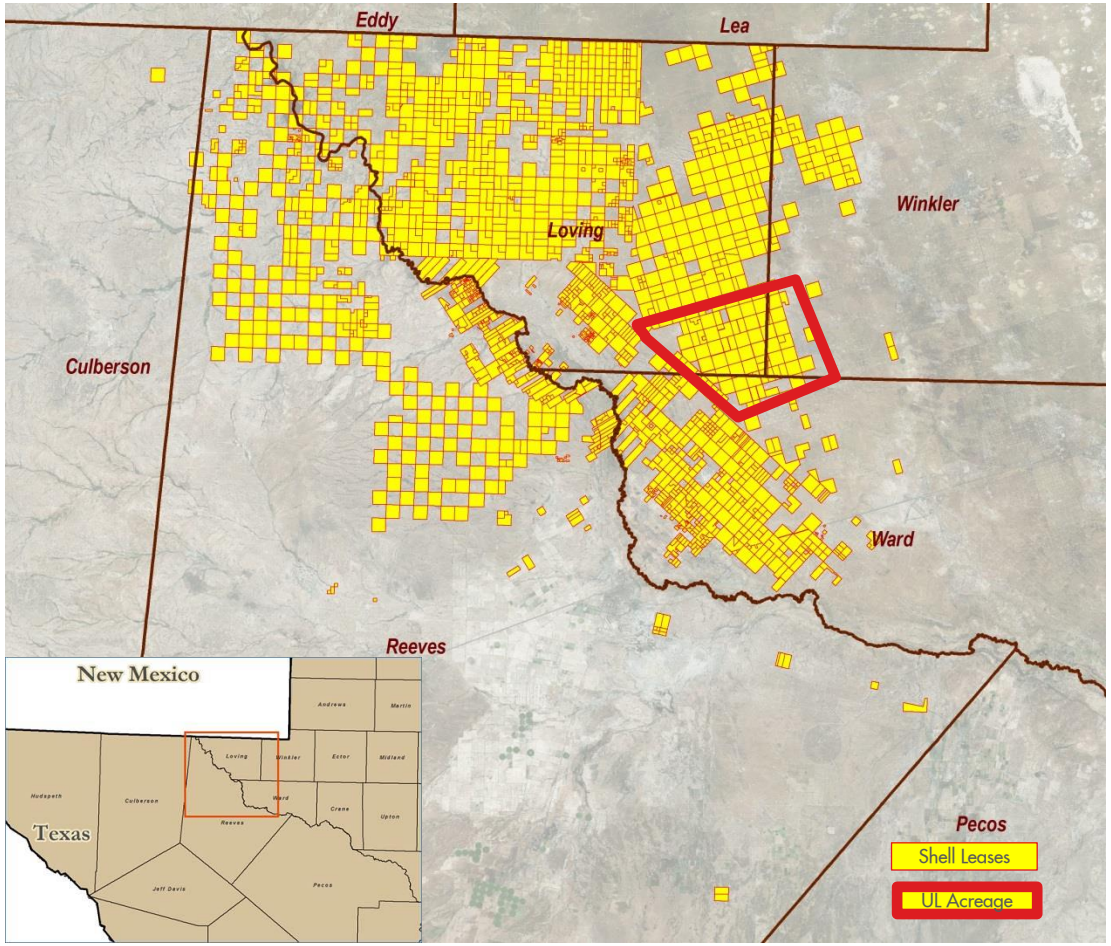
Hitting the Accelerator on Development

University Lands Partner Forum

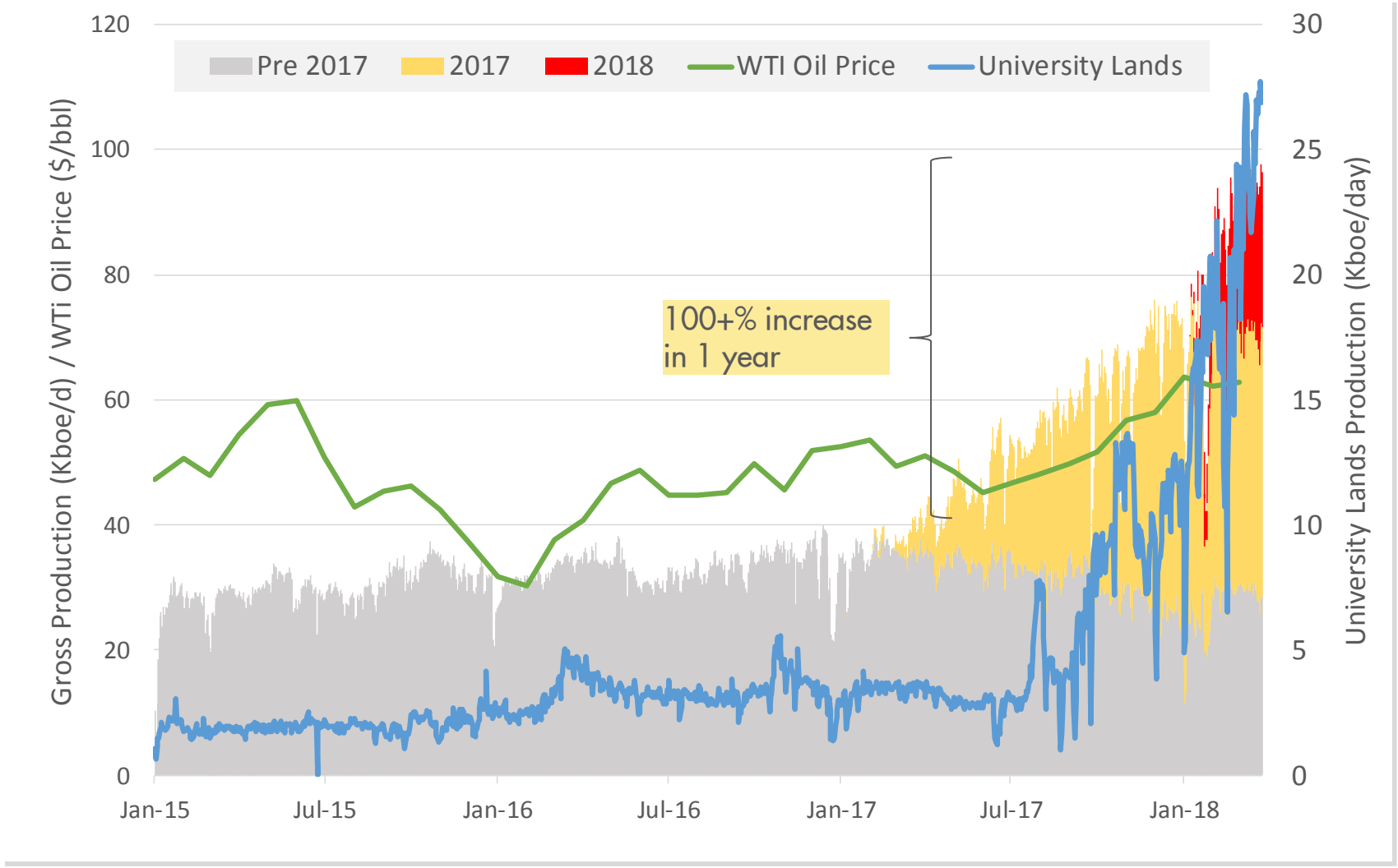
Nitin Chowdhury
Shell

Shell Position in Delaware Basin

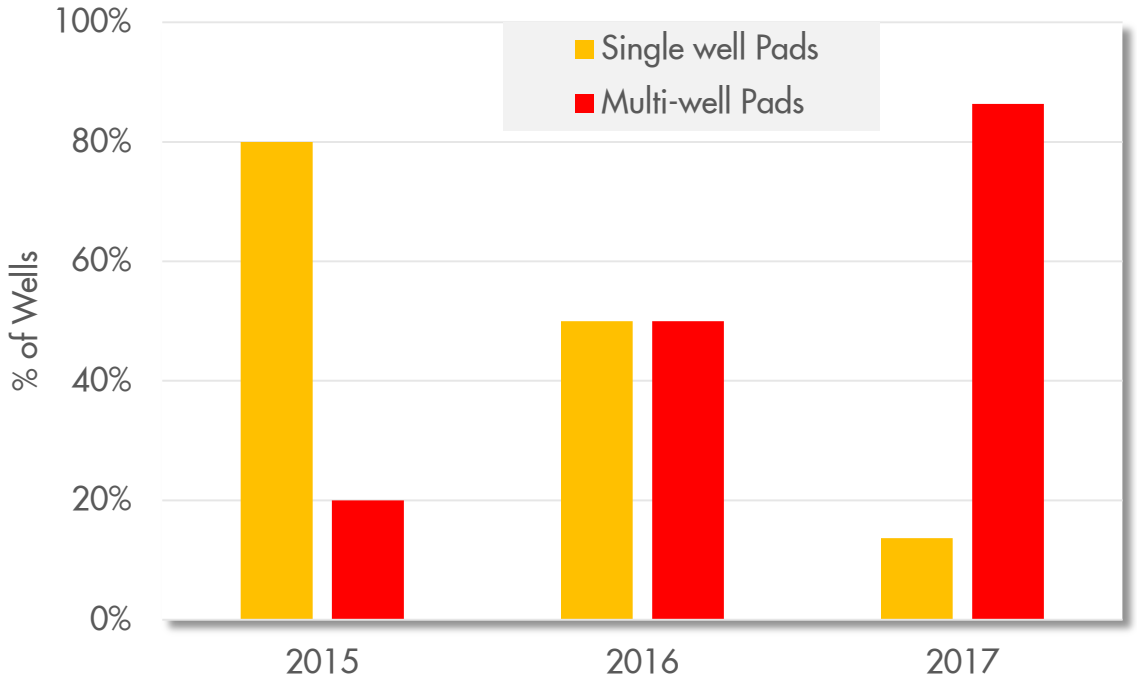


- Permian position acquired in 2012 from Chesapeake Energy
- Approximately 250K net acres in Delaware basin
- Operatorship split between Shell and Anadarko
- University Lands ~ 32K gross acres, with Shell as the operator

Shell Operated Permian Production from 2015 – Present



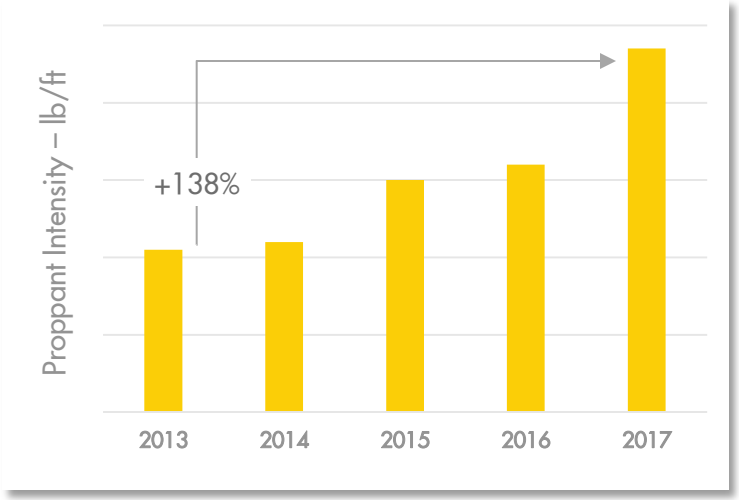
Strategic Shift to Development Over Time



- From 2015 to 2017, activity moved from leasehold and appraisal to development
- Higher emphasis on near-term cashflow
- Organizational focus on well delivery process, execution learning curves, savings from repeatability etc.

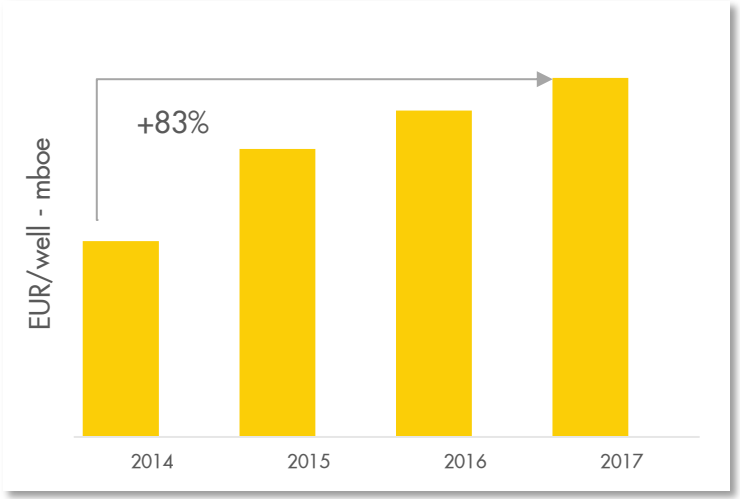
Drivers to Production Growth - Better wells and Higher Activity

Bigger Completions



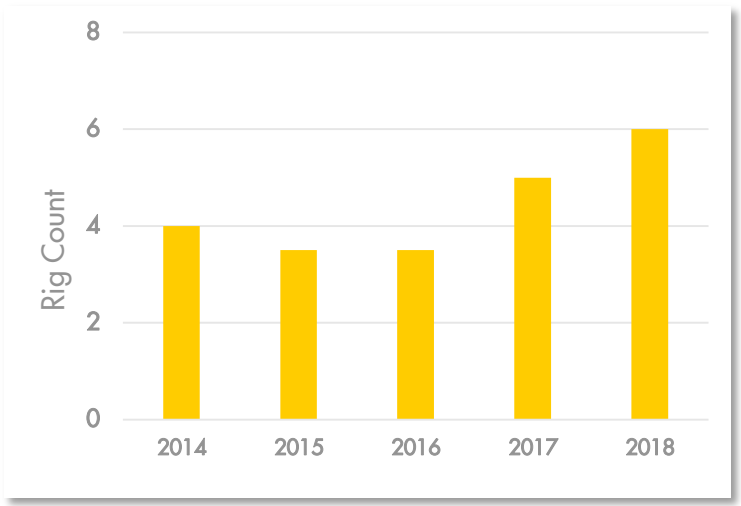
- Proppant intensity increasing with time
- Inline with majority of the industry
- Trials ongoing at higher proppant intensity

Higher EUR/well



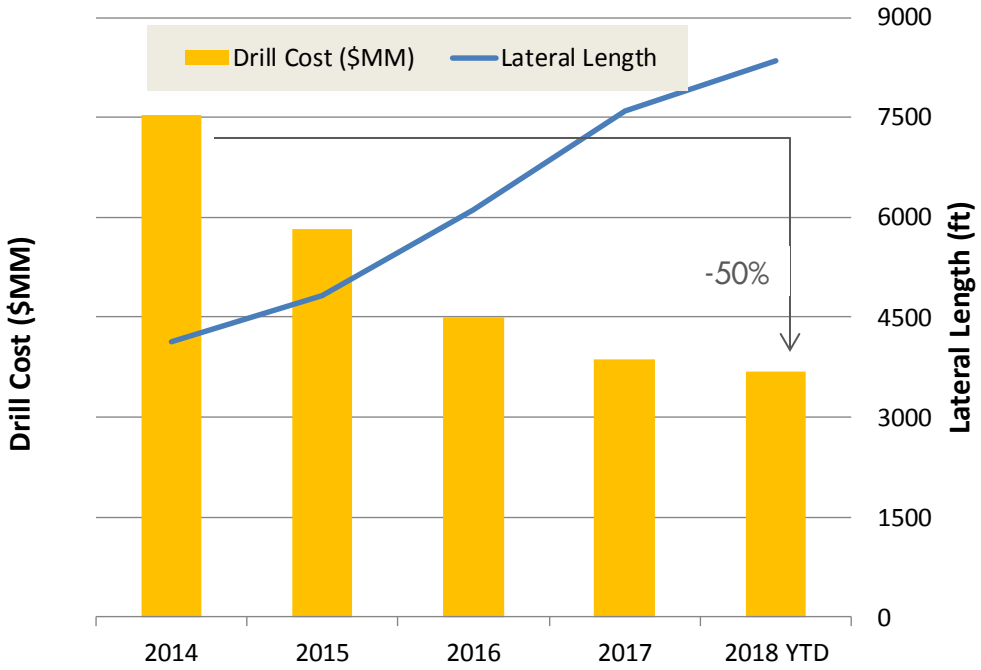
- Steady growth in EUR/well
  - Longer average lateral length
  - Shift to higher proppant intensity completion
  - Better estimate of well performance with longer term data

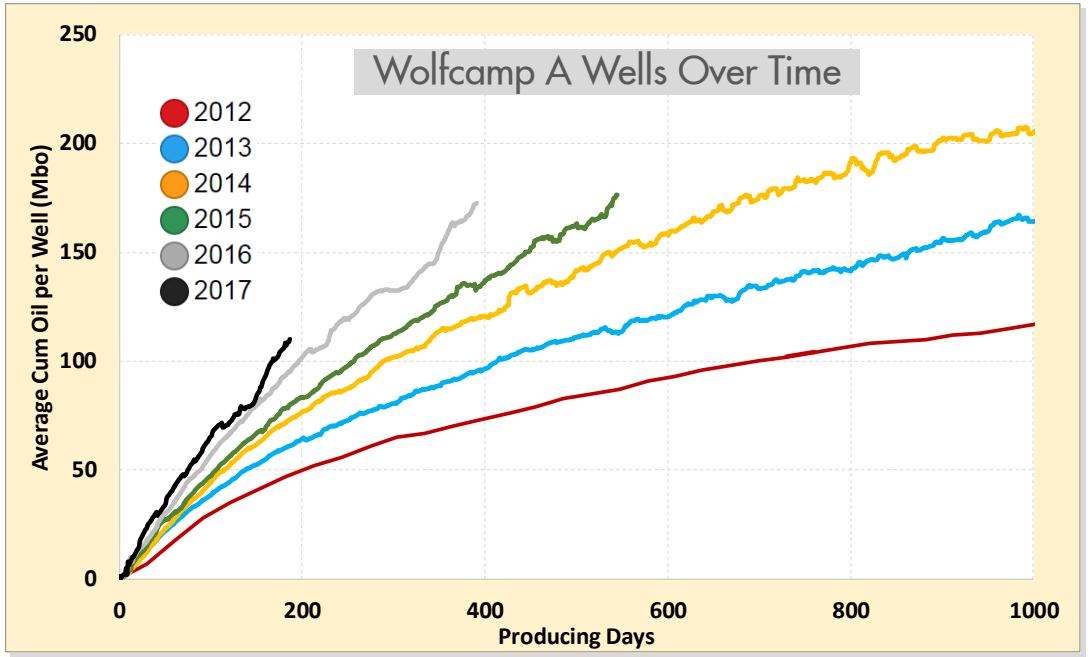
Increasing Rig Count



- Increasing activity levels over the last couple of years as the asset has moved into development

Lower Cost Structure & Better Wells Over Time

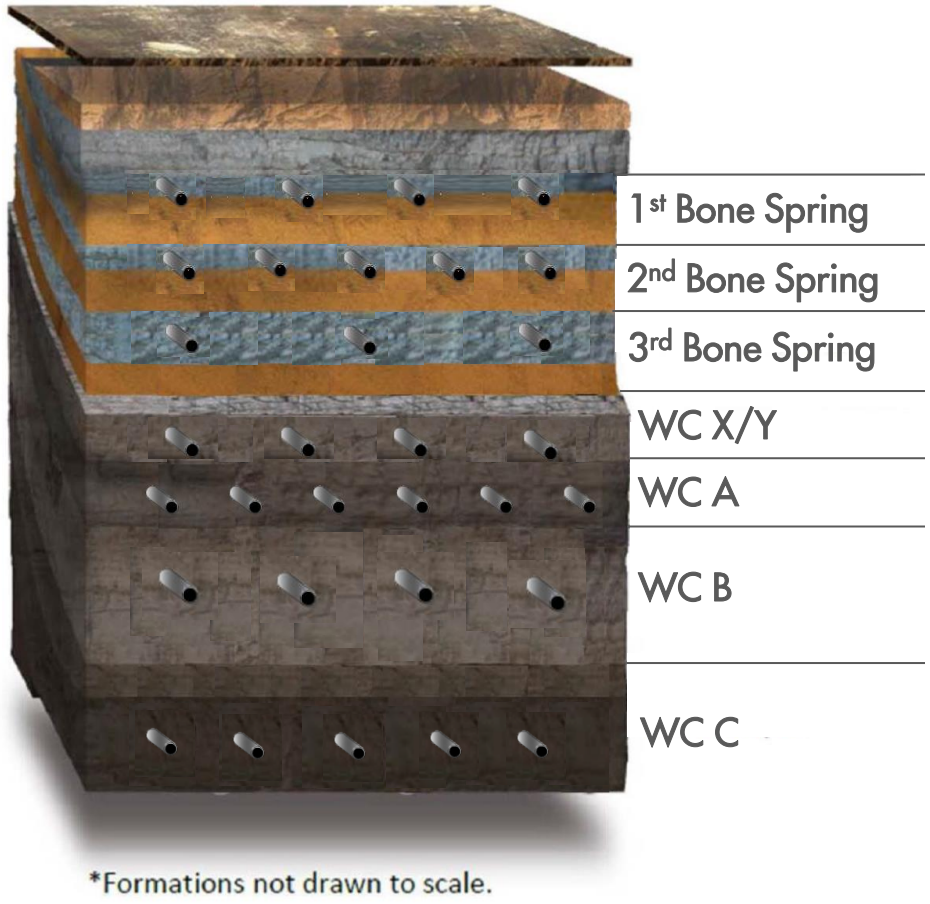




- Drilling efficiencies
- Benchmarking and learning from partners/peers
- More predictability & repeatabilty with move to development

- Longer laterals, bigger completions
- Focus on high graded acreage
- Debottlenecking of surface constraints

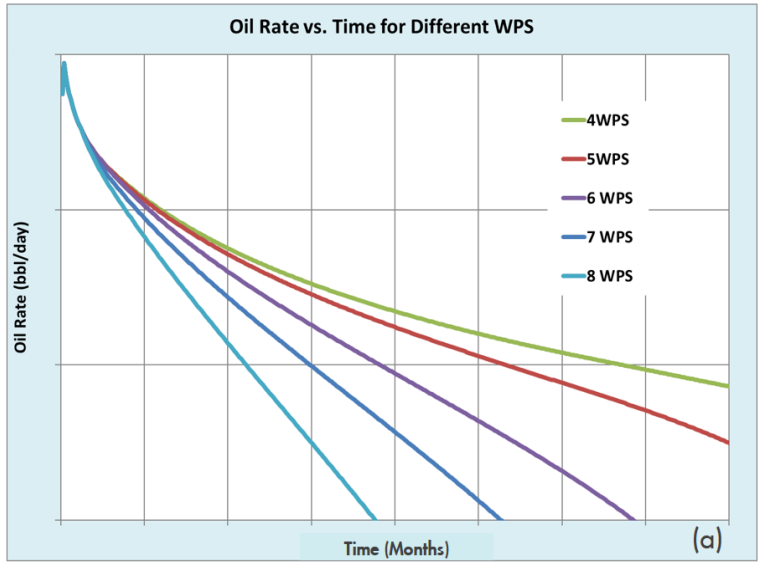
Balancing Derisking with Development

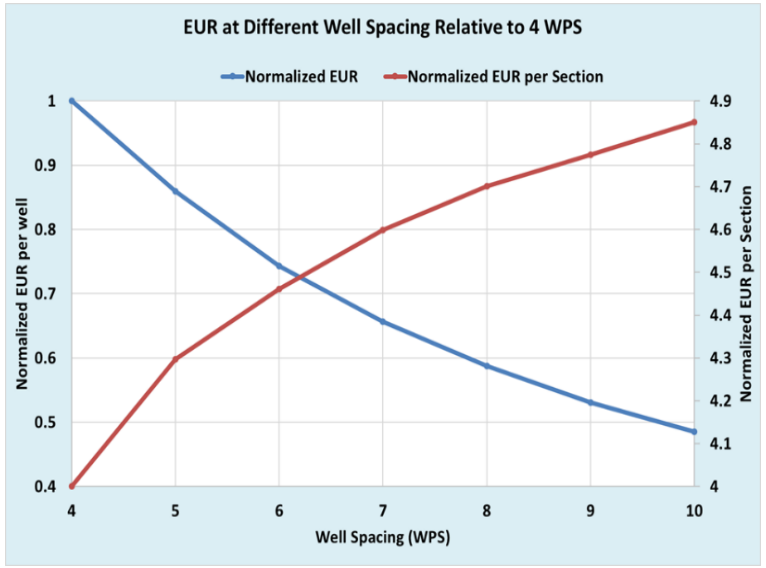


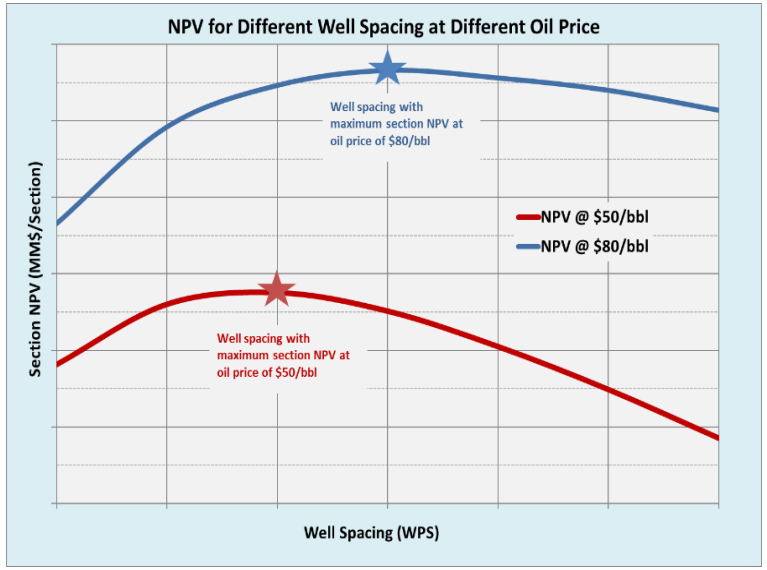
*Formations not drawn to scale.

- Development focus on 3rd Bone Spring , Wolfcamp X/Y and Wolfcamp A intervals
- Need to think of all targets with small vertical separation as part of a package
- Continuing to de-risk other targets at a measured pace through drill bit and through industry data

Balancing Technical & Economic Drivers for Well Spacing





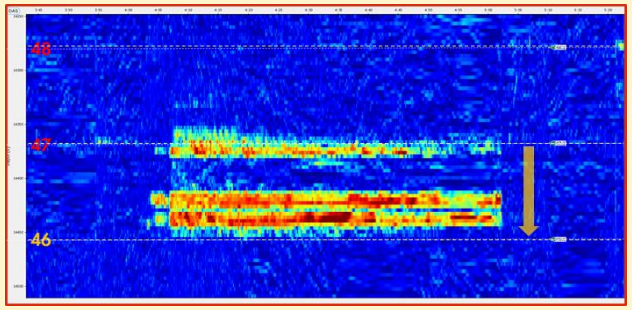


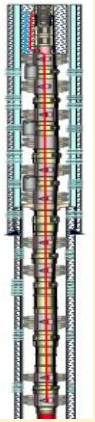
- Reduction in individual well EUR's as well density increases
- Well spacing interdependency between different benches
- Interference effects may not be apparent early in the production history
- Finding the "right" answer takes too long and changes with external factors

- Multiple well spacing trials planned in early development to further our understanding of well to well interactions

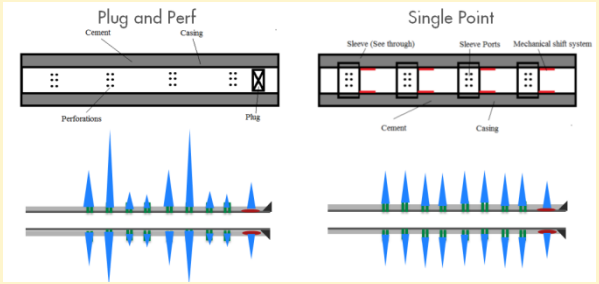
Technology Application Efforts Ongoing

Instrumentation

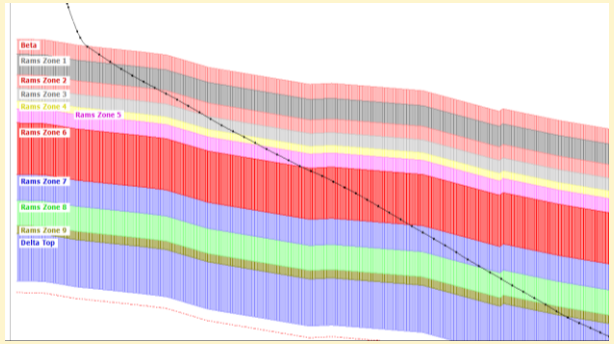




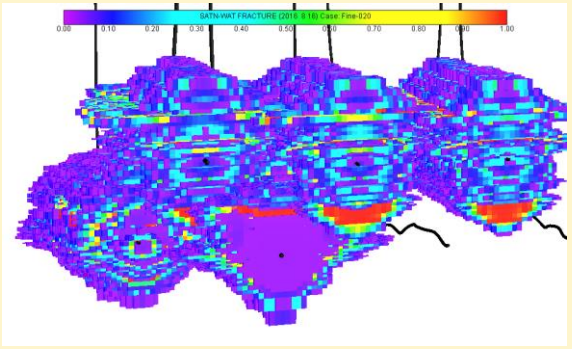
Completions Optimization



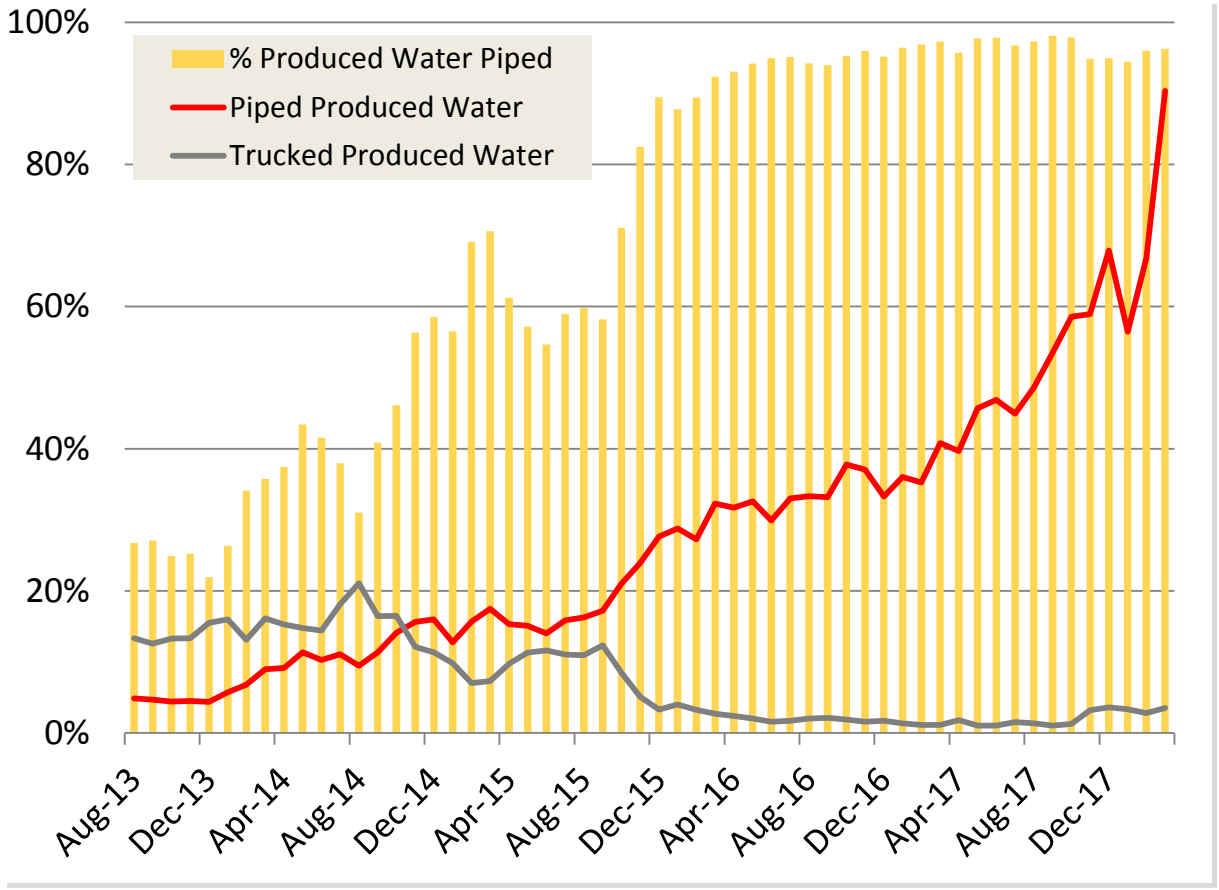
Landing Depth Optimization



Modeling



Infrastructure Being Built Ahead of Production to Minimize Trucking



- Big focus on reducing trucking to minimize HSE exposure and reduce costs
- 95% + water production piped from overall operations
- Major Infrastructure already operational on University Lands
- Trucking only used during initial flowback period and as contingency on University Lands

University Lands – Surface Infrastructure

- SWD Infrastructure
  - Currently have 3 SWD facilities & 5 SWD injection wells
  - Plans for additional 3 SWD facilities and 6 SWD injection wells
- Central Processing Facilities
  - One CPF currently operational
  - Another CPF expected online end Q2 2018
- Water Recycle Facility Plans
  - Expected online end Q3 2018