

DRIVEN TO OPTIMIZE – LOOK AGAIN



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Our Mission

- Wright & Company, Inc. 's mission is to be client driven with the most reliable, responsive and cost effective professional services possible within the oil and gas industry. This mission is achieved with personal service, understanding, sound judgment and credibility.
- Offer solid opinions on oil and gas reserves and economics with strong team with excellent reputation, knowledge, and exceptional service.

Wright & Company, Inc. Hundruss Cressedures 30 Year Anniversary Et. 1989

Experience and Expertise

- Extensive Shale expertise
- Reserves, economics, petrophysical
- Acquisitions, divestitures, and due diligence
- Expert testimony
- Management, consulting engineers
 - Technical analysts, geotechnical, administrative, and research

Geographical Reach

- Broad coverage beyond Appalachia
 - Permian
 - Illinois and Michigan Basins
 - Gulf Coast Region
 - Midcontinent STACK & SCOOP
- Specialty in Major Horizontal Plays
 - Marcellus/Utica-Point Pleasant
 - Eagle Ford
 - Lower Huron Chattanooga
 - Haynesville Bossier
 - Barnett
 - Coal Bed Methane

July 1, 1988

- Founded by D. Randall Wright, P.E.
- > Job Number 8.1
- First client (1 yr. retainer)
 - New York Life Insurance

30 YEAR HISTORY

15 Years

- SEC Reporting, financial institutions, private investments, equity capital, M&A
- Conventional vertical wells
- Initial horizontal technology
- Hundreds of projects from many clients

July 1, 2018 – 30 years

- Horizontal in various U.S. basins
- Drilling and completions current uptick
- Mid-stream for infrastructure
- > Special studies
- Over 2,000 evaluations for hundreds of clients

HART ENERGY'S DUG EAST Developing Unconventional Gas

2009 – Making the Marcellus Pay – First bags: expected approximately 500; almost 900 attended
> Operator Spotlight: Range, EQT, Rex, Cabot, Chesapeake, Atlas, CNX – projections production could reach 1 Bcf/D
> Wight & Company, Integrating Corves Results and Challenges

2010 – Presentations: Anadarko, Bentek, ECA, Jefferies, MarkWest, PDC, Range, Statoil – production could reach 7 Bcf/D by 2020
Which & Company, Inc. Burghaning Departure for the Marsalus Shale

2011 – Presentations: EPA, Magnum Hunter, EnerVest, National Fuel – Large gas field, a seat at the world energy table
Topics included: A Region Transformed, Innovation to Drive the Future, Marcellus Drilling & Completion, Welcome to Ohio – The Utica/Point Pleasant Beckons, The Economic Impact of Northeastern Shales

2012 – Presentations: Baker Hughes, Gulfport, Imperial Capital, Jefferies, Petrie Partners, Range, TPH
Topics: Downstream Demand, E&P Joint Ventures, Range Founder's Strategy, Dry Gas Economics, Capital

Expenditure, Resource Potential – forecasted short-term prices could improve to \$3.75/MMBtu



HART ENERGY'S DUG EAST Developing Unconventional Gas

2013 - Largest attendance - Former President George W. Bush was featured speaker

2014 - Marcellus Growth Story - Time moved from November to June

Presentations: Range, EIA, CONSOL, FERC, Stone Energy, Weatherford, Baker Hughes, Rex, Gulfport, Rice Energy.
Talisman – Marcellus production surpassed Texas's Barnett Shale, Thousands of Utica wells expected to be drilled in Ohio

Wight & Company, Inc.: Shalo Flaye: What Works and When

2015 - The Appalachian Basin's Role on the World Stage - Resource Resilience

- Presentations: EIA, BTU Analytics, Range, Eclipse, Williams, Chesapeake, Halliburton, Schlumberger, Rice, Petrie Partners, Ponderosa Advisors – How to manage budgets, cutting capex
- Topics: The New Economics, Marcellus & Utica Growth Plans, Eastern Ohio's Utica & Point Pleasant, Mid-Stream Issues & Opportunities, Drilling & Completion Technology, Geopolitics, Building Infrastructure, Burket/Geneseo Upper Devonian, Exporting Appalachian Gas



HART ENERGY'S DUG EAST Developing Unconventional Gas

2016 - Big Wells Deliver: Economics

Presentations: CONSOL, Ponderosa, Petrie Partners, Eclipse, APEX Energy, EdgeMarc, Cook Political, Range, Halliburton, Schlumberger, Columbia Midstream, Rice Energy, Penn Energy, Jefferies, Stratas Advisors – Low rig count would not reflect production increases

Wright & Company, Inc.: Survive and Thrive: How to Maximize Value

2017 - Utica's Dry Gas Window

- Presentations: Southwestern Energy, BTU Analytics, Occidental, Ascent, APEX Energy, Rice Energy, Wells Fargo, Laurel Mountain Energy, Eclipse, Inflection, PennEnergy
- Topics: Appalachia Rising, Great, Mighty, and Splendid, Geopolitics, Driving Value, A&D, People & Equipment Wanted, Uptick in EURs

2018 - Gassing Up

Presentations: Shell Oil Co., CNX Resources Corporation, Petrie Partners, Range Resources, Northeast Natural Energy, Rockdale Energy LLC, APEX Energy LLC, Eclipse Resources, East Daley Capital Advisors, Inc., UGI Corporation, Arsenal Resources, Halliburton, Evolution Well Services, Chesapeake Energy Corp., Laurel Mountain Energy LLC, Baker Hughes, Quantico Energy Solutions, Surcon, Ltd., Hydrozonix, and Veolia North America
Walk & Compose Ing Bottom To Coloring – Lock Agen



Discovery Well - 2004

Total Wells - 2008

- 54 Marcellus
- 8 Upper Devonian







Total Wells - 2009



10 Upper Devonian







Total Wells - 2010

- 955 Marcellus
 - 1 Utica/Point Pleasant
- 13 Upper Devonian







Total Wells - 2011

- 2,168 Marcellus
 - 11 Utica/Point Pleasant
 - 18 Upper Devonian







Total Wells - 2012

- 3,766 Marcellus
 - 92 Utica/Point Pleasant
 - 30 Upper Devonian







Total Wells - 2013

- 5,443 Marcellus
 - 397 Utica/Point Pleasant
 - 50 Upper Devonian









Total Wells - 2014

- 6,992 Marcellus
 - 882 Utica/Point Pleasant
 - 83 Upper Devonian



Source: Drilling Info 06/2018 (well completion and production data)



196.M



Total Wells - 2015

- 8,147 Marcellus
- 1,393 Utica/Point Pleasant
- 162 Upper Devonian









Total Wells - 2016

- 8,949 Marcellus
- 1,698 Utica/Point Pleasant
- 210 Upper Devonian









Total Wells - 2017

9,890 Marcellus2,076 Utica/Point Pleasant288 Upper Devonian







Total Wells - 2018

10,015Marcellus2,083Utica/Point Pleasant297Upper Devonian





DEVELOPING UNCONVENTIONAL SHALES Monthly Gas Volumes per Area, Mcf



WRIGHT'S UNIQUE POSITION Appalachia Basin Projects 2015-2018

































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IMPROVING WELL PERFORMANCE Laterals in Zone

- Challenging/complex geology with faulting in certain areas
- Investment in 3D seismic
- Interpret and establish landing target in advance
 - Proactive vs. reactive (after out of zone)
- Geosteering Critical to success
- > Additionally, design completion intervals away from faults

Results:

- Stay in zone (vs. example below)
- Maintain energy of frac (avoid loss in faults)





OPTIMIZE DRILLING LANDING TARGET Staying in Zone





INITIAL DEVELOPMENT – LOOK AGAIN Trends: Lateral Length



INITIAL DEVELOPMENT – LOOK AGAIN Trends: Proppant and Stage Spacing





COMPLETION DESIGNS Proppant



COMPLETION DESIGNS Reduced Stage Spacing



PRICING SEC Year-End Pricing

rithmetic average of the first-day-of-the	-month price for ea	ch month wit	within the prior 12-month period.															
		\$/bbl																
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ine 1	\$ 2.085	\$				LOUISIANA	SOUTH	POINT	GAS	EASTERN, M-	2 CUSHING, OK	Tier 1	Tier 1	Utica Conde	nsate**			
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eptember 1	\$ 2.935	Ş M	1arch 1			\$2.51	.0	\$2.010	\$2.335	\$1.99	\$53.	83 \$52.83	\$52.8	33	\$37.83			
october 1	\$ 2.835	\$ A	pril 1			\$3.09	15	\$2.815	\$2.940	\$2.80	\$50.	60 \$49.60	\$49.6	50	\$34.60			
lovember 1	\$ 2.785	\$M	lay 1			\$3.16	15	\$2.630	\$2.970	\$2.59	\$48.	84 \$47.84	\$47.8	34	\$32.84			
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						1	F	February 1			\$3.205	\$2.955	\$3.055	\$3.020	\$65.80	\$64.80	\$64.80	\$51.
						S2.97	6 🛛 🖻	March 1			\$2.610	\$2.105	\$2.345	\$2.100	\$60.99	\$59.99	\$59.99	\$46.
						φ <u>=</u> ,	A	April 1			\$2.755	\$2.475	\$2.545	\$2.500	\$64.94	\$63.94	\$63.94	\$50.
							N	Vlay 1			\$2.680	\$2.045	\$2.470	\$2.065	\$67.25	\$66.25	\$66.25	\$53.
							J	une 1			\$2.885	\$2.515	\$2.690	\$2.525	\$65.81	\$64.81	\$64.81	\$51.
							J	uly 1										
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							1	LST DAY OI	F MONTH AVERA	GE 2018	\$2.953	\$2.523	\$2.761	\$2.571	\$64.20	\$63.20	\$63.20	\$50





MAXIMIZE SHAREHOLDER VALUE Determine the Goal – Be Intentional – Have a Strategic Plan

Key Market Metrics

- Gas Production Rate, MMcfd or Bcfd
- Initial Production (IP)
- EUR per Well
- EUR/1,000'
- Lateral Length
- Number of Producing Wells
- Number of Undeveloped Locations
- Reduced Capex

GOAL

- Less Capex
- Increase EUR
- ➢ Higher Rate of Return
 - Quicker Payout

- PV10
- Cash Flow
- Payout
- Rate of Return
- Total Reserves
- "Proved" Reserves



Example: Longer Laterals

 Initial results look promising based on prod-time plot (high IP)



Well Set:

- Wells within 5 mi radius
- Similar proppant loads (1400-1600 lbs./ft)

Example: Longer Laterals

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- Analyze performance using laterallength normalized plots



Example: Long Laterals

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- Analyze performance using laterallength normalized plots
- This example, after 11 months, cum is ≈ 85% of ≈7,000' well average



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Conclusion:

1 - 14,000'

may not 2 – 7,000'



DEVELOPMENT CONSIDERATIONS Midstream and Acquisitions

Example: Performance "Area" (OH Utica)

- Same "Area" may not be analogous
- Variations East to West North to South
- Variations related to depth/condensate yield, and reservoir



Example: Performance vs Completion

- Base bids on "Historical" PDP from older completions?
- Or, use "Newer" Completions
 - New vintage, more proppant, closer stage spacing
 - Fewer wells in data set
- Use operator performance or offset?





Example: Performance vs Completion

- Base bids on "Historical" PDP from older completions?
- Or, use "Newer" Completions
 - New vintage, more proppant, closer stage spacing
 - Fewer wells in data set
- Use operator performance or offset?
- Is operator's go-forward design back to previous generation?
- What is analogous well?





SUMMARY

Key Points:

- Much has changed since first DUG East 2009
 - 2009 2018: Only 10 years into significant development of Marcellus
 - 2012 2018: Less than 6 years into significant development of Utica/Point Pleasant
 - Generally, NE Shale Play has out-performed initial estimates
- Still on Learning Curve Optimization (LOOK AGAIN)
 - Re-evaluate
 - Laterals have increased from <3,000' to > 10,000', some > 14,000'
- Be Intentional Know what you are trying to achieve
 - Maximizing Value
- Be Disciplined and Thorough
 - Breakeven less than \$3.00/MMBtu while still achieving significant rates of return
- Have a Strategic Plan



WHERE ARE WE NOW??

Marcellus/Utica → Dominant in U.S. Gas Production

- > 2017 U.S. Production Growth was 9 Bcf/D
- Northeast contributed about 37% of the growth (3.3 Bcf/D)
- > Accelerated second half of 2017 anticipation of more infrastructure coming online
- December 2017 PA, OH, WV = 26.8 Bcf/D
 - 2 times the 2012 production (13 Bcf/D)
- > Approximately 25% of nearly 100 Bcf/D U.S. gas production
- Estimated to average 28 Bcf/D to 35 Bcf/D in next 6 years according to EIA
- Gas prices down approximately 20% in 2018 to date "Realized Prices"
- Even at \$3.00 gas F&D costs some of the lowest of any gas play
- Even at \$3.00 gas still relatively high rates of returns

THANK YOU!



For 30 years, the right choice has been obvious.

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