Drilling and Completions Changes from Conventional to Unconventional Developments – Part Three

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Drilling and Completions Changes from Conventional to Unconventional Developments – Part Three

Part One – Conventional Well Design
• Targets permeable reservoirs with technologies of the day
• Within a traditional mineral leasing structure
• To develop a conventional field, vertically or directionally

Part Two – Unconventional Well Design
• Targets very low permeability rock with new technologies
• Within a relatively new mineral leasing structure
• To develop an unconventional field, horizontally

Part Three – Regulatory Response to Unconventionals
• Increased focus on protection of workers, public health, the environment
• Maintain protection of mineral ownership and prevents waste
• Adapting or replacing older paradigms to embrace new technology
Conventional vs. Unconventional Vertical Wells

Drilling Units

Drilling Unit

First “parent” Well

Development Wells

Vertical Wells
Conventional vs. Unconventional

- Reduced Surface Area of Operations
- More efficient use of resources and facility design
- Cost effective for well maintenance over time
Opportunities and Challenges

Opportunities:
• Smaller footprint
• Centralized facilities
• Longer wellbores
• More surface area covered
• Local revenue increases
• Increased efficiency

Challenges:
• Development in new areas
• Increased trucking
• Higher production from single facilities
• Increased water use
• High tech operations
• Regulatory legacy
Leasing, Spacing and Unitization:

- Most states leasing framework was not designed with unconventional development in mind.
- Increased surface area requires larger or longer, narrow units.
- More mineral and surface owners requires different pooling determinations.
- Legacy development created challenges in leasehold and mineral rights ownership.

See: “Horizontal Well Development Pooling, Spacing, and Unitization,” June 2015. IOGCC.
Leasing, Spacing and Unitization:

- Spacing requirements – need to be capable of allowing multi-well units.
- Unit setback requirements may need to be reduced due to elliptical drainage patterns.
- Cross unit wells may share production from more than one unit.
- Operators in some states are required to drill enough wells to drain the entire unit in a predetermined time frame.
- Participation can be a challenge for multi-well developments.

See: “Horizontal Well Development Pooling, Spacing, and Unitization,” June 2015. IOGCC.
Wellbore Integrity:

- Increased flowrates and pressure in the well bore during completion require more robust isolation.
- Protection of ground water requires proper cementing and casing.
- Pressure gradients from completion activities can interact with other nearby well bores.
- Offset well identification.
The Old:
• USDW protections provided by having leak and spill free operations at the surface.
• Casing and cementing programs across all USDWs.

The New:
• Increased engineering concerns for production casing – cyclic loading and temperature effects increase integrity needs.
• Offset well interactions – identification and mitigation
• Hydraulic Fracturing Chemical Disclosure
Water Use and Recycling:

• Moving water requires infrastructure and permitting
• Requires large pits and treatment facilities
• Reuse of water a complex challenge
• Disposal of produced water can overtake local capacity
• Increased use of technology to allow completions chemicals to interact favorably with high-TDS water
• Water injection challenges
Emissions and Flaring:

- Several wells flowing into one facility multiply the facility potential to emit.
- Increases ability to mitigate emissions through flares, vapor recovery, leak detection and repair.
- Gas takeaway capacity can be limited by right of way issues and permitting delays.
- Trends in emissions monitoring: flyovers, drones, continuous monitoring devices.
- State concerns for methane reductions.
Key Regulatory Considerations

Increase in Production Activity:

- Truck traffic increases
- Noise
- Odor
- Proximity to Homes
- Light pollution
- Worker exposure
- Local emissions
States Working Together

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Stronger

United States Environmental Protection Agency

ECOS

Interstate Oil & Gas Compact Commission

Groundwater Protection Council

State Oil & Gas Regulatory Exchange
Thank You

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