

The background image shows an industrial oil field under a clear blue sky. On the left, there are several large, tan-colored cylindrical storage tanks with metal ladders. In the center-right, a tall drilling rig with a red and white lattice structure is visible. The ground is flat and appears to be a mix of dirt and gravel. The overall scene is industrial and expansive.

SEVENTH ANNUAL

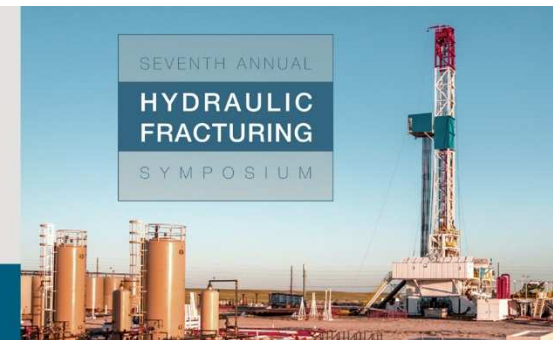
HYDRAULIC FRACTURING

SYMPOSIUM

WEDNESDAY, OCTOBER 4, 2017

velaw.com | fracking.velaw.com

Today's Agenda



I. Commercial Implications of Hydraulic Fracturing

- Craig Jarchow, President and Chief Executive Officer, Castleton Resources LLC

II. Regulatory

- Larry Nettles, Partner, Vinson & Elkins

III. Litigation

- Mark Rodriguez, Partner, Vinson & Elkins

IV. Safety/OSHA

- Tom Wilson, Partner, Vinson & Elkins
- Paul Stefan, Partner, Environmental Resources Management (ERM)

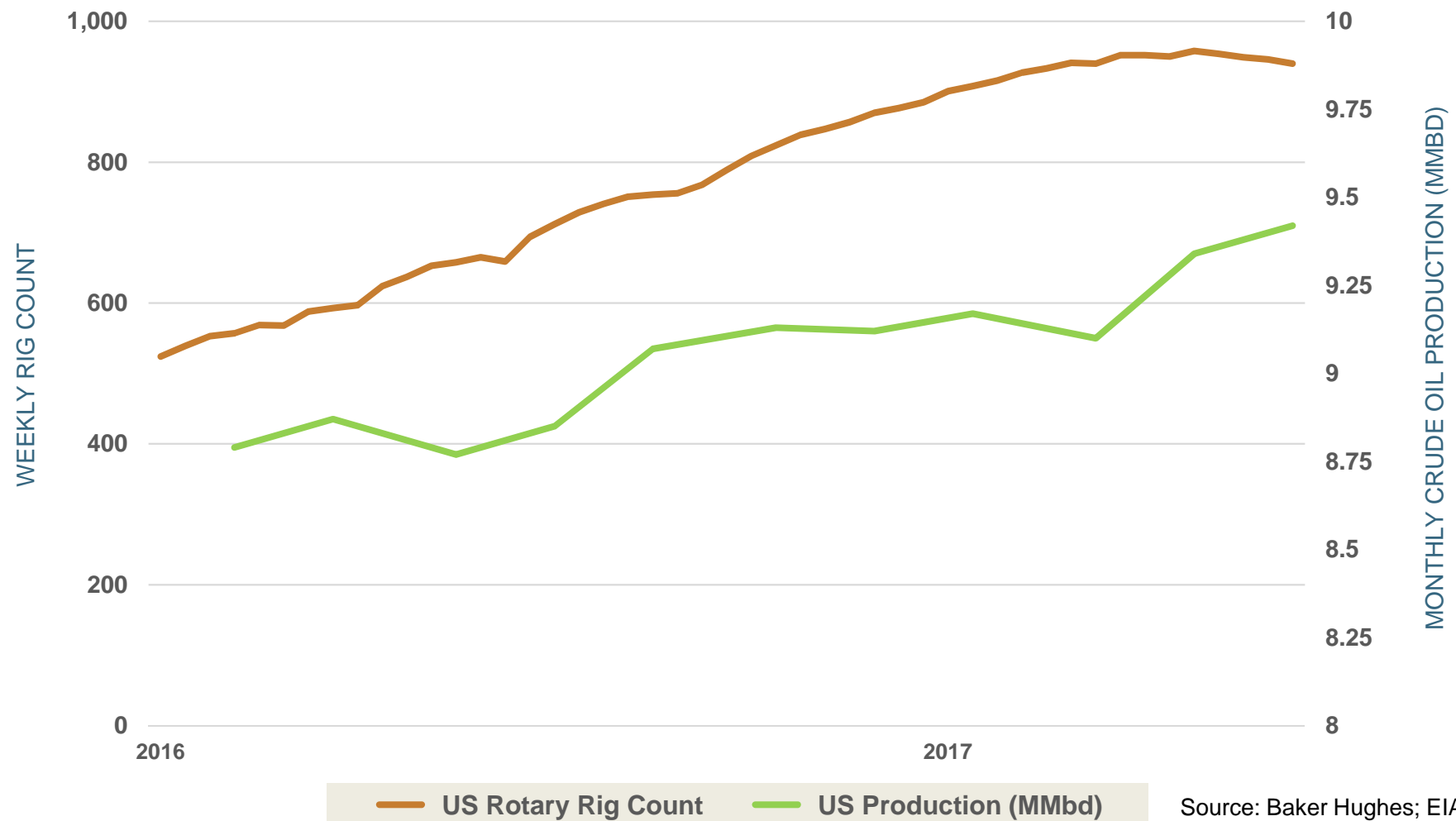
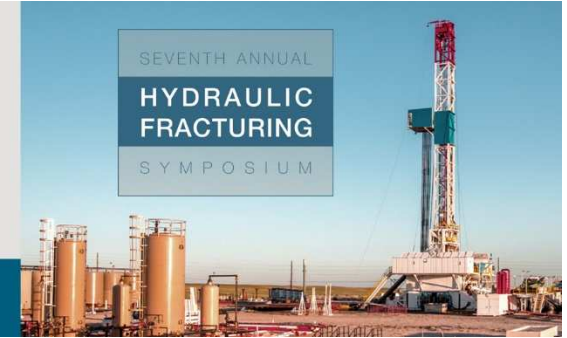
V. Market Update

- John B. Connally, Partner, Vinson & Elkins

VI. Q&A

U.S. Rig Count & Production Trends

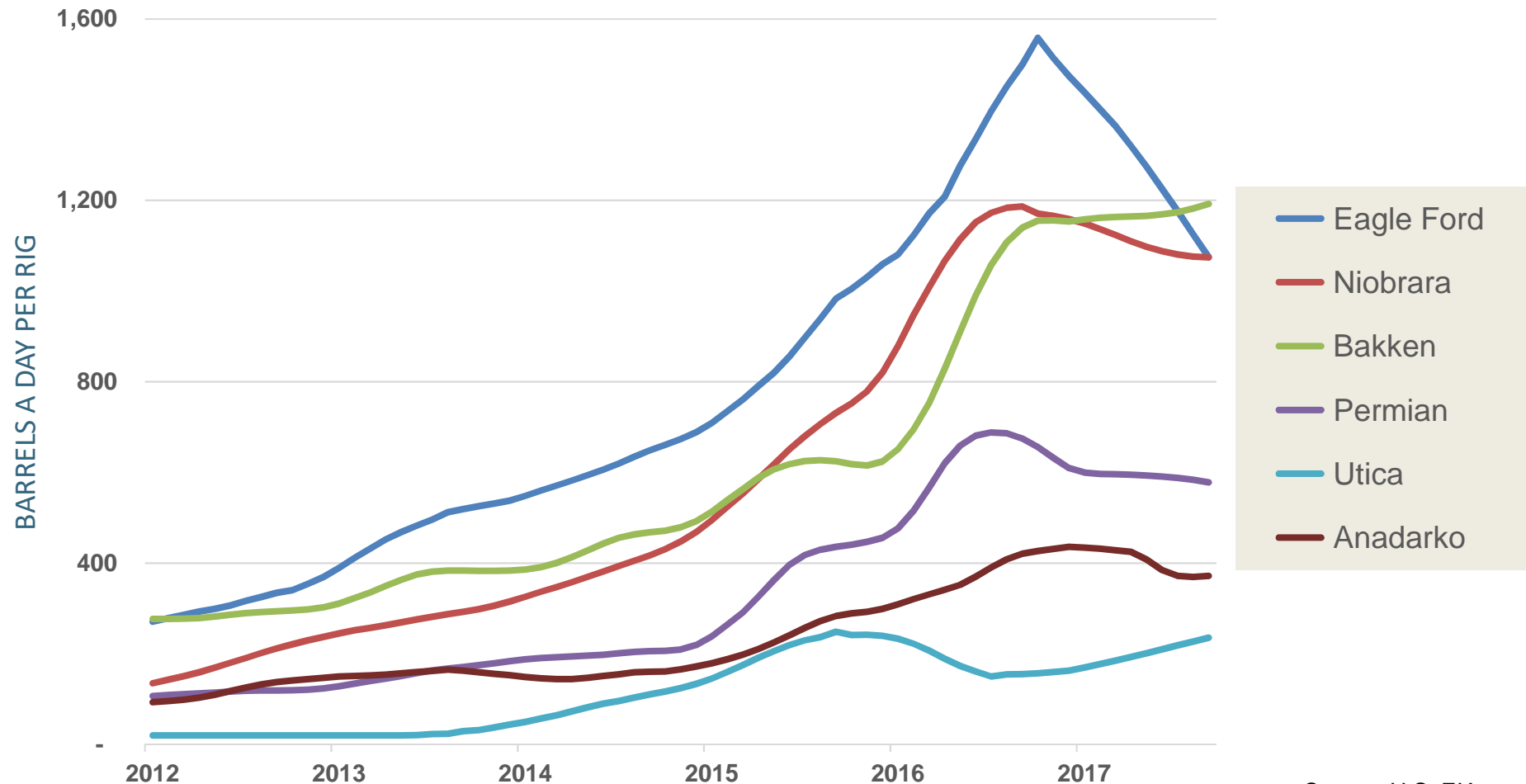
September 2016 – September 2017



Source: Baker Hughes; EIA

Oil Production at Select U.S. Shale Fields

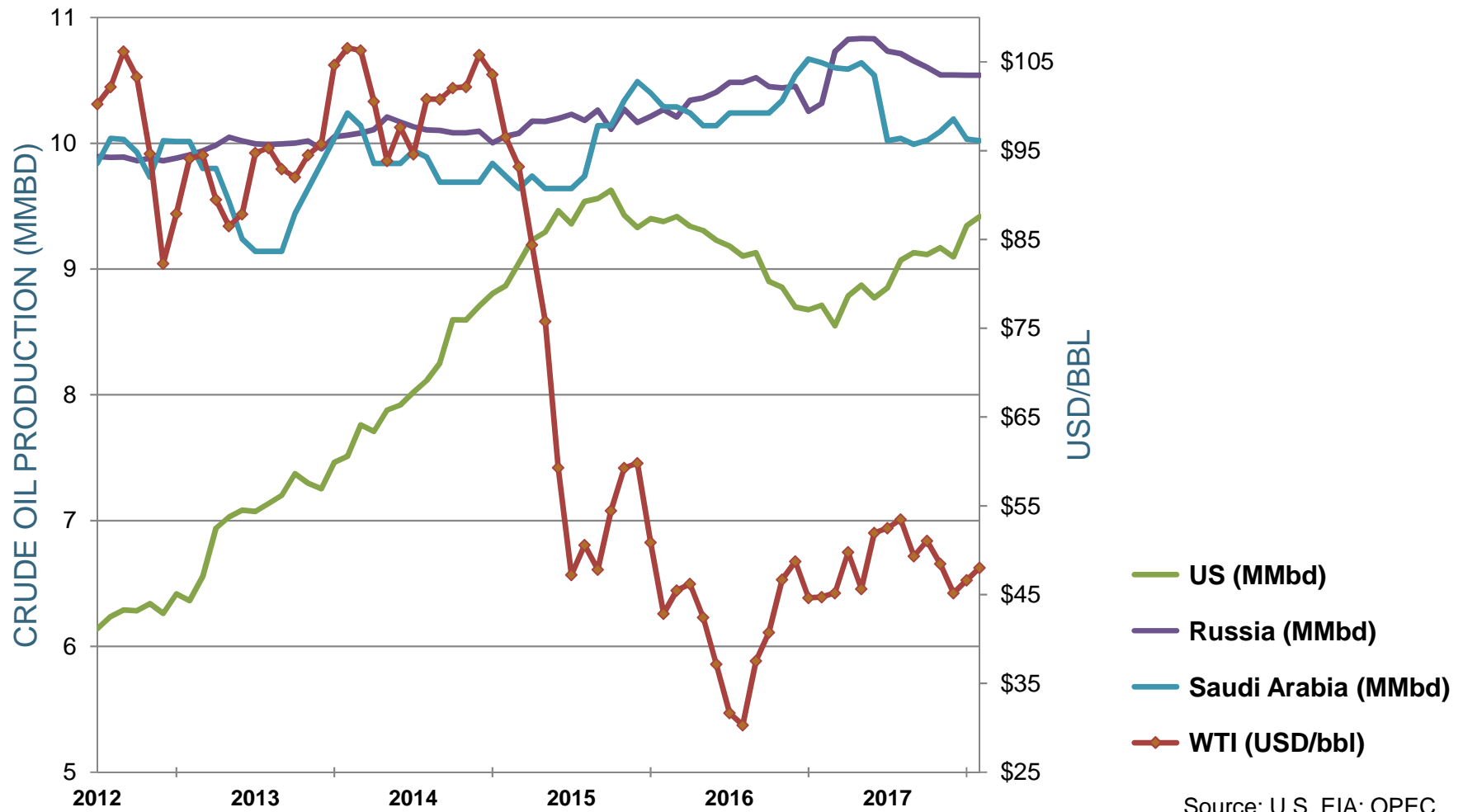
January 2012 – September 2017



Source: U.S. EIA

Crude Oil Production vs. WTI

January 2012 – August 2017



Source: U.S. EIA; OPEC

Hurricane Harvey

Effects on E&P Operations

- Eagle Ford decreased production between 300,000 to 500,000 barrels/day due to Harvey.
- Total shale oil production expected to rebound and reach 6.08 million barrels/day in October.
- The Permian is projected to increase production.



The background image shows an oil field under a clear blue sky. On the left, there are several large, orange cylindrical storage tanks with metal ladders. In the center and right, a tall drilling rig with a red and white lattice structure is visible. The rig has a long vertical pipe and various mechanical components. The ground is flat and appears to be a mix of dirt and gravel.

SEVENTH ANNUAL

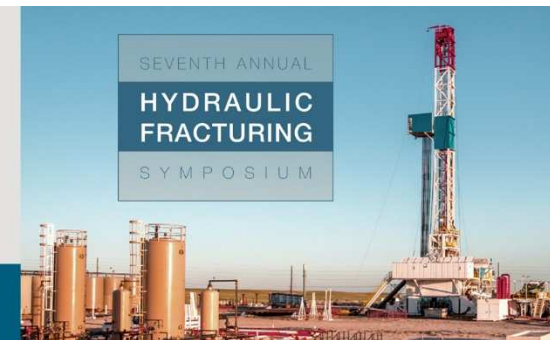
HYDRAULIC FRACTURING

S Y M P O S I U M

COMMERCIAL IMPLICATIONS OF HYDRAULIC FRACTURING

Craig Jarchow

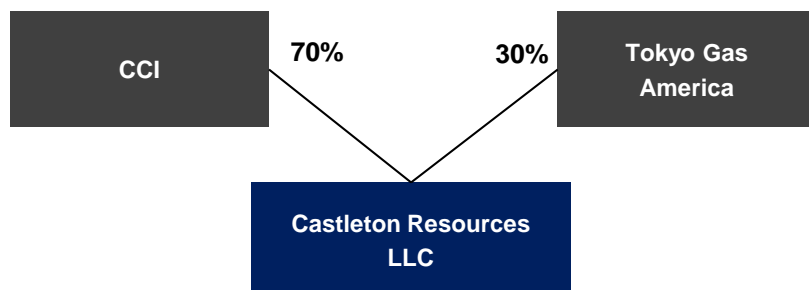
Castleton Resources is one of the biggest operators in East Texas



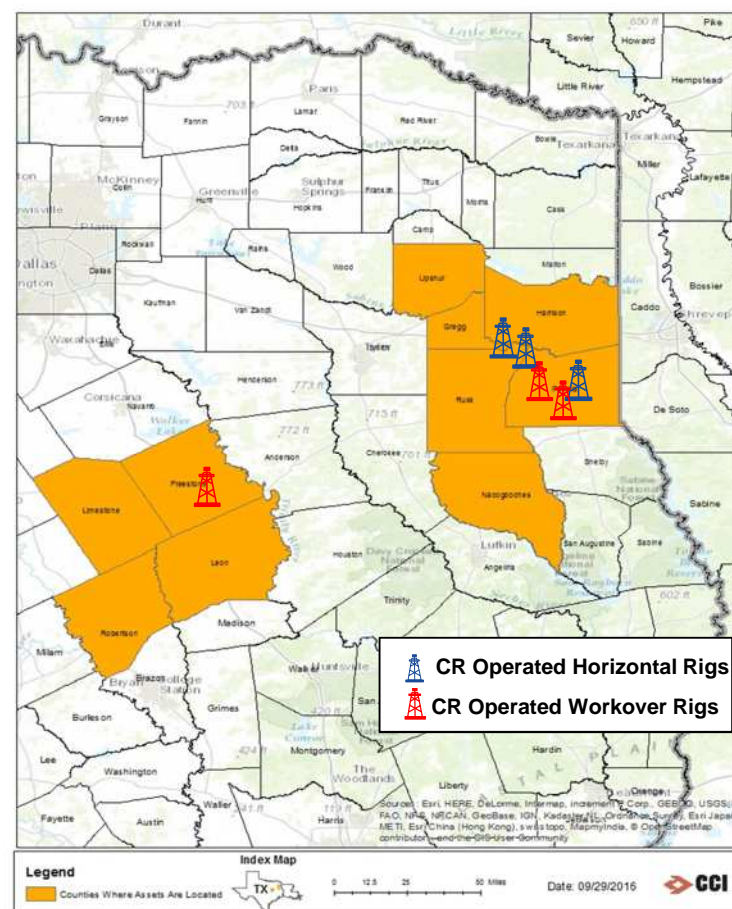
Highlights

Acreage:	ca. 163,000 net acres
Wells:	ca. 2,700 gross wells (71% operated)
Proved Reserves:	1,250 Bcfe (April 1, 2017)
Reserve Mix:	82% Gas; 3% Oil; 15% NGL
Net Production:	237 MMcf/d (March 2017)
Midstream:	Over 786 miles of gathering pipeline with high/intermediate/low pressure systems; Water and condensate infrastructure
2017E EBITDAX:	\$180MM
2017E Capex:	\$100MM
2017E FCF:	\$50MM

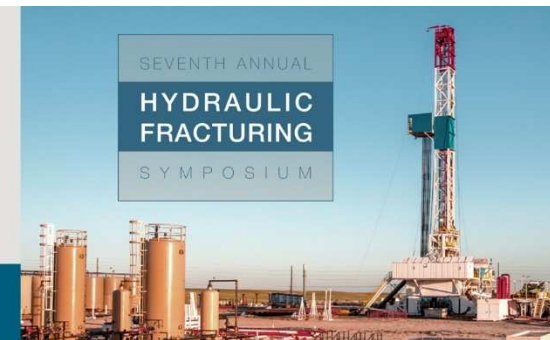
Joint Ownership by CCI and Tokyo Gas



Asset Map



Castleton Commodities International (“CCI”) is a global commodities merchant



Global Commodities Merchant

- Since the 1990's, CCI and its predecessor companies have invested across the commodities value chain through physical and financial trading and by investing in infrastructure
 - Merchant Trading
 - **Approach.** Fundamental research-driven trading in physical and financial markets based on global supply/demand fundamentals and market structures
 - **Recent additions.** Completed acquisition of Morgan Stanley's Global Oil Liquids Trading Business; Expansion in Asia and Base Metals
 - **Capabilities.** 24 trading units, 3,000+ counterparties, in-house research including 23 PhDs developing analytics
 - **Performance highlights.** Consistent profitability with 5-year average gross Sharpe ratio of 3.3 (Jan 2010 – Sep 2015)(1)
 - Assets Investing
 - **Approach.** Infrastructure investments driven by proprietary research and deal flow
 - **Recent activities.** Power plants, natural gas reserves and midstream assets; Up-cycle sale of \$1.9bn pipeline, storage, and processing assets
 - **Capabilities.** In-house engineering and operating expertise: power, upstream, midstream and downstream
 - **Performance highlights.** Current portfolio of power generation assets of over 1,500 MW earning over \$100 million of annual EBITDA and 1.2 Tcfe of proved reserves

Strategic Footprint



Experienced Investors



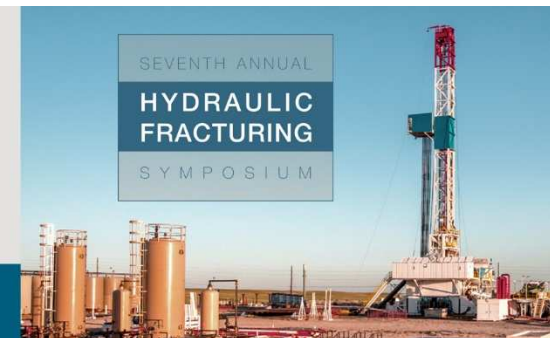
- From Dec 2006 – Dec 2012, the Company operated under the name LDH Energy



- In Dec 2012, the Company changed ownership and rebranded as CCI
 - Permanent capital from prominent family offices:

CCI's board includes representation from several family offices

CCI Board of Directors



Glenn Dubin*

Chairman

- Founder of Highbridge Capital
- Principal of **Dubin & Co.**
- Chairman of Engineers Gate



William C. Reed II*

President and CEO

- Founding Partner of Saracen Energy Advisors



Murray A. Rabinowitz

- CIO of **Brooklyn NY Holdings LLC**



Mikael Andren*

- CEO & President of **Paul Tudor Jones II** Family Office and related entities



Timothy R. Barakett*

- Chairman & Founder of **TRB Advisors LP**
- Co-Founder & Non-Executive Chairman of Stabilities Capital Management L.P.
- Founder, Chairman and CEO of Atticus Capital



Henry (Hank) R. Slack

- Chairman of Alico, Inc
- A Member of Investment Committees of **E. Oppenheimer & Son Limited**
- Previously CEO of Minorco SA



Laurence D. Belfer*

- CEO of **Belfer Management LLC**
- Previously Vice-Chairman, President and COO of Belco Oil and Gas
- Co-founder of Harvest Capital



Paul J. Fribourg*

- Chairman & CEO of **Continental Grain Company**
- Board member of Loews Corp, Estee Lauder, Burger King, Apollo Global Management



Jacques Veyrat

- Chairman & CEO of Impala
- Previously Chairman and CEO of Louis Dreyfus Group



J. Michael Evans

- Board member of Alibaba and Barrick Gold Corp
- Previously Vice-Chairman of Goldman Sachs



Thomas A. Patterson*

- Co-founder and General Partner at **Madrone Capital Partners (Walton family office)**
- Board member of JetBlue Airways



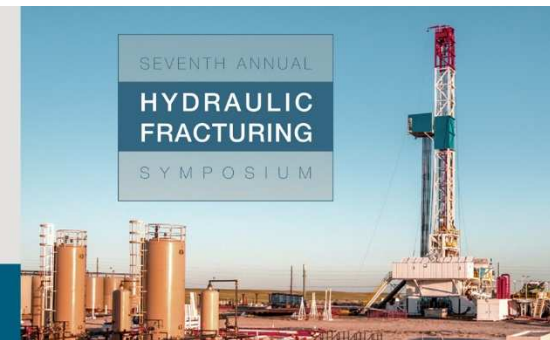
Joshua L. Steiner*

- Head of **Bloomberg L.P.'s** Industry Verticals Group
- Co-founder at Quadrangle Group

*Denotes a member of the Executive Committee; the business and affairs of CCI are managed under the direction of the members of the Executive Committee and the officers of CCI. Bold font indicates the family offices represented by the various board members.

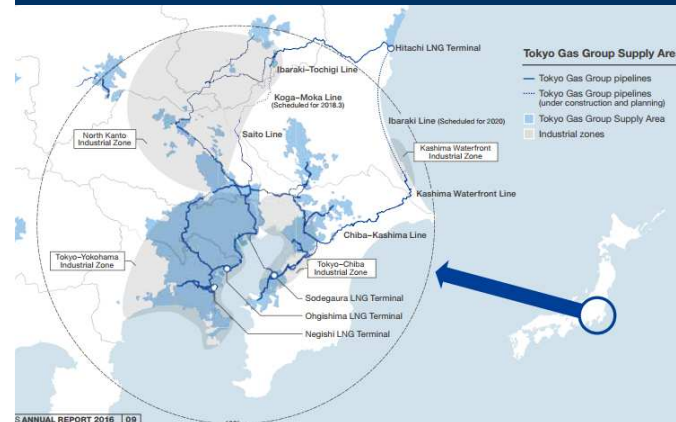
Tokyo Gas is a well-capitalized and strategic owner of Castleton Resources

CCI welcomed Tokyo Gas (TG) as a 30% equity holder and a long term partner.



- **TG is the biggest gas utility in Japan**
 - Established in 1885
 - Credit Rating: S&P AA- Moody's Aa3
 - Enterprise Value: 16.5 B USD / EBITDA: 3.1 B USD
 - Market Cap: 12.2 B USD (Pipeline asset : 39,413 miles)
 - Customers:
 - Gas: 11.5 million (40% share in Japan)
 - Electricity: 0.8 million (started to sell from 2016)
 - Sales Volume: 1.6 Bcfd (45% share in Japan)
- **TG Imports LNG from all over the world, equivalent to 1.8 Bcfd**
 - TG procures LNG from BHP through North West Shelf LNG project
 - TG will start to import LNG from the USA in 2017 and 2018
 - Cove Point LNG: 182 MMcfd from 2017
 - Cameron LNG: 93 MMcfd from 2018
 - In order to achieve a natural hedge effect, TG is increasing exposure in the US upstream, leading to the partnership with Castleton Resources in 2017
 - Barnett in 2013
 - Eagle Ford in 2016
 - East Texas in 2017

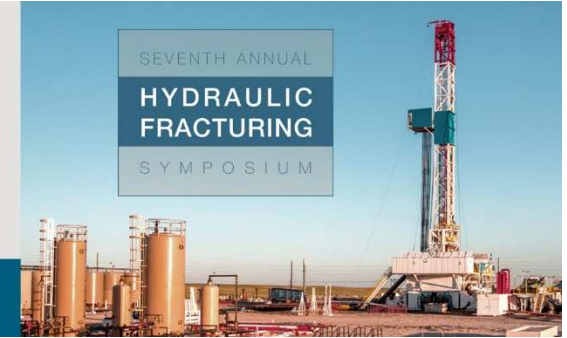
Tokyo Gas's Service Area (PL: 39,413 miles)



Imports LNG from all over the world



Castleton Resources has had good success with its Carthage acquisition



- **Oversubscribed financing for the acquisition of Anadarko's Carthage assets:**

- First-lien RBL underwritten by JP Morgan, Wells Fargo, ABN Amro, SocGen and BAML
- Syndicated a \$560 MM borrowing base, over \$1.0 billion raised (85% oversubscribed)
- First oversubscribed RBL of size coming out of the downturn
- Castleton was represented by V&E

- **Cost reductions:**

- G&A was reduced year-over-year by ca. 30% on an absolute basis 2015
- G&A was reduced year-over-year by ca. 80% on a per-unit basis since 2015
- G&A is now 18 cents per Mcfe
- LOE was reduced year-over-year by ca. 40% on an absolute basis since 2015
- Reduced field headcount from 70 to 50
- LOE for the former Anadarko assets is now ca. 25 cents per Mcfe

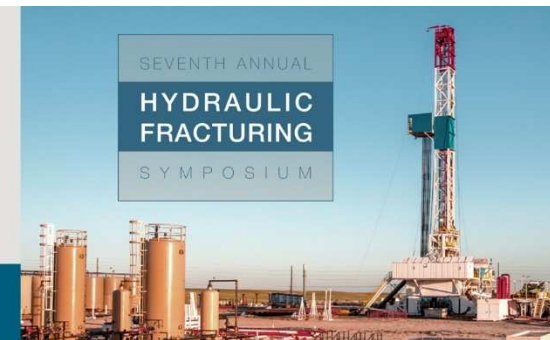
- **Production operations:**

- Halved the decline rate on the former Anadarko assets prior to drilling new wells

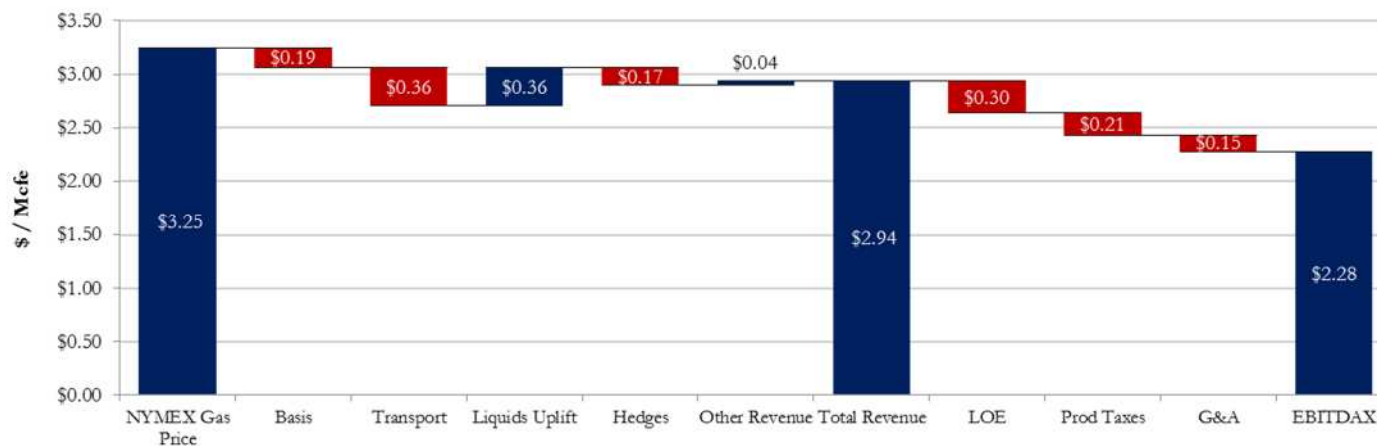
- **Asset value:**

- Booked ca. 400 Bcfe of behind-pipe reserves worth ca. \$200 MM in less than a year
- Demonstrated that the Haynesville will respond to Gen-5 completions

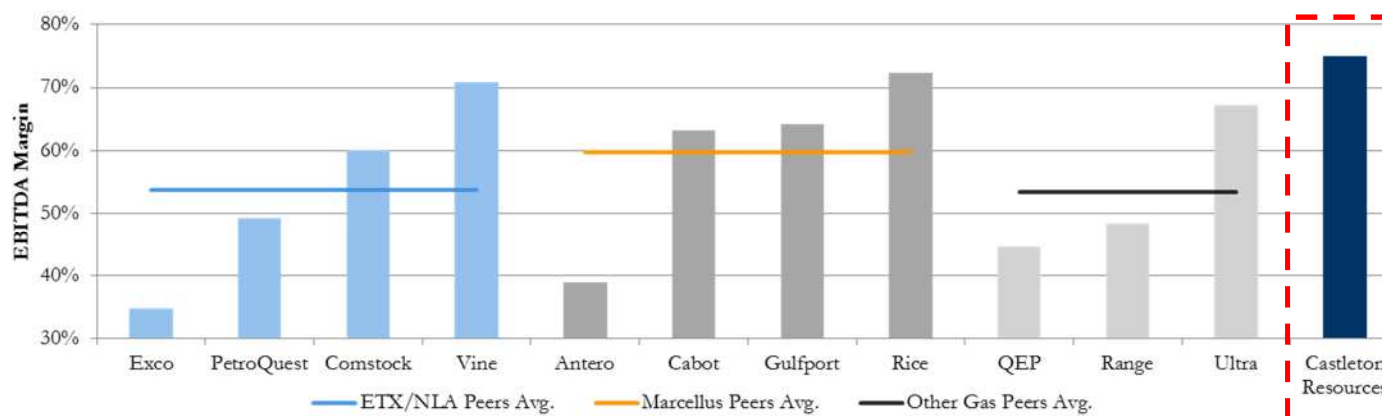
Castleton Resources has the highest EBITDA margin in its peer group



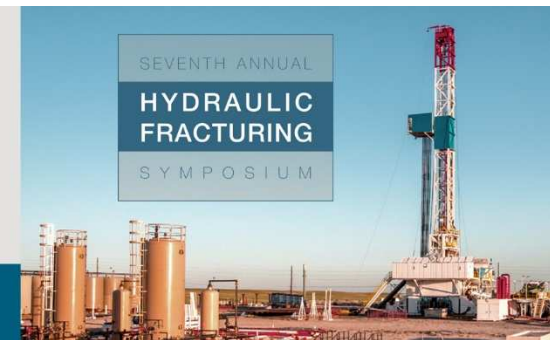
Carthage Region – Year to Date (June)



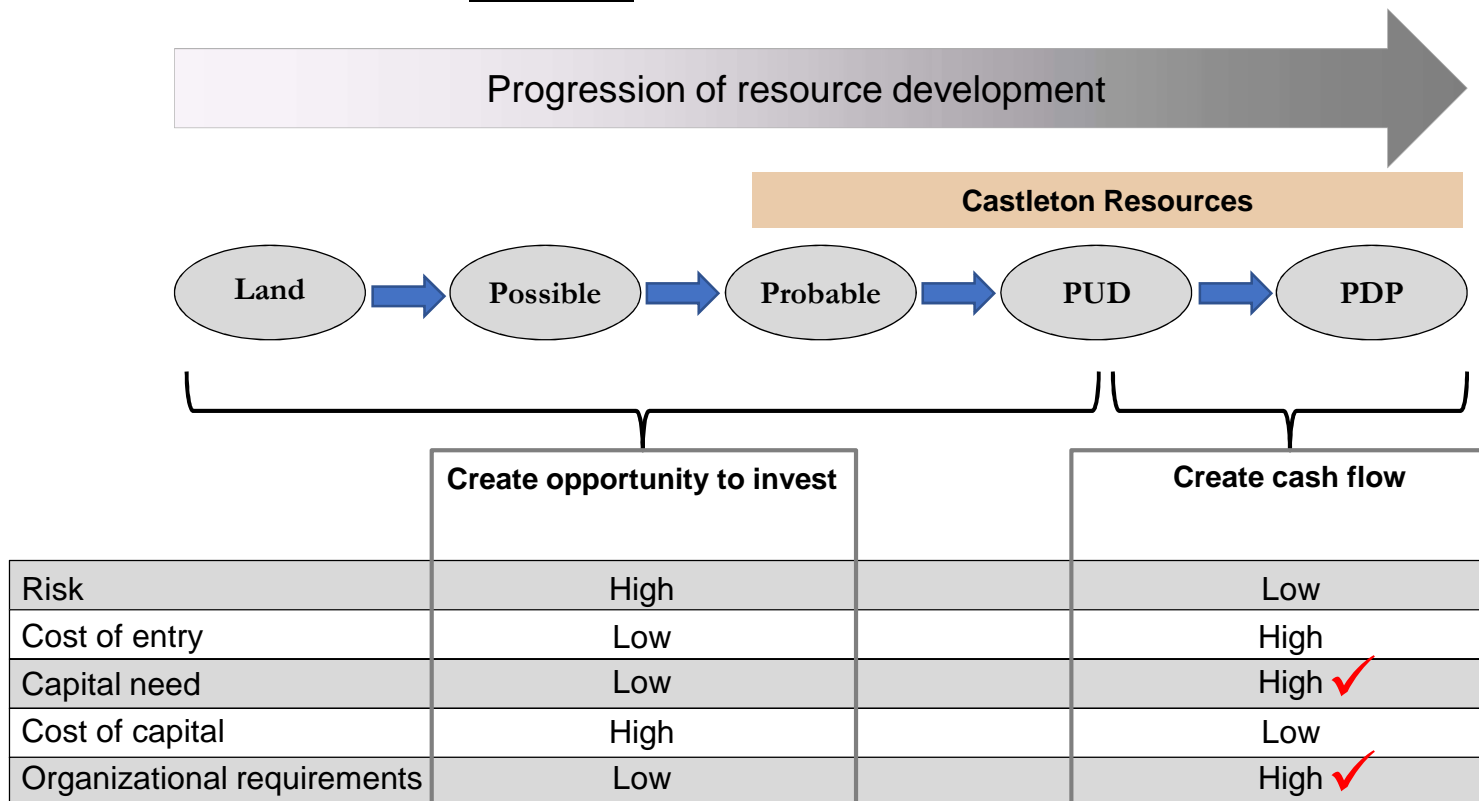
EBITDAX Margin – Gas Peers



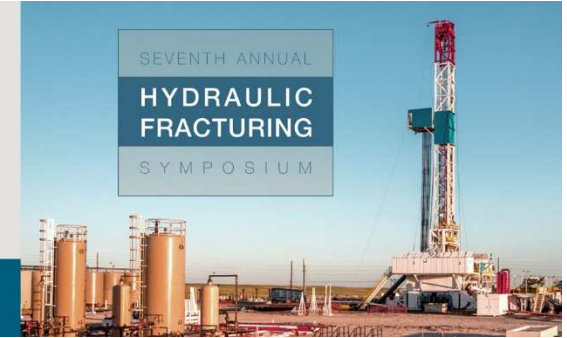
Castleton Resources seeks to create high-margin cash-flows in East TX and North LA



- In general, there are two types of upstream companies:
 - Those that create and sell the **opportunity to invest**.
 - Those that create and sell **cash flows**.



The availability of private capital is no longer a hindrance to upstream cash-flow generators



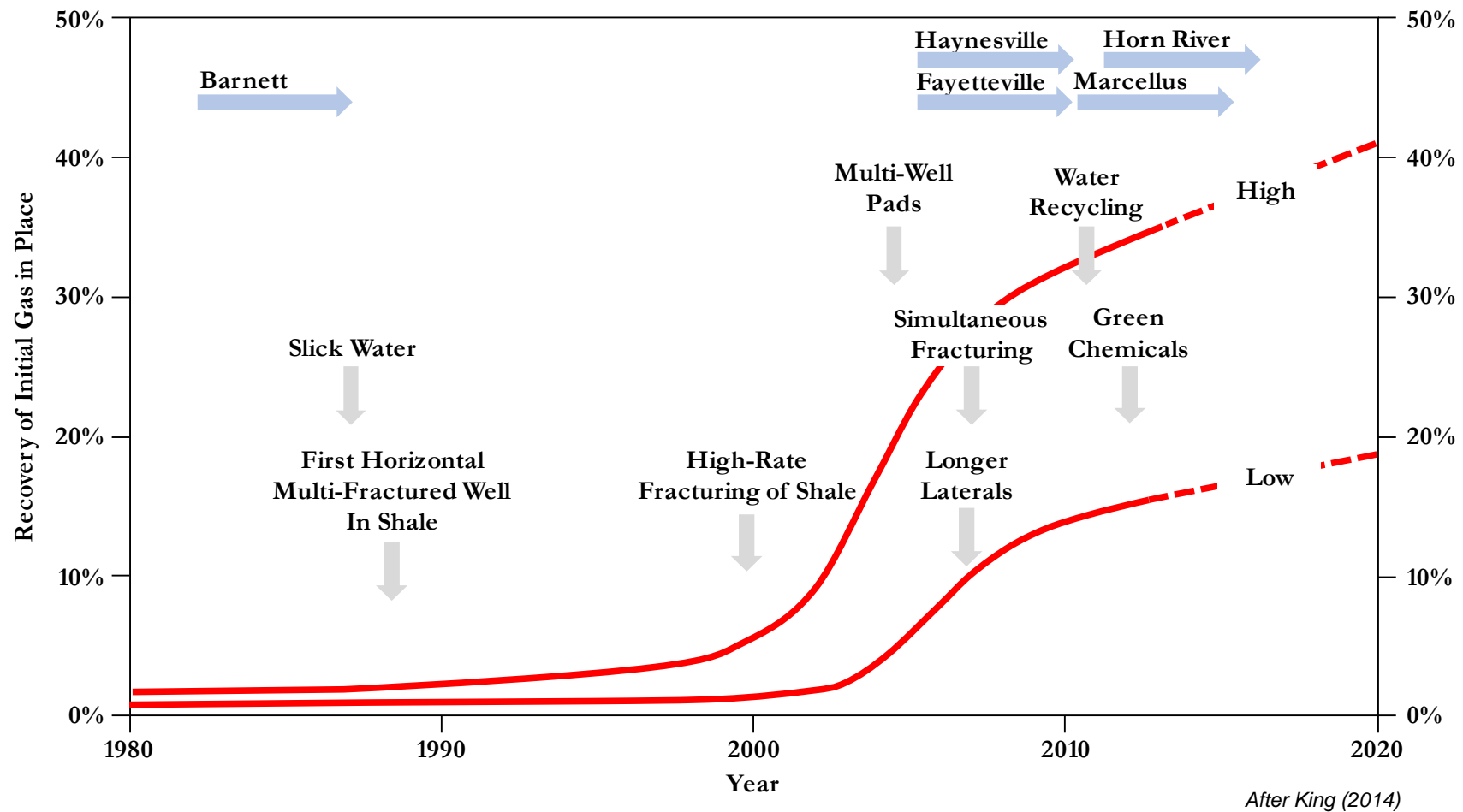
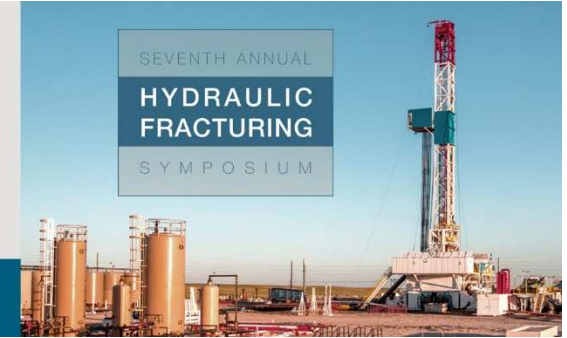
Largest private companies:

Rank	Company	State	Industry	Revenue	Employees
#1	Cargill	Minnesota	Food, Drink & Tobacco	\$109.7 B	150,000
#2	Koch Industries	Kansas	Multicompany	\$100 B	100,000
...					
#40	Tenaska	Nebraska	Multicompany	\$8.4 B	650
...					
#168	Hunt Consolidated/Hunt Oil	Texas	Oil & Gas Operations	\$2.7 B ^e	4,500

- Private capital for upstream:
 - \$90+ billion available.
 - Buying most of non-Permian asset supply.
- Tech Unicorns:
 - Number: 223
 - Valuation: \$773.6 Billion
 - Capital Raised: \$135 Billion



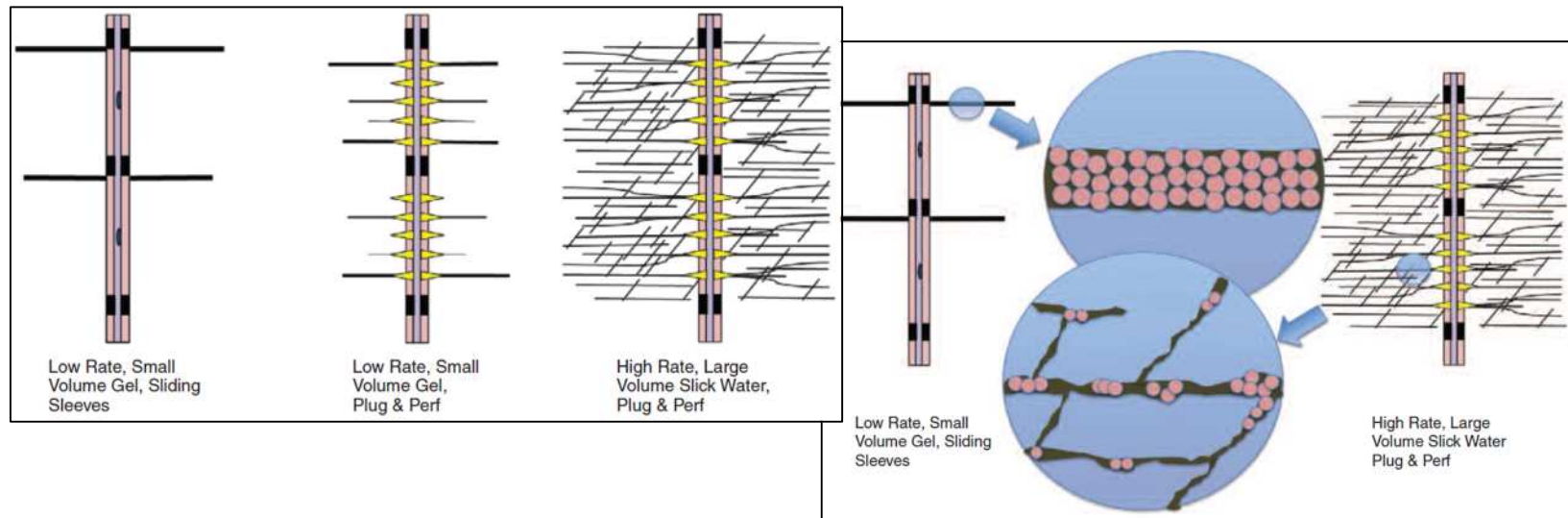
Hydraulic fracturing has been a story of ever-increasing recoveries of hydrocarbons from shale



Recoveries have increased in part through improvements in technology and know-how

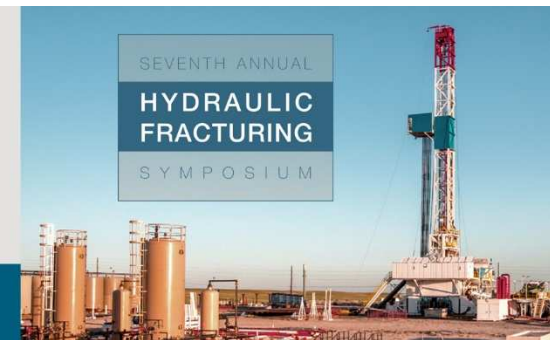


- Options in hydraulic fracturing:
 - Gel vs. slick water
 - Open hole vs. cemented liner
 - Sliding sleeve vs. plug-and-perf
 - Geometric stage-spacing vs engineered
 - Slow pumping-rate pumping vs. high
 - Ceramic proppant vs. resin-coated sand vs. northern white vs. regional sand
 - Etc.



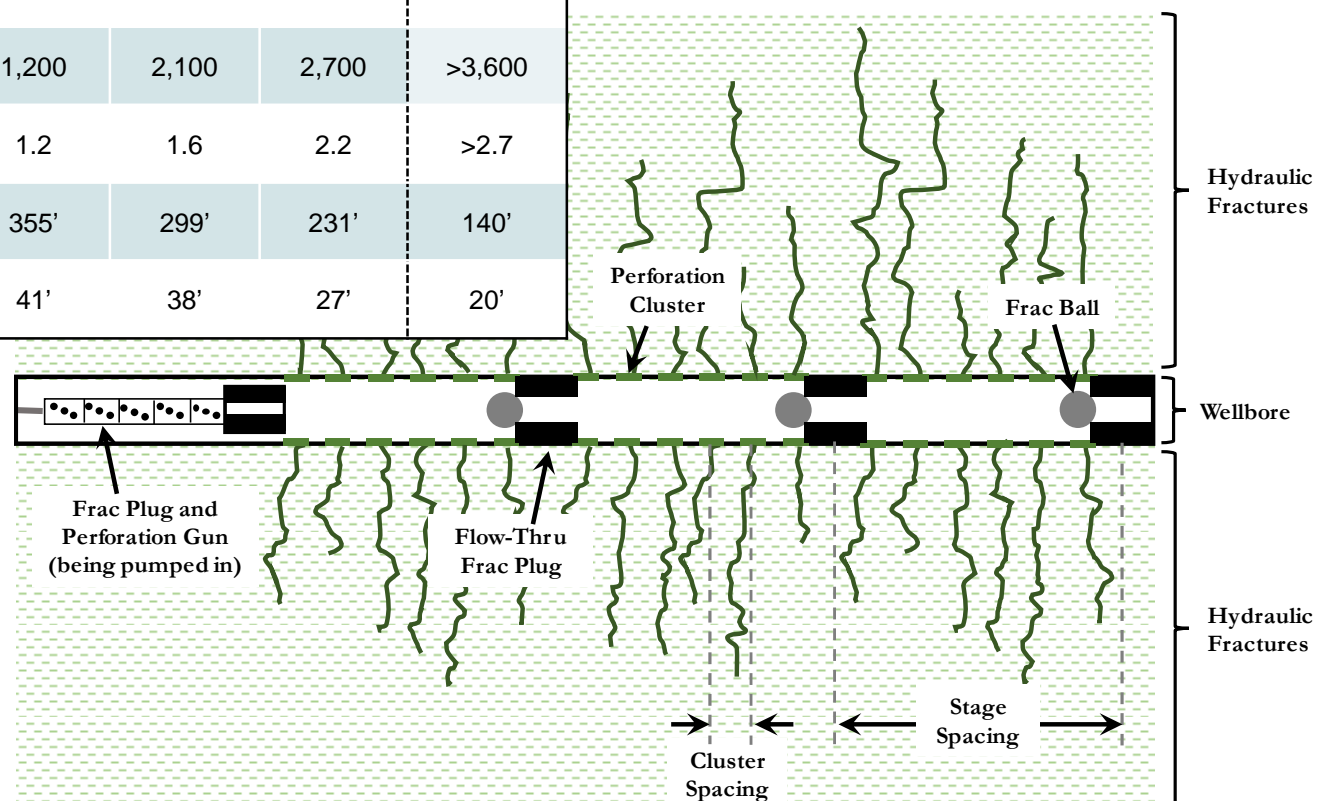
From Wright et al. (2013)

Recoveries also have increased through “super-sizing” the hydraulic fracturing



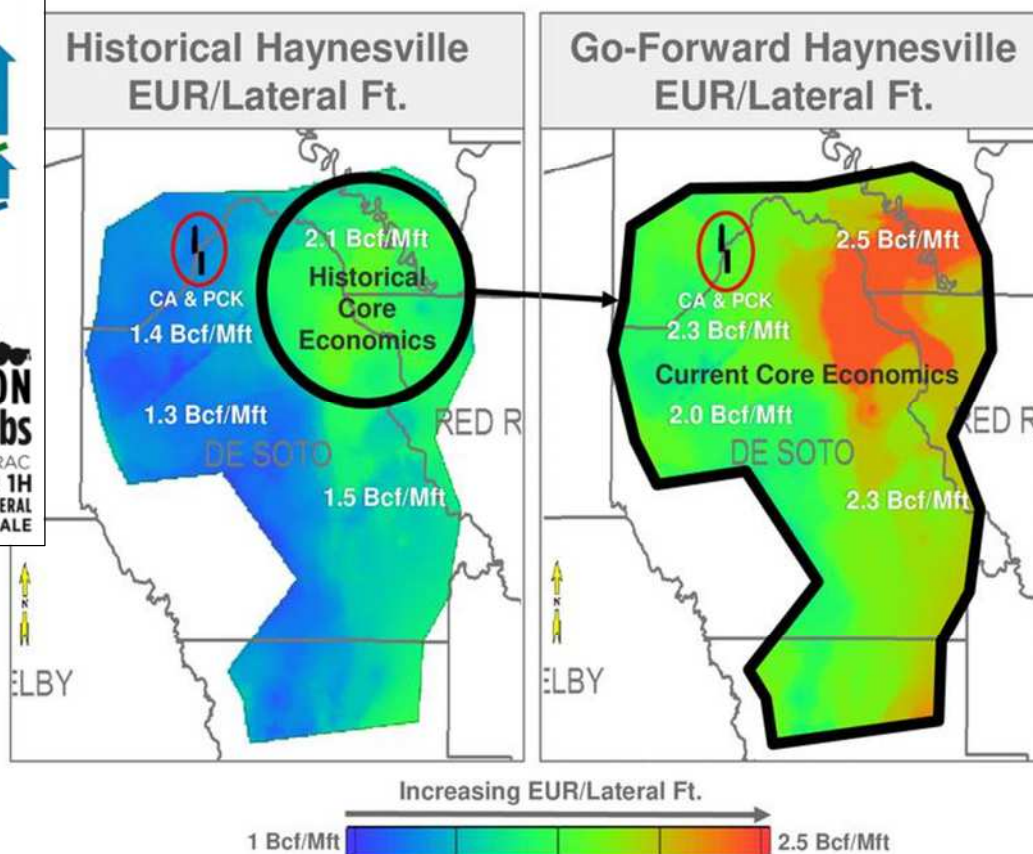
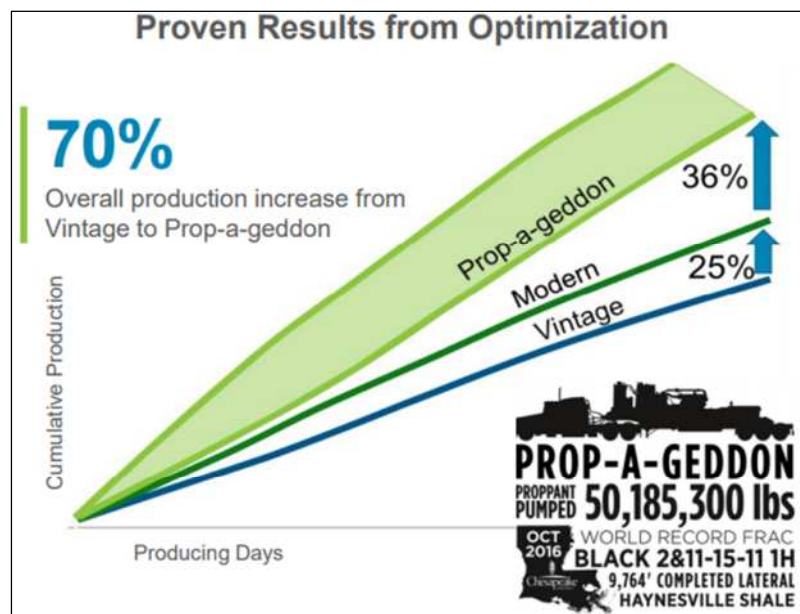
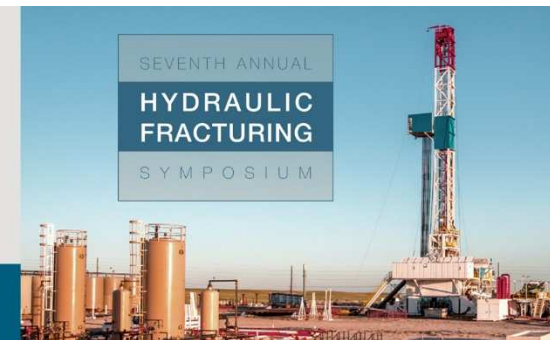
Completion Design	Gen 1	Gen 2	Gen 3	Gen 4	Gen 5
Timeframe	2008	2010	2014	2015	Present
Proppant (lbs / ft)	<1,000	1,200	2,100	2,700	>3,600
EUR (Bcf / 1000')	1.0	1.2	1.6	2.2	>2.7
Stage Spacing (ft)	399'	355'	299'	231'	140'
Cluster Spacing (ft)	54'	41'	38'	27'	20'

After Jefferies (2017)



After King (2014)

The results from “super-sizing” have exceeded our expectations by a wide margin



From Chesapeake (2016)

Despite our successes, major commercial challenges remain



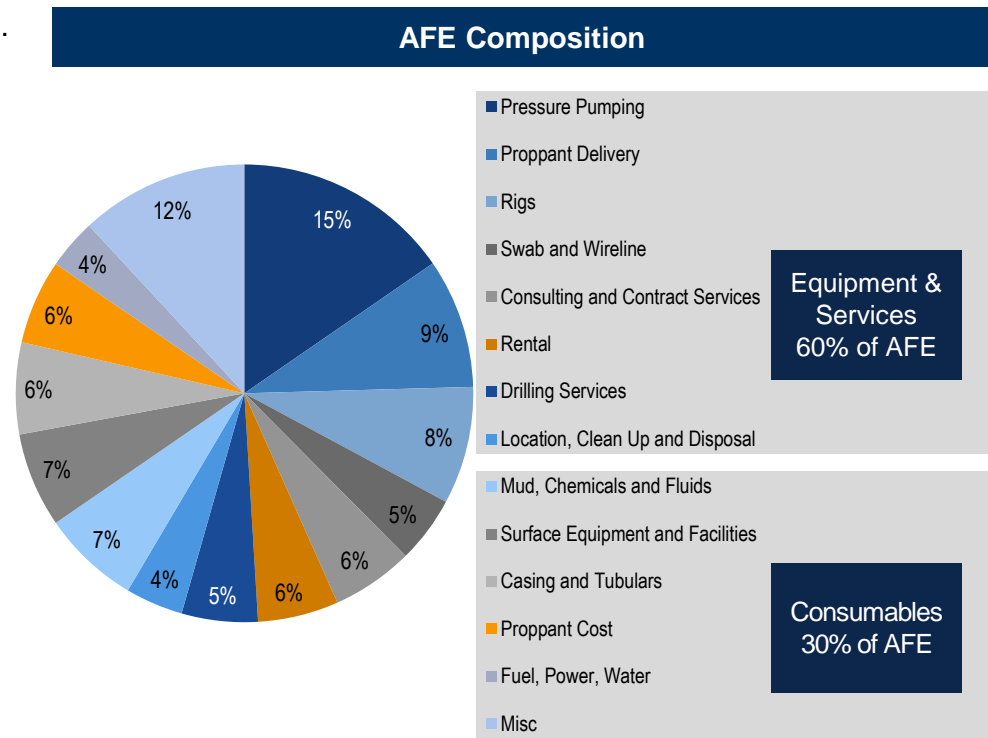
- The major commercial challenges related to hydraulic fracturing for Castleton Resources:
 - Controlling costs, and
 - controlling costs, and
 - controlling costs.
 - Pressure-managing wells while maintaining an economic type curve.
 - Preserving PUD locations at risk due to “frac hits”.
 - Making re-fracs work.



Drilling & completion costs: Many components must be managed, not one or two



- A typical AFE for a modern Haynesville well is ca. \$9.0MM.
- Of this \$9.0 MM:
 - \$3.8 MM is for drilling
 - \$4.8 MM is for completion
 - \$0.4 MM is for facilities
- Of this \$9.0 MM:
 - \$5.3 MM is for equipment and services
 - \$2.7 MM is for consumables
- Of the various costs, the top three are:
 - 15% is for pressure pumping (equipment & service)
 - 9% is for proppant delivery (equipment & service)
 - 8% is for rigs (equipment & service)



Pressure pumping: One Haynesville fracture treatment requires 50,000 horse power



- For its recent completions, Castleton used:
 - 20 pressure pumping trucks, including two spares
 - Each truck is rated for 2,500 horse power
 - Nominally, there is 50,000 horse power on location
 - Of this, 25,000 horse power actually utilized, due to rates and pressure encountered in Haynesville wells

Wireline and Perforating



Pressure Pumping

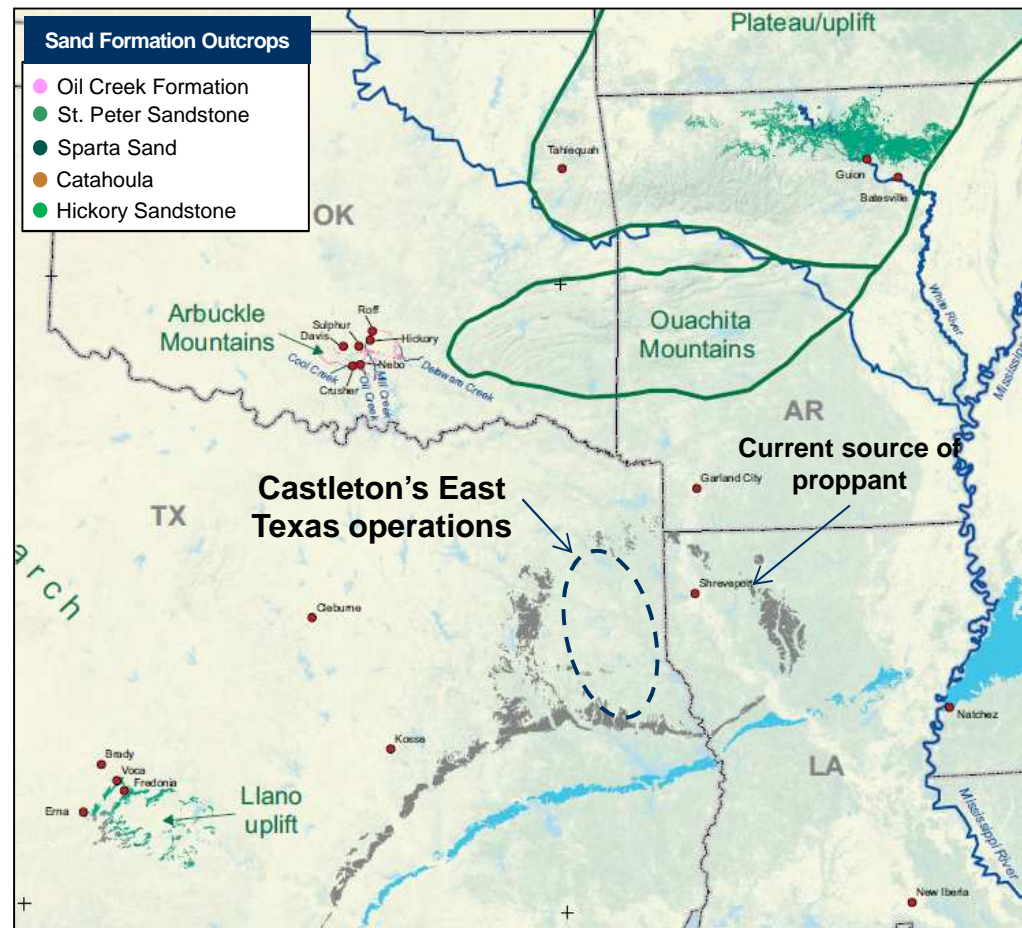


Regional sand is abundant in the area, although capacity additions will be required



- There are over 11 MM tons of current annual proppant production capacity within 300 miles of East Texas
- Castleton's 2017 drilling program will consume ca. 0.12 MM tons of proppant, approximately 1% of region's current production capacity
- The barrier to entry for regional sand mines is low

Proppant Production Map Around East Texas



Proppant Plant



Pressure management is required to prevent damage to the hydraulic fracture treatment



- Pressure management involves choking wells back so that they do not flow at their highest potential.
- This prevents the formation of large pressure differentials in the subsurface, which would crush proppant, cause proppant embedment, and cause un-propped permeability to collapse.

	Not Pressure Managed Well A	Pressure Managed Well B
IP30 (Mcf/d)	15,000	12,000
Draw down	> 50 psi / d	< 25 psi / d
B	0.8	0.75
De	82%	68%
EUR (Bcfe)	6.4	8.4
EUR (Bcfe per 1000' Ft)	1.4	1.9

Single Well

Gross Well Cost, \$M	\$7,000	\$6,500
Well Cost Per Lateral Ft	\$1,556	\$1,857
Lateral Length	4,500	3,500

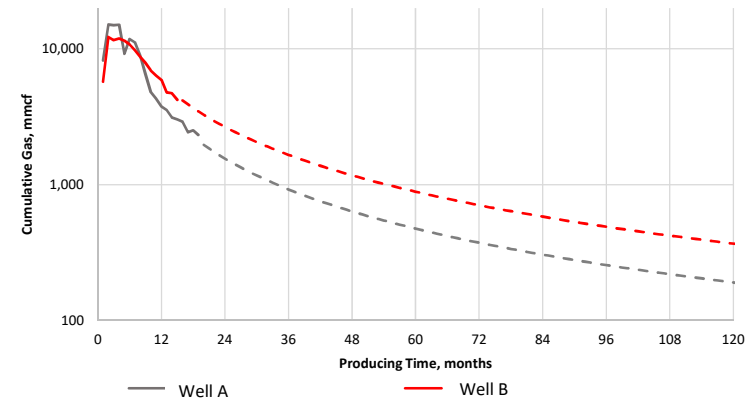
Single Well Return

PV10, \$M	\$1,113	\$3,407
IRR	26.8%	56.3%
Payout, yrs	2.6	1.6

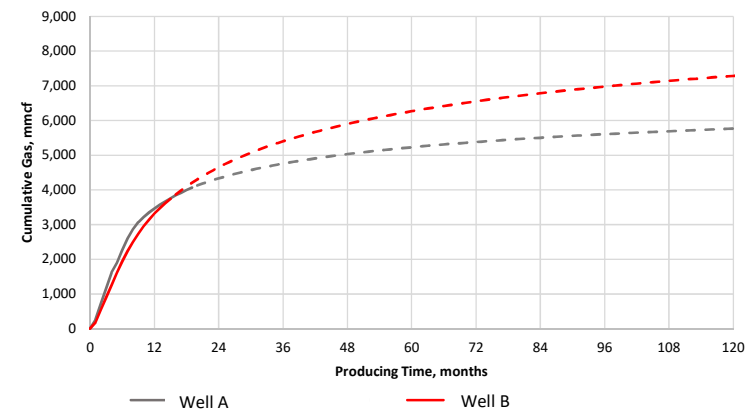
Delta

\$2,294
29.5%
(1.0)

Production (MMcf/d)



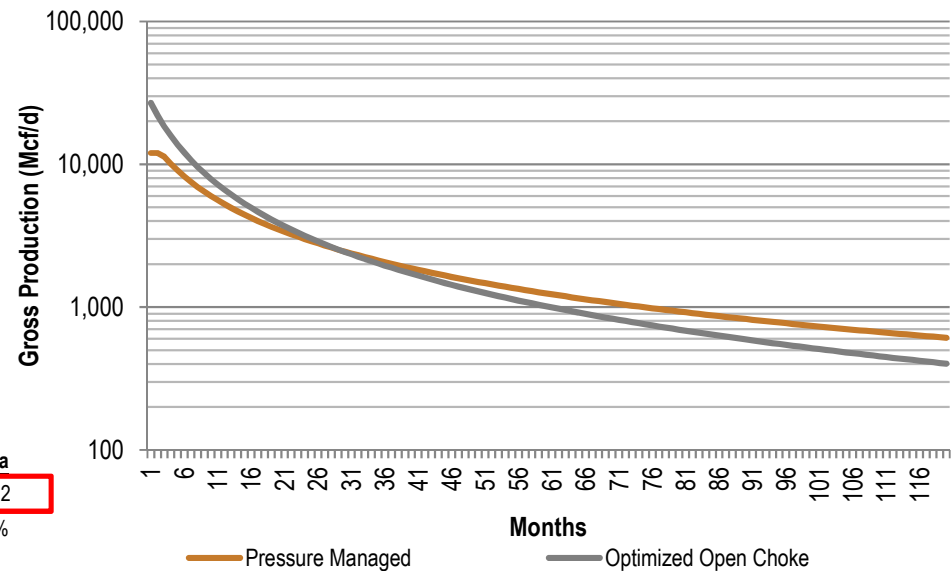
Cumulative Production (MMcf)



Problem: Pressure management degrades returns immensely relative to ideal case



	Pressure Managed	Optimized Open Choke
IP30 (Mcf/d)	12,000	30,000
Pressure Management	Yes	No
B	0.9	0.7
De	62%	79%
EUR (Bcfe)	11.2	11.2
EUR (Bcfe per 1000' Ft)	1.5	1.5
Single Well		
Gross Well Cost, \$M	\$9,750	\$9,750
Well Cost Per Lateral Ft	\$1,300	\$1,300
Lateral Length	7,500	7,500
Single Well Return		
PV10, \$M	\$478	\$2,690
IRR	11.9%	29.2%
Payout, yrs	5.2	2.3



Delta

\$2,212

17.3%

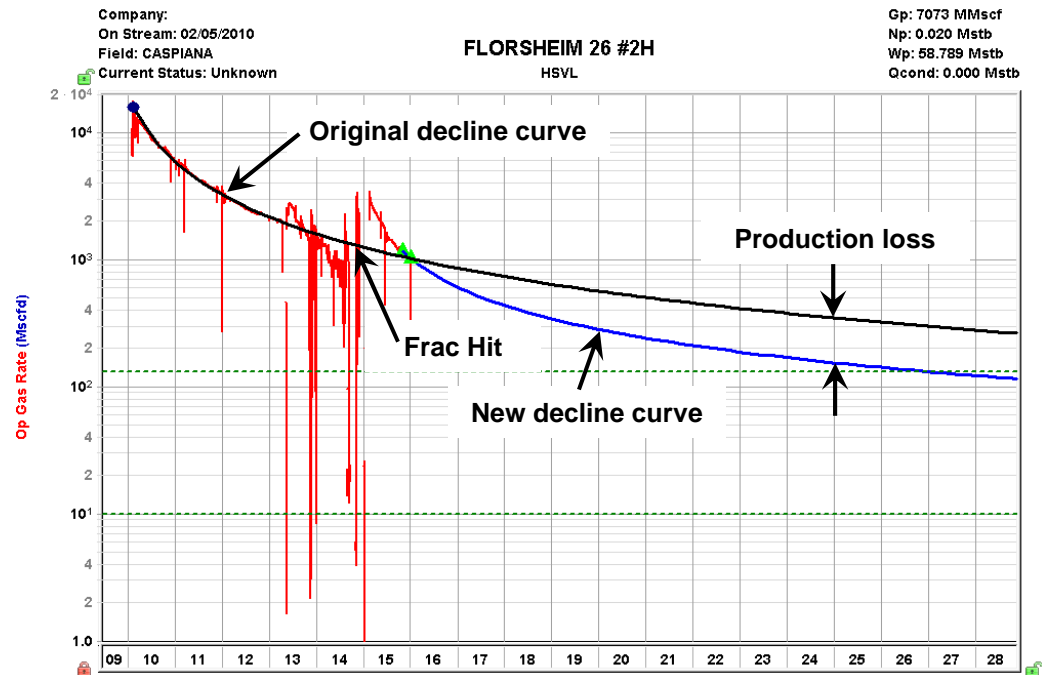
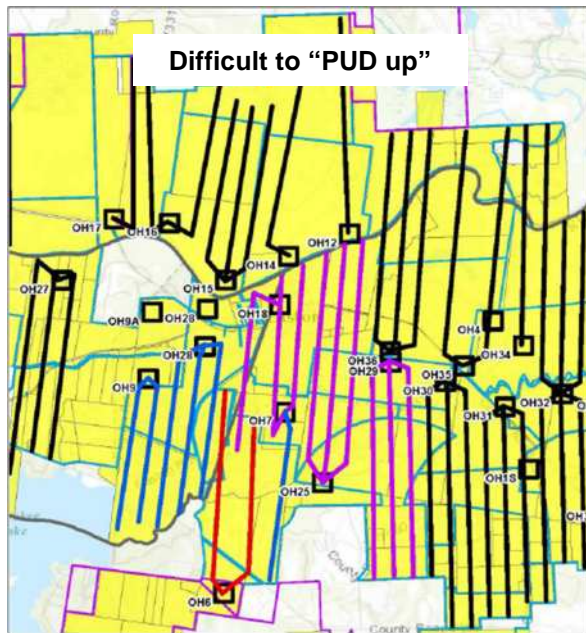
(2.9)

- The cost of delaying production on a typical Haynesville well due to pressure management is over \$2 MM.
- Thus, it would make economic sense to invest up to \$2 MM in preventing proppant crushing and embedment, as well as in ways to prevent un-propped permeability from collapsing.

Problem: Frac hits make it difficult to “PUD-up” acreage, and thereby create asset value

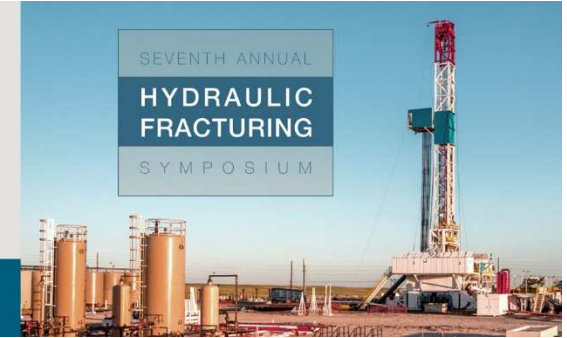


- As a horizontal well produces, it changes the stress regime in the rock nearby.
- With time, the changes in stress are sufficient to cause an existing well to be an attractor of newly created hydraulic fractures in adjacent wells.
- This attraction can cause “frac hits”.

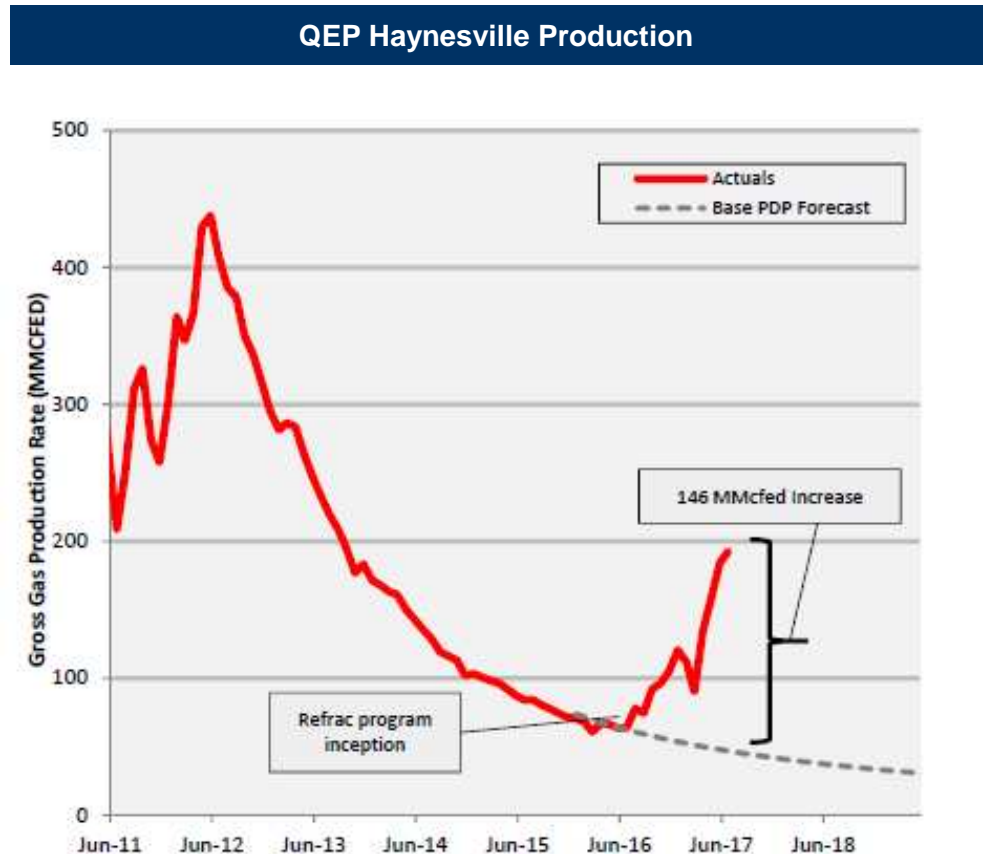


- Frac hits can cause the production from an existing well to be reduced (see figure above).
- Frac hits also can cause hydraulic fracturing in new wells to be ineffective. Instead of opening up new rock, the fracture treatment is hijacked by the adjacent well. **This effect can condemn PUD locations.**

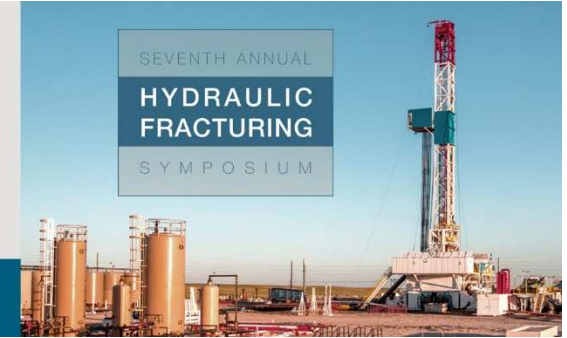
Opportunity: Fracturing rock again using pre-existing wellbores



- Given the massive improvements in completions over the years, re-fracturing rock using new technologies and know-how makes sense in principle.
- Surely, recovery factors can be improved.
- And, this can be done without having to invest the capital for a new wellbore.
- Indeed, operators are having some success with “re-fracs”. For example QEP in the Haynesville (see figure to the right).

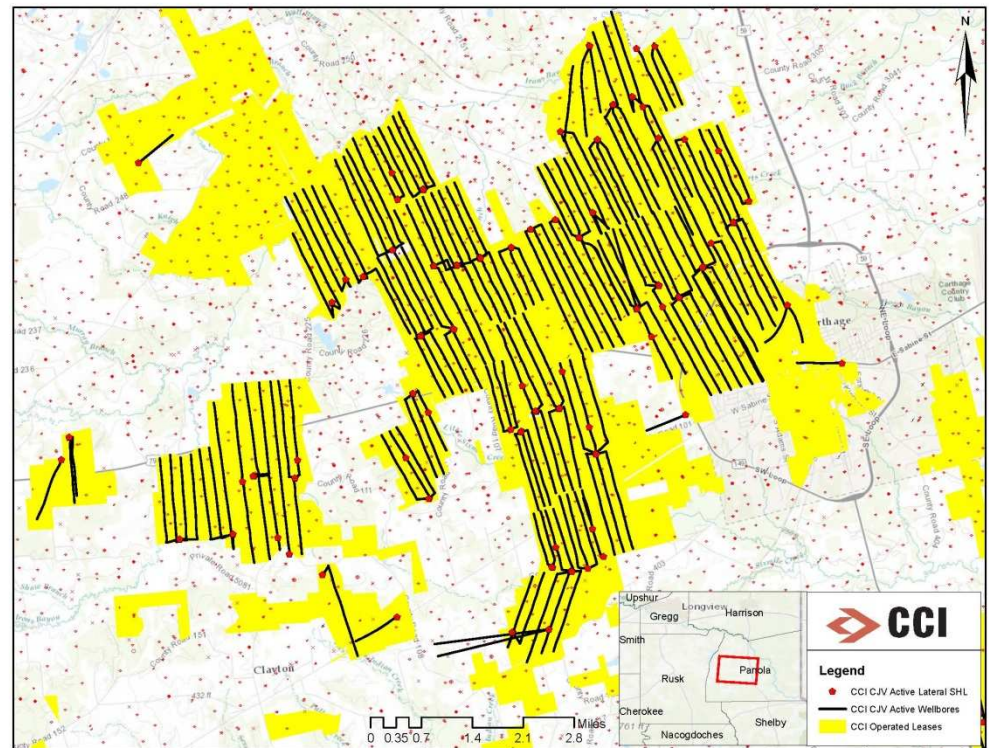


Opportunity: If re-fracs can be improved, the economic benefit would be huge



- Unfortunately, refracs on a large scale have proven difficult because:
 - Not all wellbores are suitable. Many are too small.
 - Not all prior completions are suitable. In some early generation completions, cluster spacing (but not stage spacing) was relatively small.
- However, there are thousands of horizontal wells with early-generation hydraulic fractures that would be candidates for re-fracs if the technology can be improved.

Castleton Resources – Producing Horizontal Wellbores (CJV)

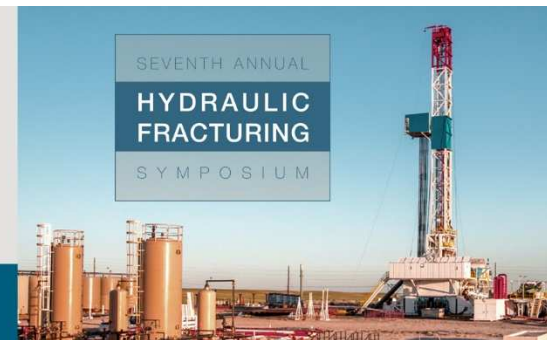


Summary



- Castleton Resources is one of the largest upstream operators in East Texas.
- Castleton Resources is backed with private, permanent capital from Castleton Commodities International and Tokyo Gas.
- Castleton Resources is designed to take resource development all the way to cash flows, rather than simply selling the opportunity for others to invest.
- As a result, Castleton Resources has a full operational capability and has used this capability to achieve important early successes with its \$1.0+ billion acquisition of the former Anadarko Carthage assets.
- The availability of private capital should allow Castleton Resources to continue to grow.
- The effectiveness of hydraulic fracturing continues to increase recovery factors in shale.
- This has come from technical improvements, improvements in know-how, and "super-sizing". Production improvements in some cases have exceeded 50%, making large swaths of rock economic.
- The challenges for hydraulic fracturing going forward are:
 - Controlling costs.
 - Pressure-managing wells while maintaining an economic type curve.
 - Preserving PUD locations at risk due to "frac hits".
 - Making re-fracs work.
- Thank you.

Speaker Biography



+1 (281) 714-2949



craig.jarchow@cci.com

Craig Jarchow is President & CEO of Castleton Resources, an upstream company with operations in East Texas. Castleton Resources is owned by Castleton Commodities International and Tokyo Gas. Dr. Jarchow was a Partner at Pine Brook Road Partners, an investment firm which focused on energy and financial services. Dr. Jarchow has worked in the upstream field for over 25 years, holding senior level positions at Amoco, Apache Corporation and First Reserve Corporation. Dr. Jarchow holds a B.A. in Geology from the University of Santa Barbara, California and M.S. and Ph.D. in Geophysics from Stanford University, and an M.B.A. from MIT. He is a Fellow of the Geological Society of America.

The background image shows an industrial oil field under a clear blue sky. On the left, there are several large, orange cylindrical storage tanks with metal ladders. In the center and right, a tall drilling rig with a red and white lattice structure is visible. The ground is flat and appears to be a mix of dirt and gravel. The overall scene is a typical representation of hydraulic fracturing operations.

SEVENTH ANNUAL

HYDRAULIC FRACTURING

SYMPOSIUM

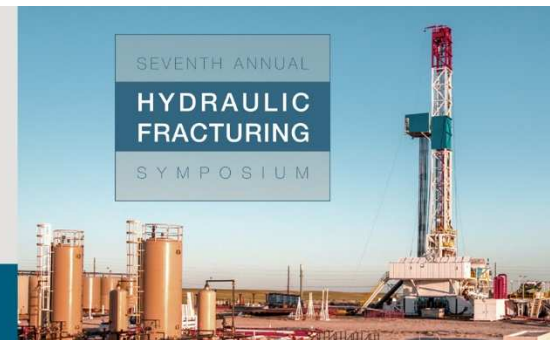
REGULATORY UPDATE

Larry Nettles

Regulatory Rollback

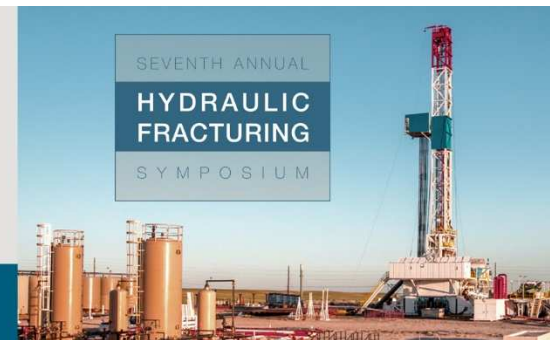
Efforts and Obstacles

- Trump Administration has issued several Executive Orders calling for the review and potential rescission of many regulations.
 - Agencies must comply with the Administrative Procedures Act (APA) in rolling back regulations.
 - This includes creating an administrative record and the obligation of reasoned decisionmaking.
 - Rules based on existing scientific record and action-forcing statutes may be more difficult for an agency to change without significant litigation risk.



Regulatory Rollback

Quad Oa



- On July 2, 2017, the D.C. Circuit struck down EPA's 90-day stay on the NSPS methane rules ("Quad Oa").
 - EPA has issued a proposed rule to stay Quad Oa for 2 years, but this rule is not yet final.
 - Quad Oa's deadline for submission of an initial annual monitoring report is October 31, 2017.
- Appropriations bill HR 3354 would prohibit funds from being used to enforce Quad Oa.
 - HR 3354 passed the House on September 15, 2017.



Regulatory Rollback

Methane Information Collection Request

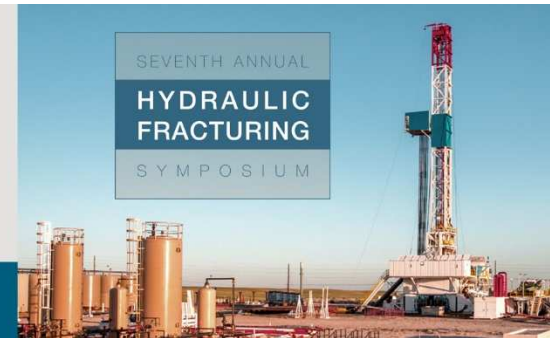


- On November 10, 2016, EPA issued an Information Collection Request (ICR) to the oil & gas industry.
 - The ICR signaled the potential extension of methane regulations, like Quad Oa, to existing sources.
- On March 2, 2017, EPA withdrew the ICR.



Regulatory Rollback

Clean Power Plan



- President Trump's March 2017 Executive Order on Energy Independence called for EPA to review the Clean Power Plan (CPP).
- In April 2017, the D.C. Circuit granted EPA's request to suspend proceedings in two cases involving the CPP.
 - On August 9, 2017, the D.C. Circuit held the cases in abeyance for an additional 60 days.
- The CPP is still subject to the Supreme Court's 2016 stay for now.



Regulatory Rollback

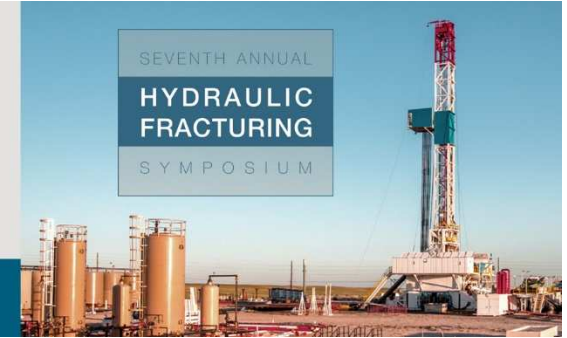
WOTUS



- In 2015, the Sixth Circuit stayed EPA's expansive waters of the United States (WOTUS) rule issued under the CWA.
- On February 28, 2017, President Trump issued an Executive Order calling for EPA to review the rule.
- On June 27, 2017, EPA issued a proposed rule to rescind the 2015 WOTUS rule. EPA's proposed rescission will proceed in two steps:
 - First, EPA will replace the 2015 version of the WOTUS rule with the pre-2015 version.
 - Second, EPA will reevaluate and revise the definition of WOTUS to be consistent with the February 2017 Executive Order.

Regulatory Rollback

BLM Fracking Rule

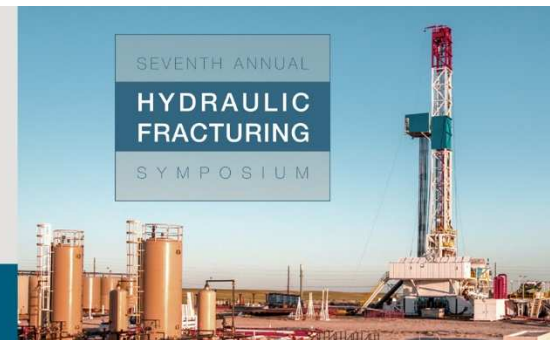


- BLM's 2015 Fracking Rule was struck down in 2016 by a federal district court in Wyoming, which held that BLM lacked authority to regulate fracking.
- On July 24, 2017, BLM issued a proposed rule to rescind the Fracking Rule.
- On September 21, 2017, the Tenth Circuit vacated the district court's decision and dismissed the case in light of BLM's proposal.
 - Environmental groups have argued that the decision effectively reinstates the 2015 fracking rule.
 - However, Trump Administration is expected to move quickly to block any implementation.
- The Tenth Circuit's decision could open the door to future BLM fracking regulations by vacating the district court's broad decision.



Regulatory Rollback

BLM Waste Prevention Rule



- On November 18, 2016, BLM published its final Waste Prevention Rule, which imposes additional emission controls related to venting, flaring, and leaking of natural gas.
 - The rule called for a “waste minimization plan” to be submitted in January 2017; other deadlines scheduled for January 2018.
- President Trump’s March 2017 Executive Order called for BLM to review the Waste Prevention Rule.
- On June 14, 2017, BLM postponed the rule’s January 2018 deadlines, pending judicial review.
- Forthcoming proposed rulemaking expected to push back compliance date to July 17, 2019.
- Appropriations bill HR 3354 would prohibit funds from being used to enforce the BLM Waste Prevention Rule.
 - HR 3354 passed the House on September 15, 2017.



Regulatory Rollback

Social Cost of Carbon



- In 2010, the Social Cost of Carbon (SCC) was created by the Interagency Working Group on Social Cost of Greenhouse Gases to help agencies quantify future impacts from GHG emissions.
- President Trump's March 2017 Executive Order disbanded the Interagency Working Group and withdrew SCC documents.
- Agencies will still likely be required by federal courts to quantify future impacts from GHG emissions in their regulations.



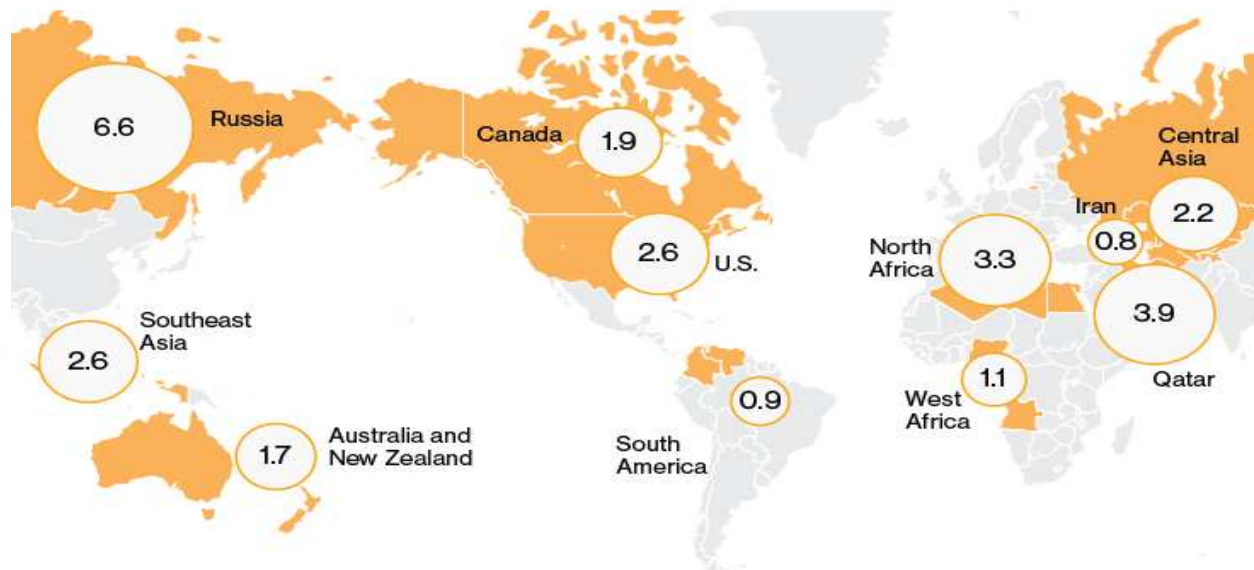
Regulatory Rollback

DOE LNG Proposed Amendment



- On September 1, 2017, the DOE proposed expediting the application and approval process for small-scale exports of LNG to non-FTA countries.
 - If the amendment is finalized, applications with volume below a certain threshold and that do not require NEPA review will receive automatic approval.

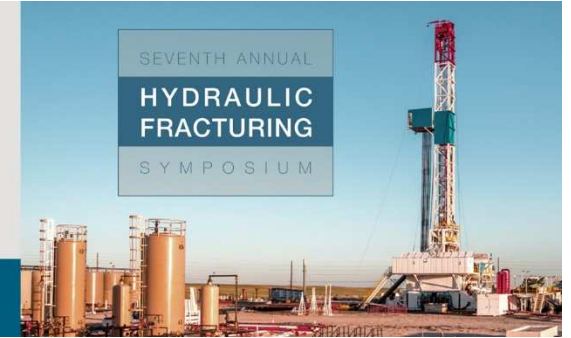
Projected major regional natural gas exporters in 2020
Estimated net exports in trillion cubic feet²



2 – Via pipeline or LNG export

State Developments

Oklahoma Seismicity

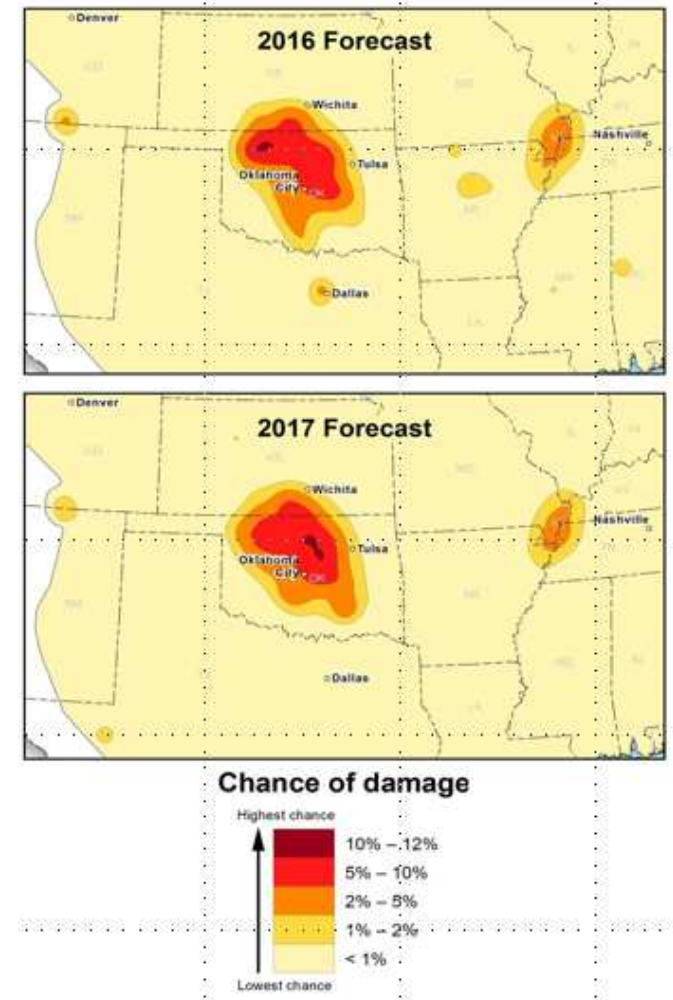


Source: Oklahoma Energy Resources Board

State Developments

Oklahoma Seismicity

- In November 2016, the Oklahoma Corporation Commission (OCC) issued an order to cease or scale back operations at 50 wastewater injection wells following 5.0 magnitude earthquake near Cushing.
- In December, OCC issued seismicity guidelines for the SCOOP and STACK plays.
 - The guidelines call for mitigation, breaks from operations, or cessation of operations with varying magnitudes of seismic activity.
- From December to June, OCC contacted 27 operators to order mitigation measures following 2.5 magnitude or greater earthquakes.
- Wastewater injection into Arbuckle—not hydraulic fracturing—still thought to be the highest risk.



State Developments

Oklahoma Seismicity



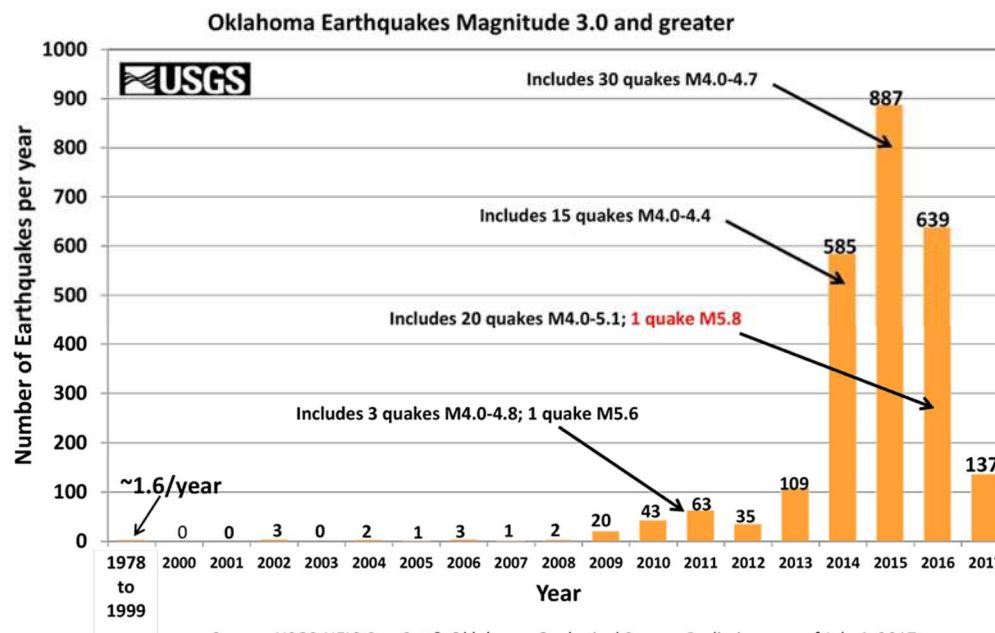
Source: Oklahoma Energy Resources Board

State Developments

Oklahoma Seismicity



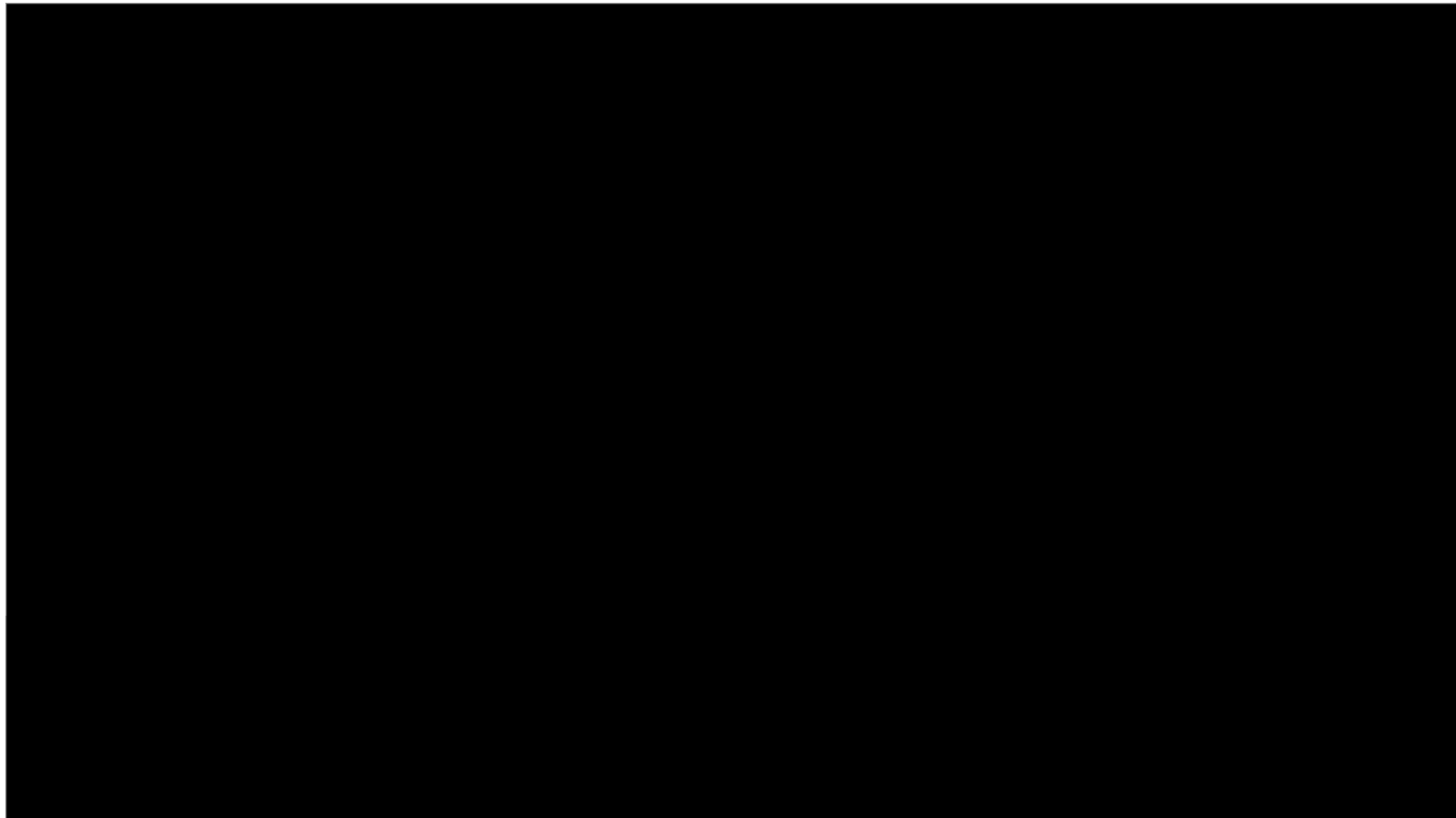
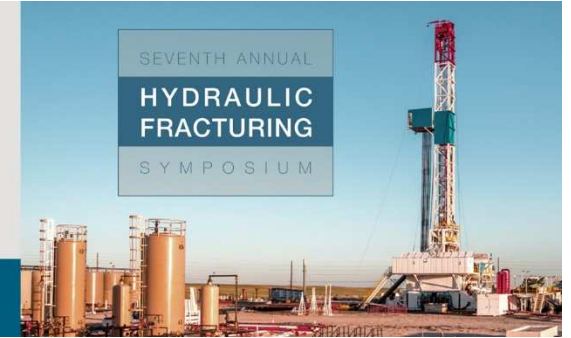
- A November 2016 Science Advances study predicted a decrease in widely felt earthquakes in Oklahoma by the end of 2016, and return to “historic levels within a few years.”
 - Through June 27, there were 140 3.0 or greater earthquakes, down from 386 through that date in 2016.



Source: USGS-NEIC ComCat & Oklahoma Geological Survey; Preliminary as of July 4, 2017

State Developments

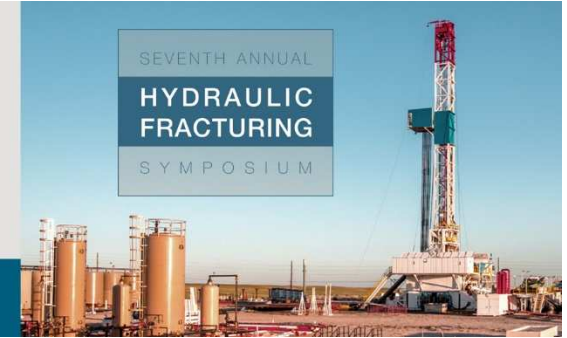
Oklahoma Seismicity



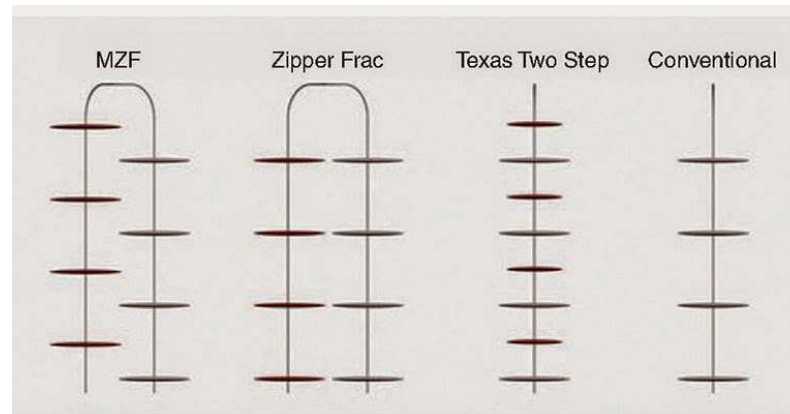
Source: Oklahoma Energy Resources Board

State Developments

Pennsylvania Regulatory Developments



- DEP found in April 2016 that Lawrence County seismic events showed “marked temporal and spatial relationship” to well stimulation.
 - In Lawrence County area agency plans to prohibit “zipper fracking,” require seismic monitoring and reporting via permit conditions.
 - DEP will develop area-specific seismicity rules in long term.
- Gov.’s proposed methane rules have stalled.
 - Proposal included end of air-quality permit exemption for new gas well pads, revised permit for new compressors, BMPs for pipelines, and more.



State Developments

Pennsylvania Regulatory Developments – Chapter 78(a) Rules



- Oct. 2016: New Chapter 78a fracking rules effective.
 - Authorized in part by 2012 statute overhauling state oil and gas development law, Act 13.
- Nov. 2016: State court blocked some Chapter 78a rules while industry group pursued legal challenge.
 - Injunction remains in effect.
 - Enjoined rules involved public resource protections, large fluid holding ponds, well site restoration standards and monitoring for underground hazards around fracking operations.
- DEP plans to amend Chapter 78 rules for conventional wells in 2018.



State Developments

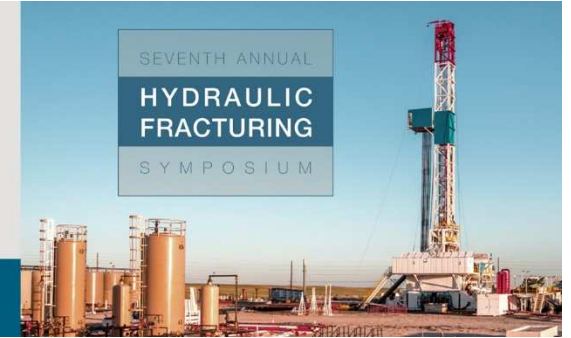
Texas Regulatory Developments

- State program, TexNet, built and maintains a network of seismometers.
 - Works with industry to study their data regarding seismicity and fluid disposal.
- In November 2016, RRC voted to relax rules regarding plugging of inactive wells.
 - New rule considers wells “active” with much lower levels of production than the old rule required.
 - Result: More low-production wells are active and do not need to be plugged and abandoned. This will save small producers money.



State Developments

Texas Regulatory Developments



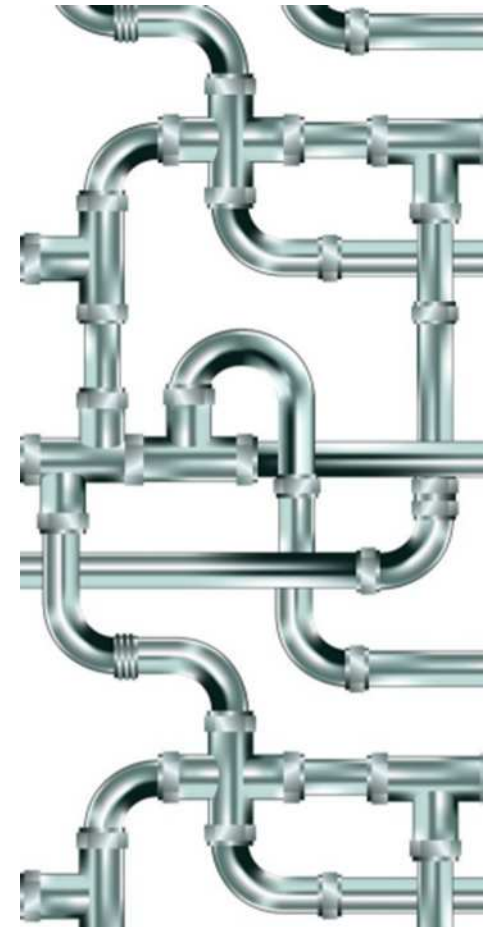
- Proposed bills S.B. 1868 and H.B. 3403 would have restricted oil and gas activity within 1,500 feet of schools.
 - Approximately 1,000 schools have wells within this distance.
 - Bills did not pass during regular session.



State Developments

Notable Local Developments

- [Boulder County, Colorado](#): Five-year fracking moratorium expired in May 2017.
 - County issued [restrictive new oil and gas rules](#) in March 2017.
 - Rules include notice to area residents, public meetings, and soil and water testing.
- [Erie, Colorado](#): In May 2017, city expanded health code to allow complaints regarding fracking odors.
 - On Sept 12, 2017, city approved ordinance requiring oil and gas operators to [map pipelines](#) in the town.
- [Murrysville, PA](#): May 2017 city ordinance requires 750 ft. setback from any protected structure (e.g., residence) to well pad.
- [Monroeville, PA](#): Sept. 2017 seismic testing ordinance requires notice to landowners, insurance, and performance bonds.



Efforts to Ban Fracking

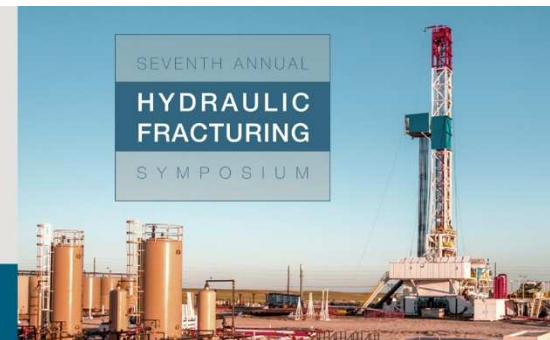
Results of Recent Efforts



- Maryland: Fracking ban signed into law in April 2017.
- Nevada: Fracking ban failed in June 2017.
- Monterrey County, California: Voters approved fracking ban in Nov. 2016.
 - First county ban in area with drilling activity.
 - Industry challenging ban in court.
- Lafayette, Colorado: Passed symbolic, anti-fracking “Climate Bill of Rights and Protections” in March 2017.
 - Similar measure failed to gather enough signatures to appear on 2017 ballot in Columbus, Ohio.



Efforts to Ban Fracking



Upcoming Efforts

- New York: State regulators revising solid waste facility rules. May prohibit fracking waste.
 - Similar bills introduced in Assembly and Senate.
- Ohio: Under January 2017 law, county boards of elections have more discretion to invalidate local charter proposals conflicting with state law and/or constitution.
 - Now easier to keep fracking bans off ballot due to conflict with state jurisdiction.
 - Ex: Youngstown, Bowling Green, and Athens, Ohio, proposed charter initiatives.
 - Ohio Supreme Court rejected the proposed Athens charter amendment in September 2017.
 - Judicial challenges to proposed Youngstown and Bowling Green charter amendments remain pending.
- Lafayette, Colorado: City Council to consider ordinance that would place a year-long moratorium on new oil and gas development within city limits.
- Broomfield, Colorado: Will vote on ballot initiative to require protection of health, safety, and environment before any drilling inside city limits.

Efforts to Ban Fracking

DRBC Proposal



- Delaware River Basin Commission proposal for permanent fracking ban.
 - May 2010: Adopted de facto natural gas drilling moratorium in watershed.
 - September 13, 2017: DRBC voted to issue draft regulations to ban fracking in the watershed, formalizing the May 2010 moratorium.
 - DRBC must release draft rules by end of November. Public comment period to follow.



What to Watch For

Federal Developments

- Pursuant to settlement, EPA to consider updating RCRA drilling waste regulations by March 2018. Would complete any updates by July 2021.
- Pursuant to settlement, BLM to address alleged deficiencies in Bakersfield Resource Mgmt. Plan and its NEPA analysis.
 - Involves auction of new drilling rights on federal land in California.
 - NEPA analysis allegedly deficient because of failure to adequately address impacts of fracking.
- Nevada: In lawsuit, environmentalists allege BLM did not comply with NEPA when it allowed oil and gas drilling to proceed on federal land in Nevada.



What to Watch For

State Developments



- Colorado Court of Appeals decision in Martinez v. COGCC : Protection of public health and the environment is “a condition that must be fulfilled” by the state before oil and gas drilling.
 - Petition for cert pending. Decision could impact Colorado’s state regulatory regime
- Pennsylvania: DEP to increase permit application fees for shale well operators.
- Illinois: State issued first fracking permit in August 2017.



Speaker Biography



+1.713.758.4586



lnettles@velaw.com

Larry, a partner in Vinson & Elkins' Houston office, has been practicing environmental law full-time since 1981 and has an exceptionally broad range of environmental law experience that makes him particularly well suited to advise clients with multifaceted environmental problems, such as those frequently encountered in large business transactions. Larry currently serves as the Environmental and Natural Resources Practice Group Leader, Co-Chair of the firm's Energy and Infrastructure practice group and Chair of the Shale and Hydraulic Fracturing Task Force. He is also a member of the firm's Climate Change practice group.

Larry has been recognized as the top environmental lawyer in the United States for the past ten years by *United States Lawyer Rankings*. He has also been recognized as one of the best environmental lawyers in the nation in the most recent edition of *Best Lawyers in America*®; one of the best environmental law attorneys in Texas on the "Texas Super Lawyers" list published in *Texas Monthly*, and by *Chambers & Partners* in its recent guidebook on *America's Leading Lawyers for Business*.

The background image shows an oil field under a clear blue sky. On the left, there are several large, orange cylindrical storage tanks with ladders. In the center-right, a tall drilling rig with a red and white lattice structure is visible. The foreground is a flat, sandy area with some equipment and a blue fence line.

SEVENTH ANNUAL

HYDRAULIC FRACTURING

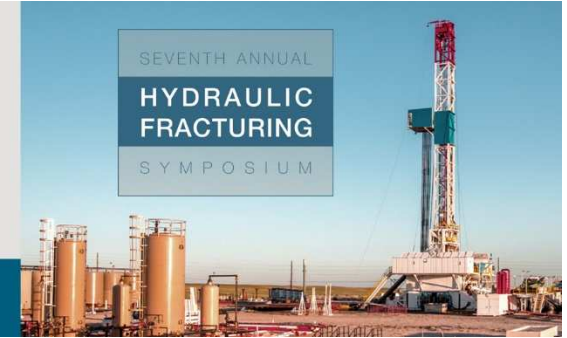
SYMPOSIUM

LITIGATION

Mark Rodriguez

Litigation

Presentation Overview



- Royalty Claims
- Development Claims
- Vertical Operators vs. Horizontal Operators
- Joint Venture/Joint Operator Disputes
- Seismicity Lawsuits
- Citizen Suits

Royalty Claims

Overview



- The shale revolution has marshaled in a new era of royalty and development claims.
- Royalty owners challenging developers in era of field-wide, capital-constrained development.
- Class-action certification stage critical juncture in lawsuit.

Why Have We Seen a Rise in Royalty Litigation?

Overview



- We are seeing lots of activity in Texas and beyond...why?
- Key factors:
 - Large number of shale plays across the state and the country.
 - Significant development and high prices.
 - As prices and development drop, claims often follow.
 - Unique leases that, in many cases, have not been interpreted by courts.
 - All of this combines for a rise in litigation and allegations of...
 - Royalty underpayment
 - Development and drainage
 - PPQ
 - Lease termination/cancellation
 - Lessors assert, lessees deny, and lawsuits follow.

Royalty Claims

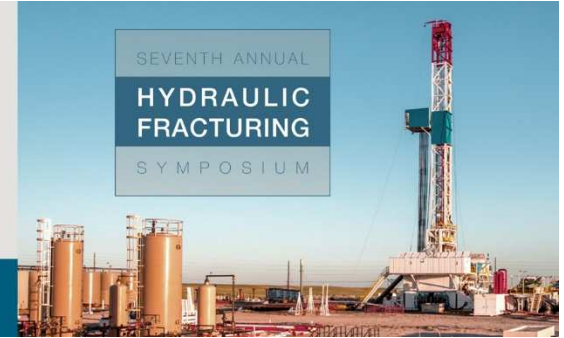
Class Action



- *Strack v. Continental Resources, Oklahoma*
 - Plaintiffs sought certification of a statewide Oklahoma class of more than 14,000 royalty owners, seeking more than \$200 million in alleged royalty underpayments on gas.
 - The district court granted certification of a b(1)/b(2) class for declaratory and injunctive relief, deferring a ruling on a b(3) class.
 - In February 2017, the Court of Civil Appeals reversed, holding that certification was improper as a matter of law. Plaintiffs' certiorari application to the Oklahoma Supreme Court is fully briefed and is pending.

Royalty Claims

Class Action



- *McKnight v. Linn Operating*, (W.D. Okla.)
 - In this royalty class action filed in Oklahoma state court and removed to federal court in Oklahoma City, trial court entered an order in February 2016 denying class certification of claims alleged to exceed \$200 million.
 - Plaintiff then sought permission from the bankruptcy court to litigate the motion for reconsideration in the Oklahoma federal court, which was denied.
 - Plaintiff then filed a motion and an adversary proceeding in the bankruptcy, arguing that it should be allowed to present claims on behalf of the proposed class. The bankruptcy court denied the motion and dismissed the class claims in the adversary proceeding in the Spring of 2017.

Royalty Claims

Class Action



- *Seeligson et al. v. Devon Energy Production Company LP*, No. 3:16-cv-000082 (N.D. Tex.) (Kinkeade, J.)
- Class definition: All persons or entities who (i) are or were royalty owners in Texas wells producing natural gas that was processed through the Bridgeport Gas Processing Plant by Devon Gas Services, L.P. (“DGS”); (ii) received royalties from Devon Energy Production Company, L.P. (“DEPCO”) on such gas; and (iii) had oil and gas leases that were on one of the following [nine lease] forms:
 - Producers 88-198(R) Texas Paid-Up (2/93);
 - MEC 198 (Rev. 5/77);
 - Producers 88 (Rev. 10-70 PAS) 310;
 - Producers 88 Revised 1-53—(With Pooling Provision);
 - Producers 88 (2-53) With 640 Acres Pooling Provision;
 - Producers 88 (3-54) With 640 Acres Pooling Provision;
 - Producers 88 (4-76) Revised Paid Up with 640 Acres Pooling Provision;
 - Producers 88 (7-69) With 640 Acres Pooling Provision; and
 - Producers 88 (Rev. 3-42) With 40 Acres Pooling Provision.

Development Claims

Prudent Operator Standard



- Failure to Develop Leases
 - Texas applies the prudent operator standard. *Shelton v. Exxon Corp.*, 719 F. Supp. 537 (S.D. Tex. 1989).
 - “The standard of care in testing the performance of implied covenants by lessees is that of a reasonably prudent operator under the same or similar facts and circumstances.” *Amoco Prod. Co. v. Alexander*, 622 S.W.2d 563, 567–68 (Tex. 1981).
 - No case law on whether fact finder must consider field development, or any sort of per se protection for operator developing modern shale fields.

Development Claims

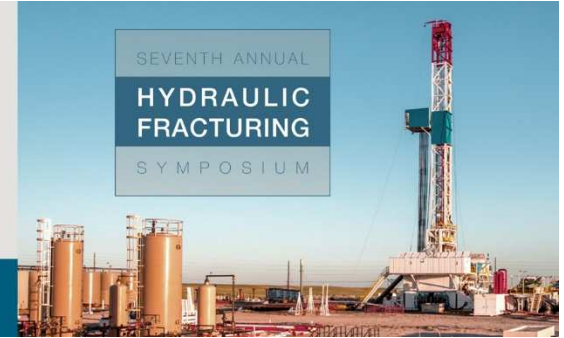
Prudent Operator Standard (cont'd)



- Theories about prudent operator standard found in 5-6 Williams & Meyers Oil & Gas Treatise § 806.
 - “Since the standard of conduct is objective, a defendant cannot justify his act or omission on personal grounds or by reference to his peculiar circumstances. It is no excuse that defendant failed to drill the offset well a prudent operator would have drilled because defendant is short of cash, over-committed on drilling programs, has no need for more production, or prefers to spend his money on other things.”
 - “In short, the question is not what was meet and proper for this defendant to do, given his peculiar circumstances, but what a hypothetical operator acting reasonably would have done, given circumstances generally obtained in the locality.”

Development Claims

Prudent Operator Standard (cont'd)



- Suggested factors to be considered by jury when considering whether operator developed prudently. *Spiller v. Massey & Moore*, 406 P.2d 467, 472 (Okla. 1965).
 - (1) The quantity capable of being produced from the premises as indicated by prior exploration and development;
 - (2) The local market or demand;
 - (3) Means of transporting to market;
 - (4) Extent and result of operations, if any, on adjacent lands;
 - (5) Character of the reservoir; and
 - (6) Usages of the business.
- Issue remains unresolved by Texas courts.

Development Claims

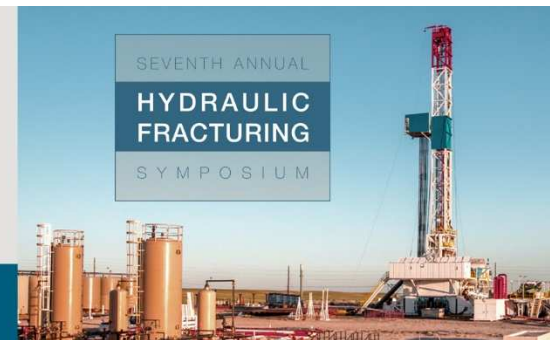
Prudent Operator Standard (cont'd)



- Unsettling situation for operators, potentially exposing shale players to liability for each lease.
- A bad decision by court or jury could alter the course of shale field development, potentially leading to economic and engineering inefficiencies.
- Ignores the reality of the industry and field-wide development.

Vertical Operators vs. Horizontal Operators

Overview



- “Well-bashing” incidents.
- Operators of vertical wells bringing suit against operators of horizontal wells for diminished production, pollution, and contamination as a result of hydraulic fracturing.
- Claims of nuisance, trespass, negligent injury to real property, and unjust enrichment.
- One attorney described the Oklahoma suits as a sort of proxy war between vertical and horizontal operators amongst a growing political divide about the state’s resources.

Vertical Operators vs. Horizontal Operators

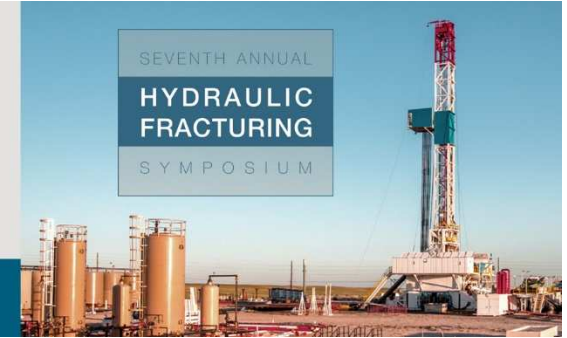
Jury Verdict



- *H&S Equipment Inc. v. Felix Energy LLC*, No. 5:15-cv-01244 (W.D. Okla.).
- Jury awarded \$220,000 verdict for destruction of a single vertical stripper well drilled in 1981.
- Plaintiff succeeded on claims of trespass and private nuisance.
- Trial lasted approximately two days.
- Theory has not yet been tested in other states.

JV/JOA Disputes

Overview



- Alleged Conduct:
 - Use of affiliate service providers to misappropriate non-operator funds (by double-dipping).
 - Collusion to charge excessive midstream and marketing fees to non-operator.
 - Operator attempts to allocate attorney's fees for its alleged conduct to non-operator.
 - Non-operator refuses to pay rightful portion for uneconomic project.
- Claims:
 - Breach of Contract.
 - Fraud, RICO.
 - Indemnification.
- Consider standard of conduct under the JOA.
- Cases may be handled in arbitration – for that reason, limited public information available.
- Non-operator/third party may be drawn into lawsuit by royalty owner against operator.

JV/JOA Disputes

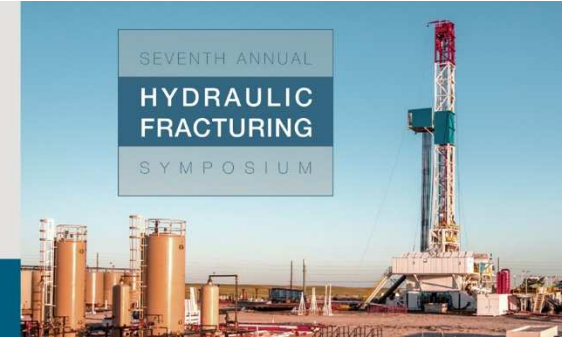
Recent Jury Verdict



- *Matrix Petroleum, LLC v. Talisman Energy USA Inc.*, No. 14-08-00158 (LaSalle Cnty. Dist. Ct.).
 - Nearly \$100 million jury verdict for fraud in accounting practices.
 - Breach of Operating Agreement.
 - Five-week trial.
 - One day of deliberations.

Seismicity Lawsuits

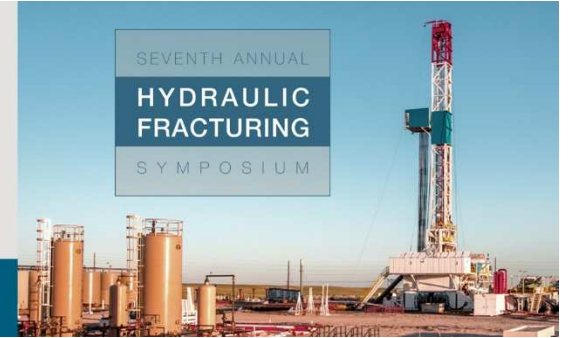
Overview



- Oklahoma earthquakes linked to disposal injection of produced water (slightly different and shallower than hydraulic fracturing activities in the state).
- Variations of Actions:
 - Private Tort Action (Homeowner vs. Well Owner).
 - Citizen Suits (Group vs. Government Agency).
 - Tribal Suits (Member Homeowners vs. Well Owner in Tribal Court).

Seismicity Lawsuits

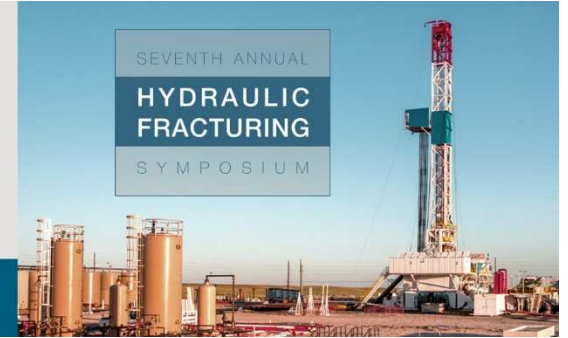
Outcomes



- No large jury verdicts to date.
- General outcomes (no guarantee moving forward):
 - Private Tort Action – Confidential Settlements.
 - Citizen Suits – Dismissed.
 - Tribal Suits – First filed in 2017; suit pending. Any judgment will likely face enforceability challenges.

Citizen Suits

Overview



- Lawsuit brought by a private citizen against a government agency demanding that a law be enforced.
- Rarely successful. Groups often bring the suits to call attention to the issue and hope for legislative or executive action.

Citizen Suits

Hydraulic Fracturing Lawsuits - Examples



- *FreshWater Accountability Project v. Patriot Water Treatment, LLC* (N.D. Ohio)
 - Defendant Patriot pretreats wastewater from hydraulic fracturing operations and other industrial users at its Centralized Waste Treatment Facility and allegedly discharges effluent containing excessive quantities of pollutants into the City of Warren's sewer system. The effluent is then further treated at Warren's publicly owned wastewater treatment facility and discharged into the Mahoning River.

Citizen Suits

Hydraulic Fracturing Lawsuits - Examples



- *Ohio Environmental Council v. US Forest Service* (S.D. Ohio)
 - Plaintiff alleges that Defendants failed to properly study and consider the environmental impact of newly authorized oil and gas leases, which opens up Ohio's Wayne National Forest to fracking, violating the National Environmental Policy Act.
- *Center for Biological Diversity v. Bureau of Ocean Energy Management* (C.D. Cal.)
 - Plaintiffs challenge the Bureau's decision to authorize the use of offshore fracking on the Pacific Outer Continental Shelf without first analyzing the impacts of these activities through a comprehensive Environmental Impact Statement.

Speaker Biography



+1.713.758.3288



mrodriguez@velaw.com

Mark is a trial attorney with nearly 20 years of experience representing energy industry clients in a broad range of lawsuits and arbitrations, including royalty disputes, class actions, disputes under operating agreements, and other energy-related contract disputes.

In addition, he represents clients in administrative proceedings, audits, and investigations involving claims by state agencies and the federal government concerning royalties, civil penalties, notices of noncompliance, and the False Claims Act. Mark also counsels clients with regard to the calculation of federal and private royalties, including issues related to the handling of post-production costs. His nationwide energy practice includes lawsuits, arbitrations, and administrative proceedings in or involving Texas, Alaska, Colorado, Mississippi, New Mexico, North Dakota, Oklahoma, Utah, and Wyoming. Additionally, Mark represents clients in appeals before the Department of the Interior Office of Hearings and Appeals, and the Office of Natural Resources Revenue.

SEVENTH ANNUAL

HYDRAULIC FRACTURING

SYMPOSIUM

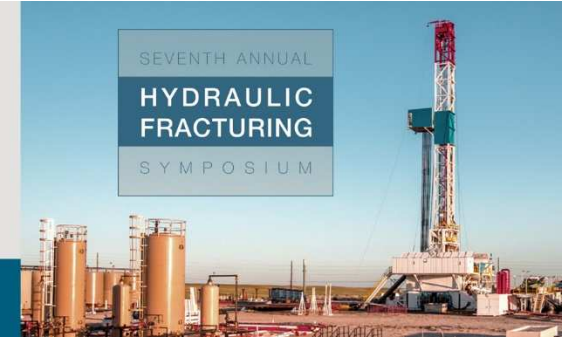
**HOW BEST TO DELIVER BUSINESS OUTCOMES
IN A SAFE AND SUSTAINABLE MANNER**

Vinson&Elkins
Established 1907

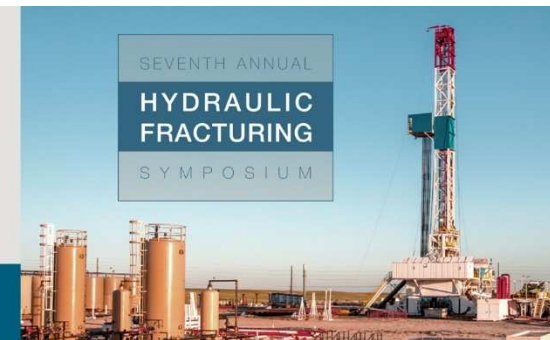


Tom Wilson & Paul Stefan

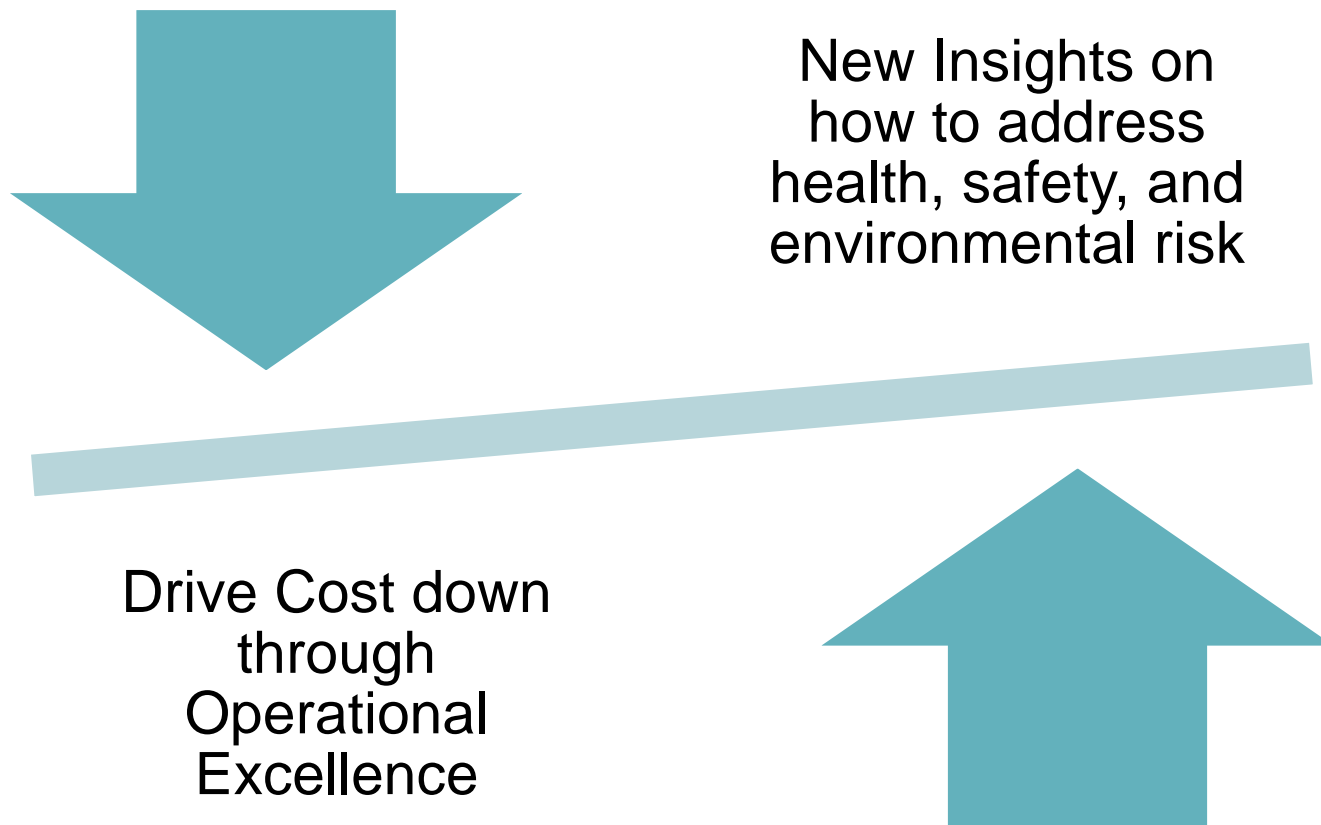
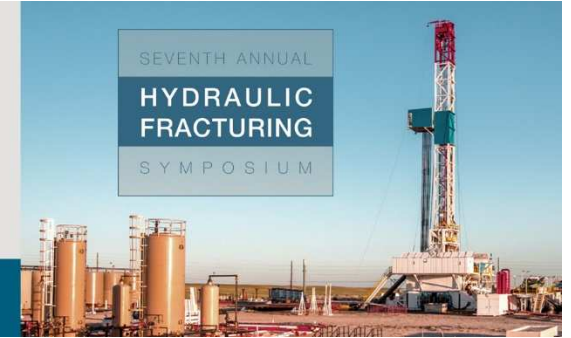
Broker Peace



Common Concern – Risk Management



Clients' Perspectives on the Challenge



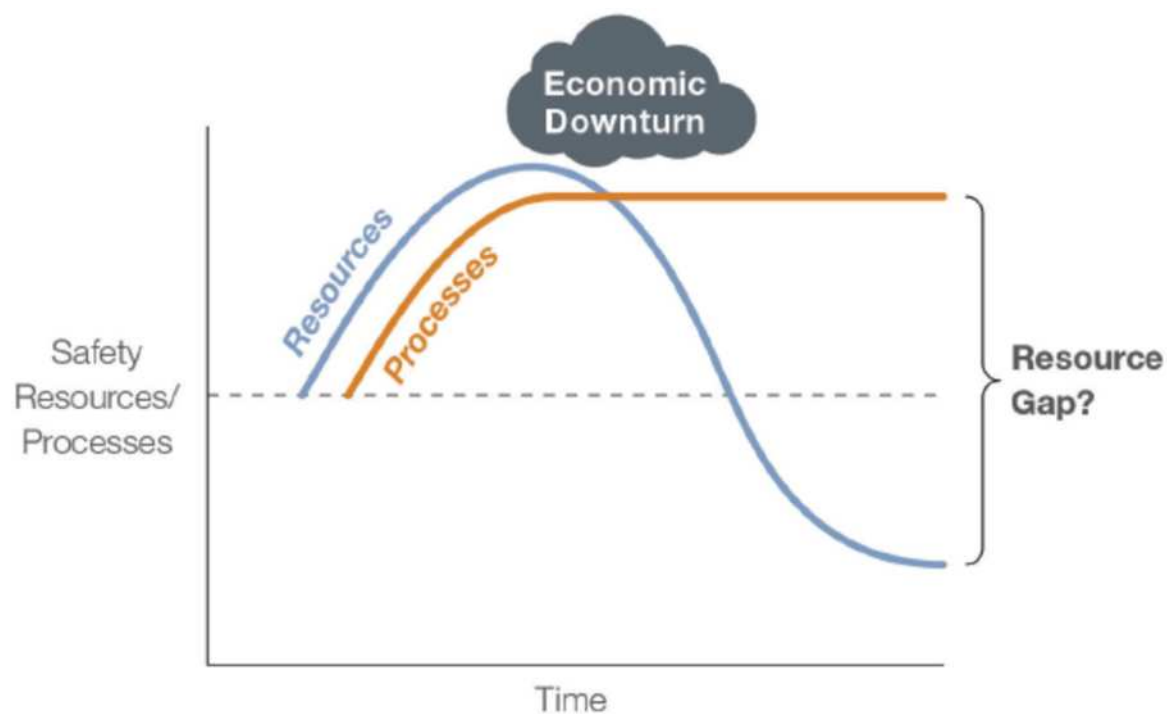
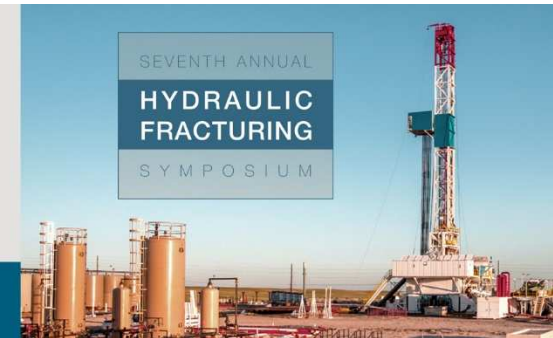
How do you know



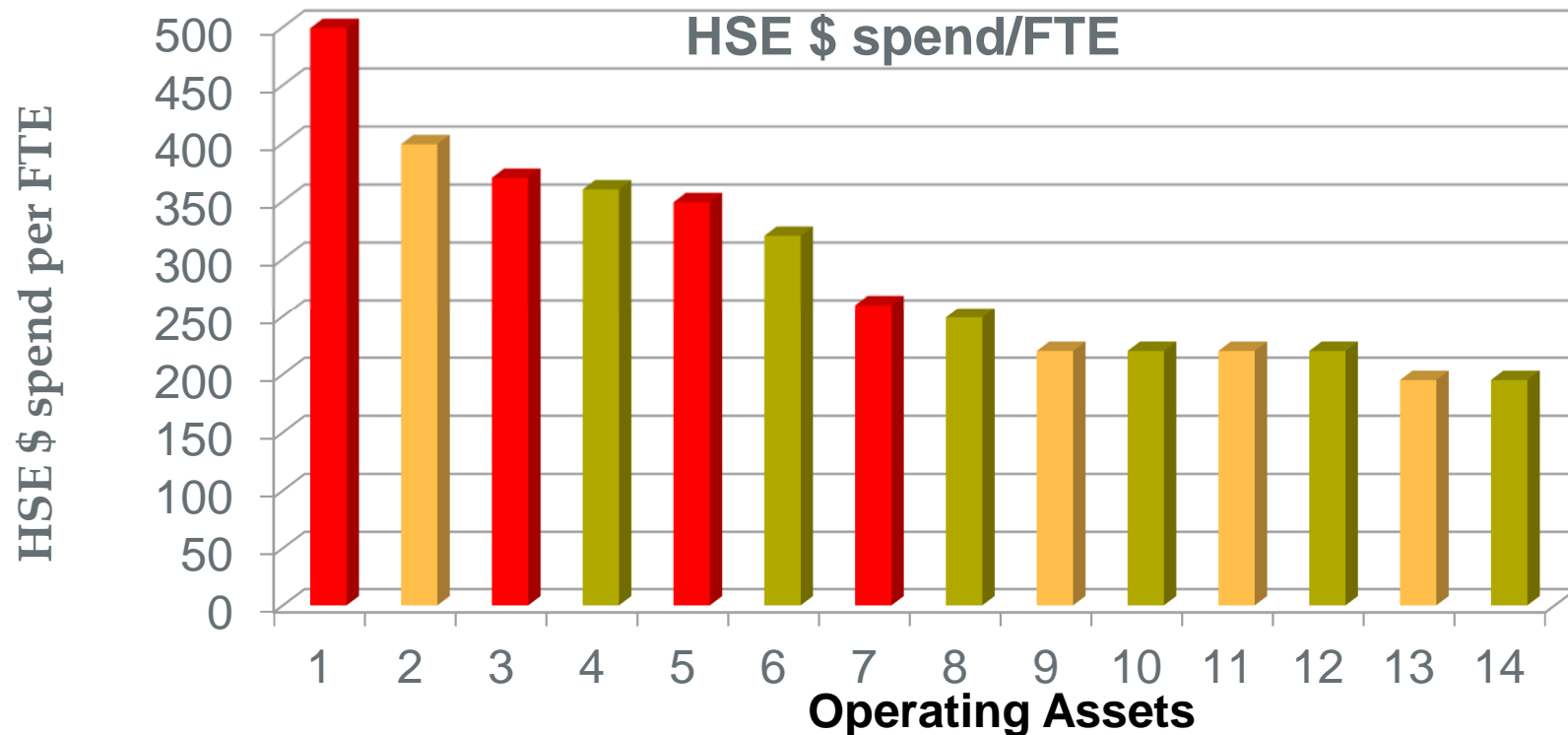
Presented with a significant budget-cutting exercise during a market downturn, a director asked:

“How do you know you’re right in choosing which costs to reduce and activities to eliminate—and are not increasing the enterprise’s operational risk?”

Our Perspective – Event Driven Risk



More HSE \$ \neq Better HSE Performance

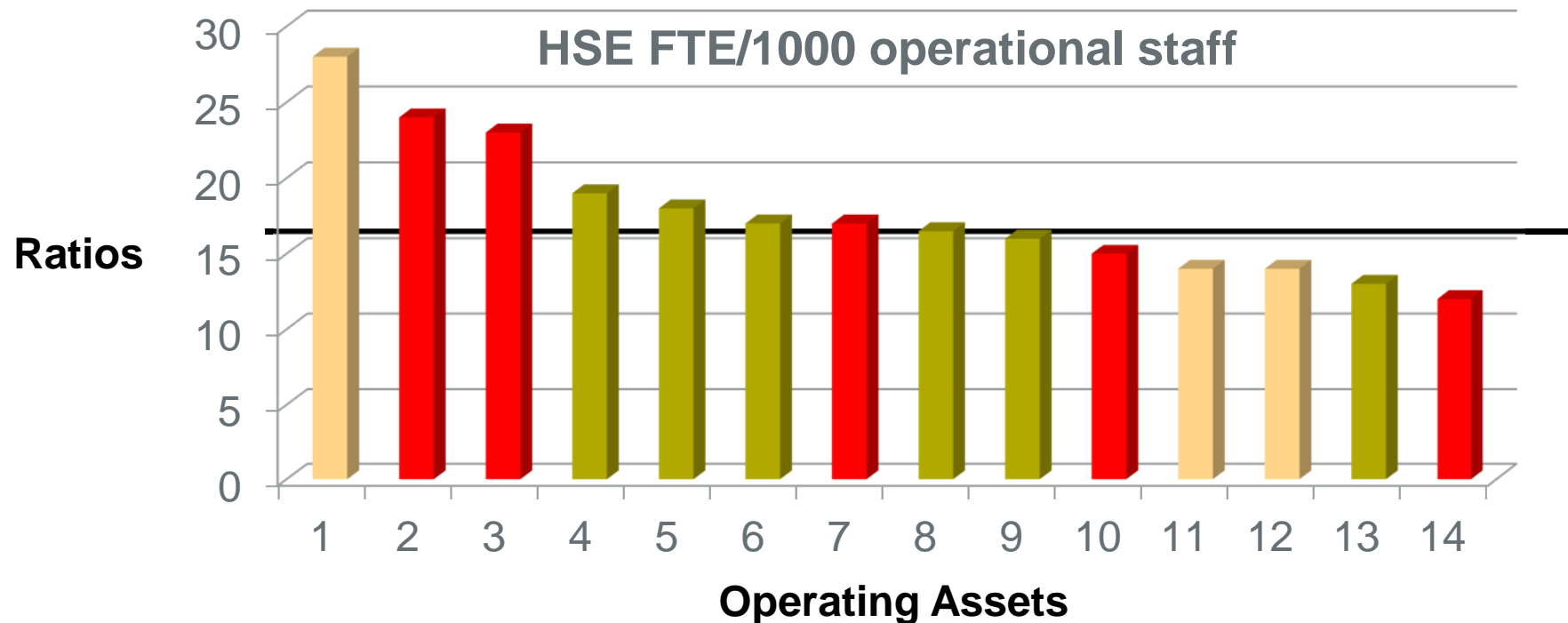


Data for HSE performance over 3 years

- Red** = High All Incident Frequency Rate (AIFR) & poor environmental compliance
- Amber** = Medium AIFR & average environmental compliance
- Green** = Low AIFR & good environmental compliance



More HSE expertise \neq Better HSE performance



Data for HSE performance over 3 years

- Red** = High All Incident Frequency Rate (AIFR) & poor environmental compliance
- Amber** = Medium AIFR & average environmental compliance
- Green** = Low AIFR & good environmental compliance

Stop, Prioritize, Simplify

A Fit for Purpose HSE Function



Stop

- Saves costs
- No impact on risk or performance

- Administrative and non-HSE activities (security, logistics)
 - New corporate, BU & site initiated HSE programs
 - Overlapping safety programs & training
 - Health related services (outsource)

Prioritize

- Risk informed
- Need vs. nice to have

- Sharing of HSE resources & expertise between sites
 - HSE management system simplification
 - Process safety

Simplify & Streamline

- Organizational processes

- Committees & meetings
- Audits & inspections
- Corporate requests
- Incident reporting

Fit for purpose HSE function



How do you know



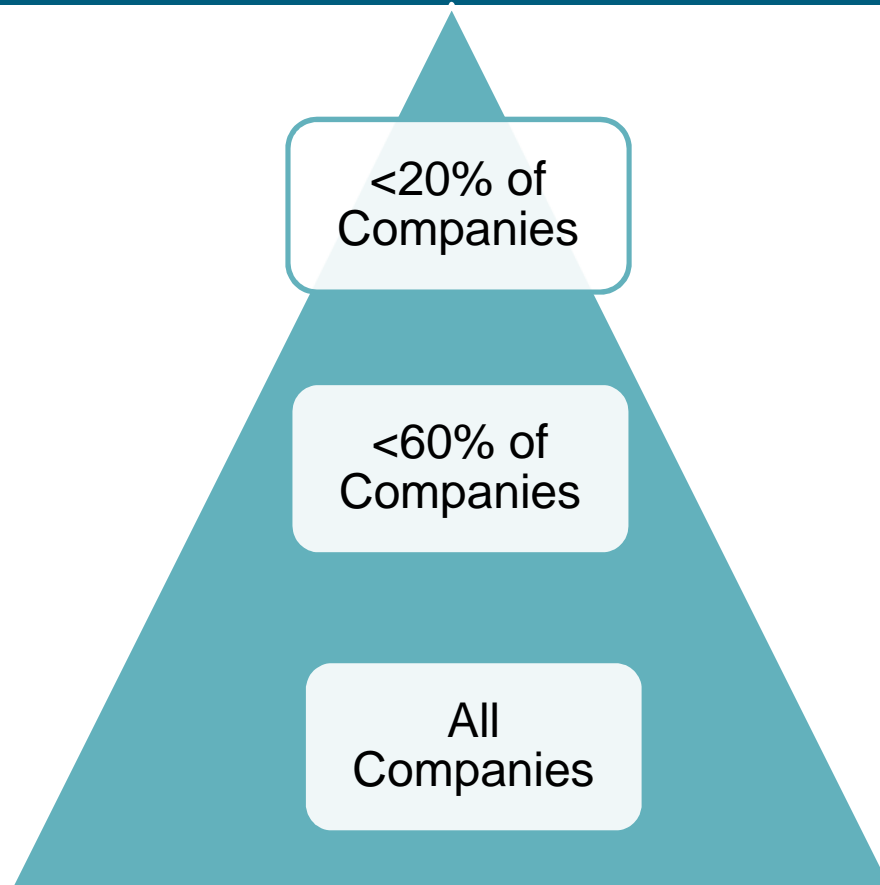
Director asked:

“How do you know you’re right in choosing which costs to reduce and activities to eliminate—and are not increasing the enterprise’s operational risk?”

Client’s answer:

“It is embedded in the quality of our processes and our people...it is part of our DNA.”

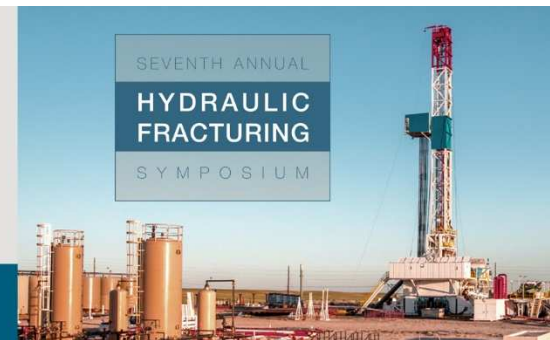
Survey of Public Reports: Lagging HSE Indicators Rule!



Environment	Safety	Health
Decommissioning & clean up costs and efficiencies		Employee engagement
Biodiversity Ecosystems services	Process safety Tier 1 & 2 events Leadership programs	Occupational exposure to contaminants
GHG emissions Spills Significant Incidents Fines Water Energy Air emissions	Fatalities LTI or TRI	Occupational illnesses (new cases, frequency rates)

Based on an analysis of the 2016 corporate sustainability reports.

NIOSH Field Studies – Hydraulic Fracturing High Levels of Respirable Crystalline Silica



Sources:



thief hatches

Side fill ports

vehicle traffic



transfer belts

blender hopper

OSHA Standard – Silica Timeline



June 2021
Engineering
Controls

!

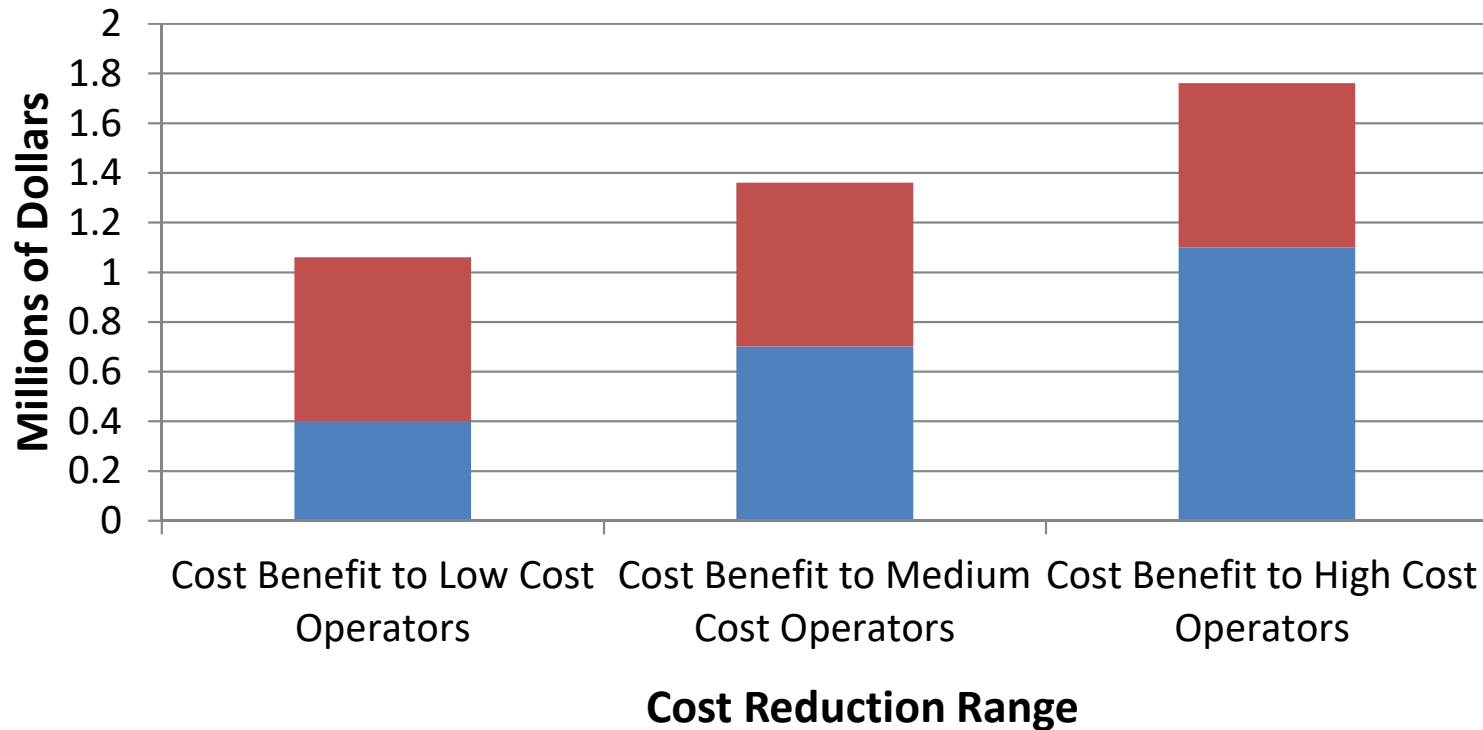
June 2018
Recordkeeping
Training
Medical Surveillance
Written Exposure Plan
Respirators
Regulated Areas
Exposure Assessments

June 2016
50ug/m³



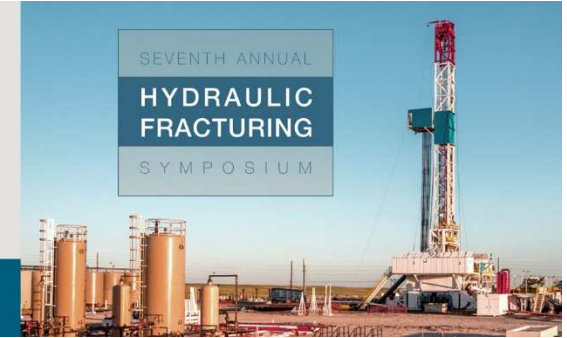
Less Dust is Good for Equipment, too




Removing Dust using Airis ADV-4



- with Added Op Ex (e.g. O&M)
- Cap Ex (e.g. Equipment Replacement)

Apply this to the New Silica Standard....

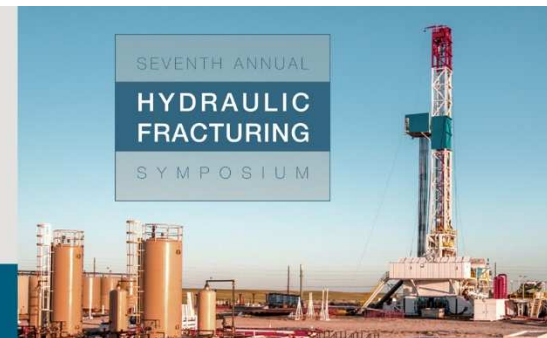


Analysis	Analysis	Insight	Decision
<i>Lagging indicator</i>	<i>Leading indicator</i>	<i>Root cause</i>	<i>Action agreed</i>
Safety HiPO rate 	% HiPo action closure  % Safety obs. completed 	Insufficient expertise & focus on HiPos	Re-orientate safety programs

- **What would most significantly improve your performance?**
 - More **analysis** of lagging indicators
 - More **analysis** of leading indicators
 - Better interpretation and **insight** on gaps, root causes and improvement actions
 - More focus and visibility on decisions to improve performance
 - Other

Analysis – Insight – Decision

Speaker Biography



+1.832.209.8794



paul.stefan@erm.com

Paul, a partner in Environmental Resource Management's (ERM) Houston office, has been helping upstream E&P clients address environmental, health, and safety issues since 1991. His primary focus is on EHS risk and value impacts, especially those frequently encountered in asset transactions involving large acreage positions or a significant number of assets. Paul currently serves as a leader in the Due Diligence practice and works closely with ERM's Safety and Risk Group.

Recently, Paul has been working with Tom Wilson and Chris Bacon of V&E on a series of Executive Forums to identify how E&P companies are structuring EHS systems and processes in a cost-constrained environment. This has led to gathering insights and benchmarking from E&P companies on how to do less EHS activity with fewer resources, and still manage EHS risk.

Speaker Biography



+1.713.758.2042



twilson@velaw.com

Tom is an accomplished labor and employment lawyer with almost 30 years of experience counseling clients on matters impacting their business processes and objectives. Tom's safety and health practice covers a range of energy industry clients. He advises clients throughout the country on their emergency response preparation processes and has litigated significant cases before all levels of the judicial system, including the Occupational Safety and Health Commission.

Tom also advises employers regarding union relations and assists them with collective bargaining negotiations and liability issues arising from union sponsored multi-employer pension plans. He represents clients in a variety of industries dealing with heavily unionized businesses, specifically refineries, chemical plants, and port operations. As a litigator, Tom has represented clients at all levels of the judicial system, including the United States Supreme Court.

The background image shows an oil field under a clear blue sky. On the left, there are several large, orange cylindrical storage tanks with metal ladders. In the center and right, a tall drilling rig with a red and white lattice structure is visible. The rig has a long vertical pipe and various mechanical components. The ground is flat and appears to be a mix of dirt and gravel.

SEVENTH ANNUAL

HYDRAULIC FRACTURING

SYMPOSIUM

MARKET UPDATE

John B. Connally

TRENDS IN OIL & GAS

1H17



Q1 – Domestic Upstream

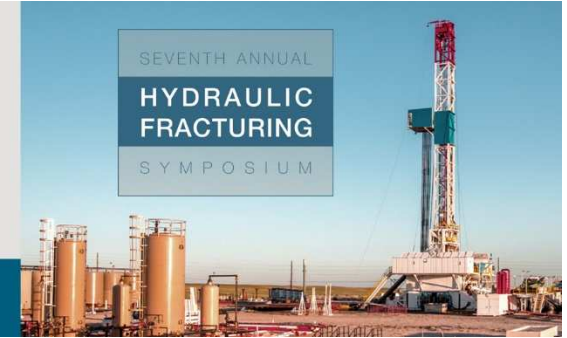
- The upstream segment remained active. A total of 32 deals worth \$36.60 billion were announced 68% increase in deal volume, year over year

Q2 – Domestic Upstream

- Upstream segment, a total of 29 deals worth nearly \$20 billion
- Shale deals were a major contributor to deal activity in the second quarter, with 21 deals, worth \$17.13 billion
- Low cost shale oil production basins, where infrastructure readily exists such as the Permian, dominated the shale deal activity deal volume

TRENDS IN OIL & GAS

1H17

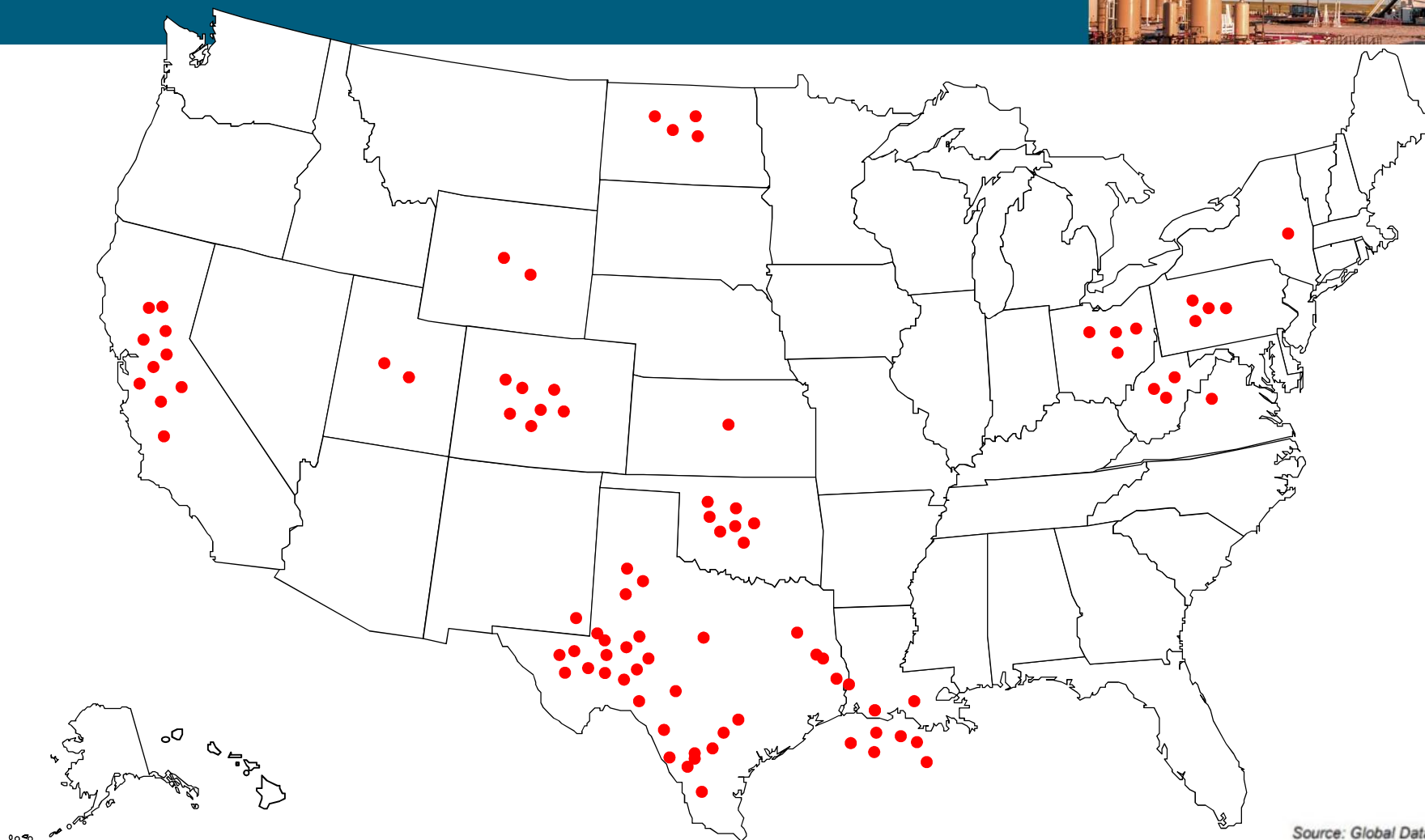
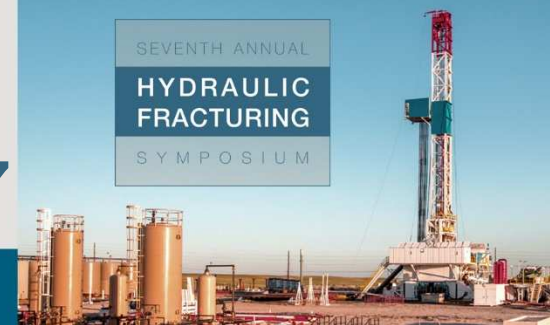


Global Upstream

- Global oil and gas mergers and acquisitions across all sectors topped \$135 billion in the first half of 2017 compared to \$87 billion in the same period of 2016
- Asset-based deals aimed to refocus and reinforce portfolio positions to form a stronger platform from which to prosper in the expected O&G market recovery
- Realignment of holdings in the Canadian oil sands, with the exit of some international majors, concentrating more of this play in the hands of focused Canadian operators
- Brazil activity beginning to reemerge
- Joint venture and midstream development activity in Mexico

DOMESTIC UPSTREAM TRANSACTIONS YTD 2017

SEVENTH ANNUAL
HYDRAULIC
FRACTURING
SYMPOSIUM



Source: Global Data

Upstream Deal Value by Major US Shale Play

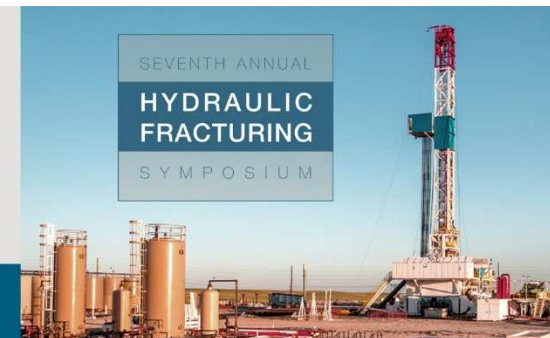
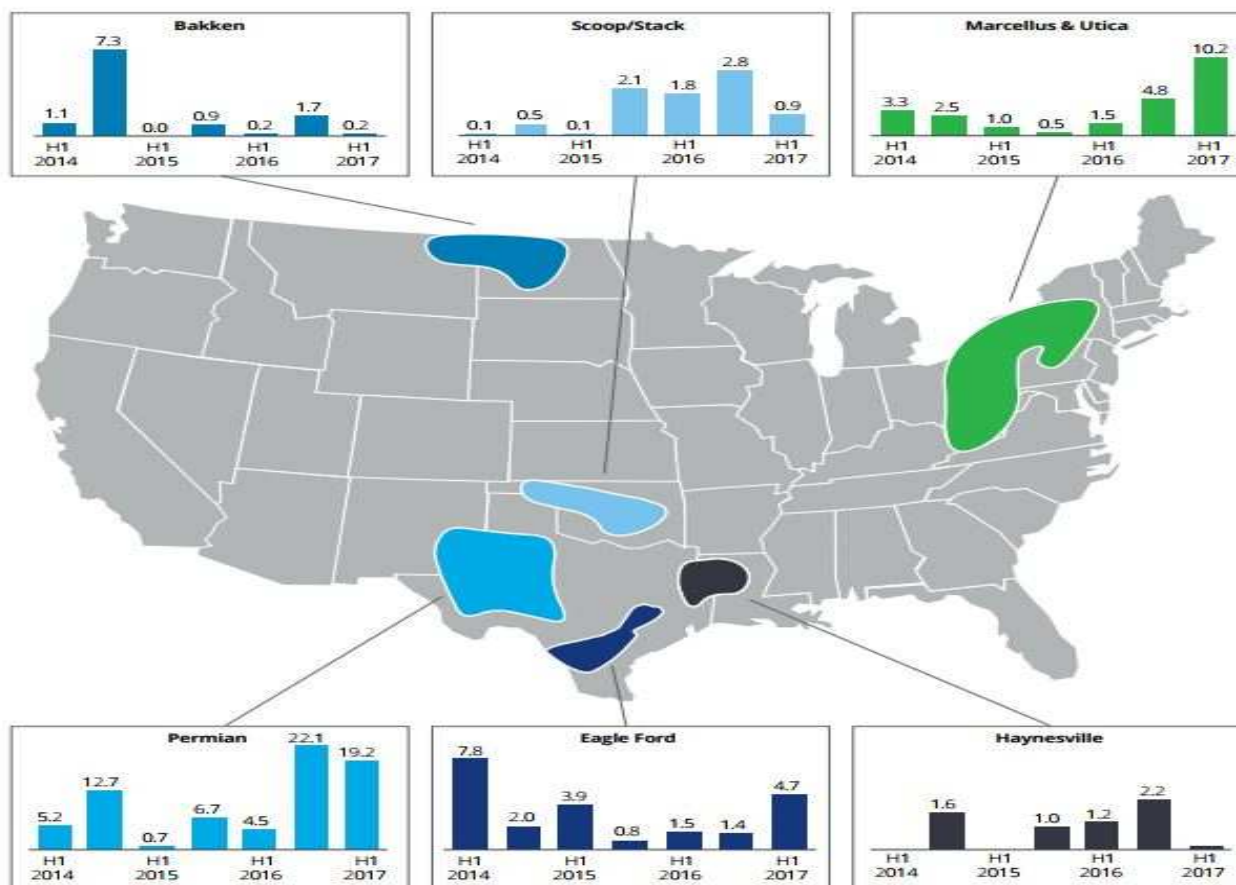


Figure 3. Upstream deal value by major US shale play (USD billion)

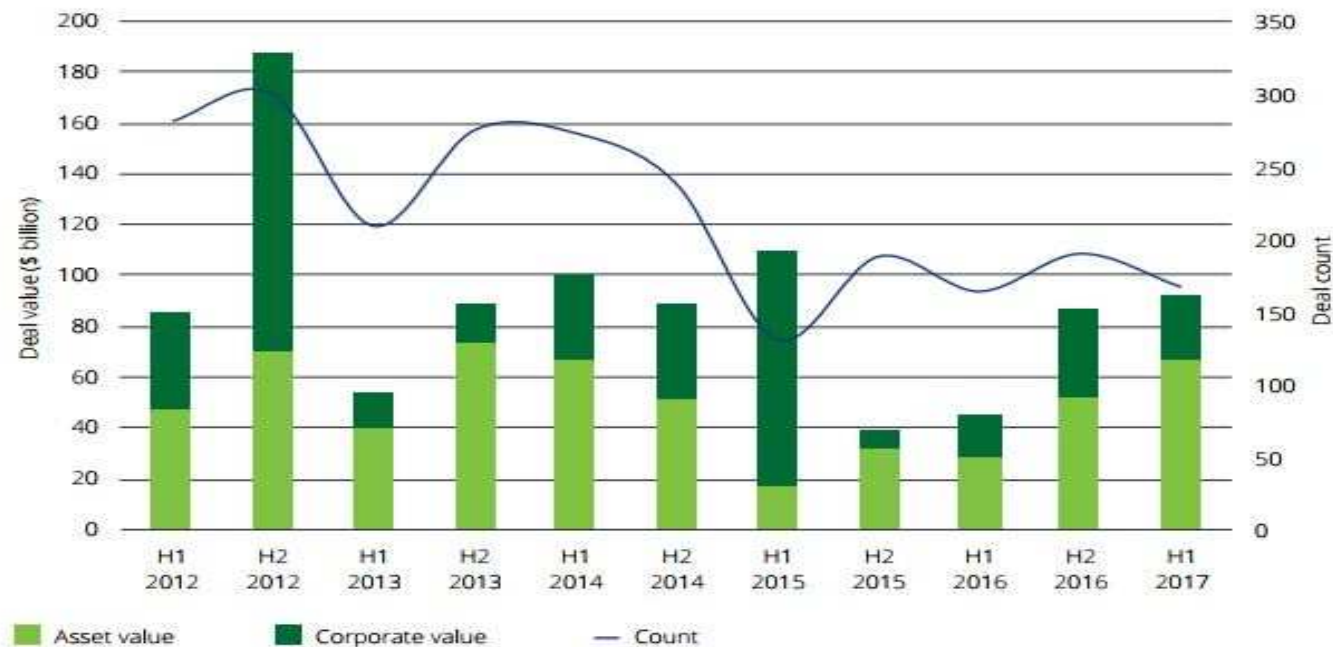


Sources: 1Derrick's M&A Database and Deloitte analysis

Global Upstream M&A Deals 2012-2017



Figure 4. Global upstream M&A deals by value and count



Sources: 1Derrick's M&A Database and Deloitte analysis

The first half of 2017 saw increased M&A activity for the upstream sector, with around \$92 billion in deals, one of the top three periods in the past five years.



Global Oil & Gas Transactions 2014-2017

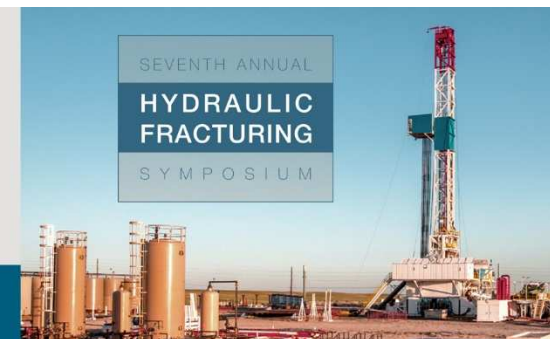
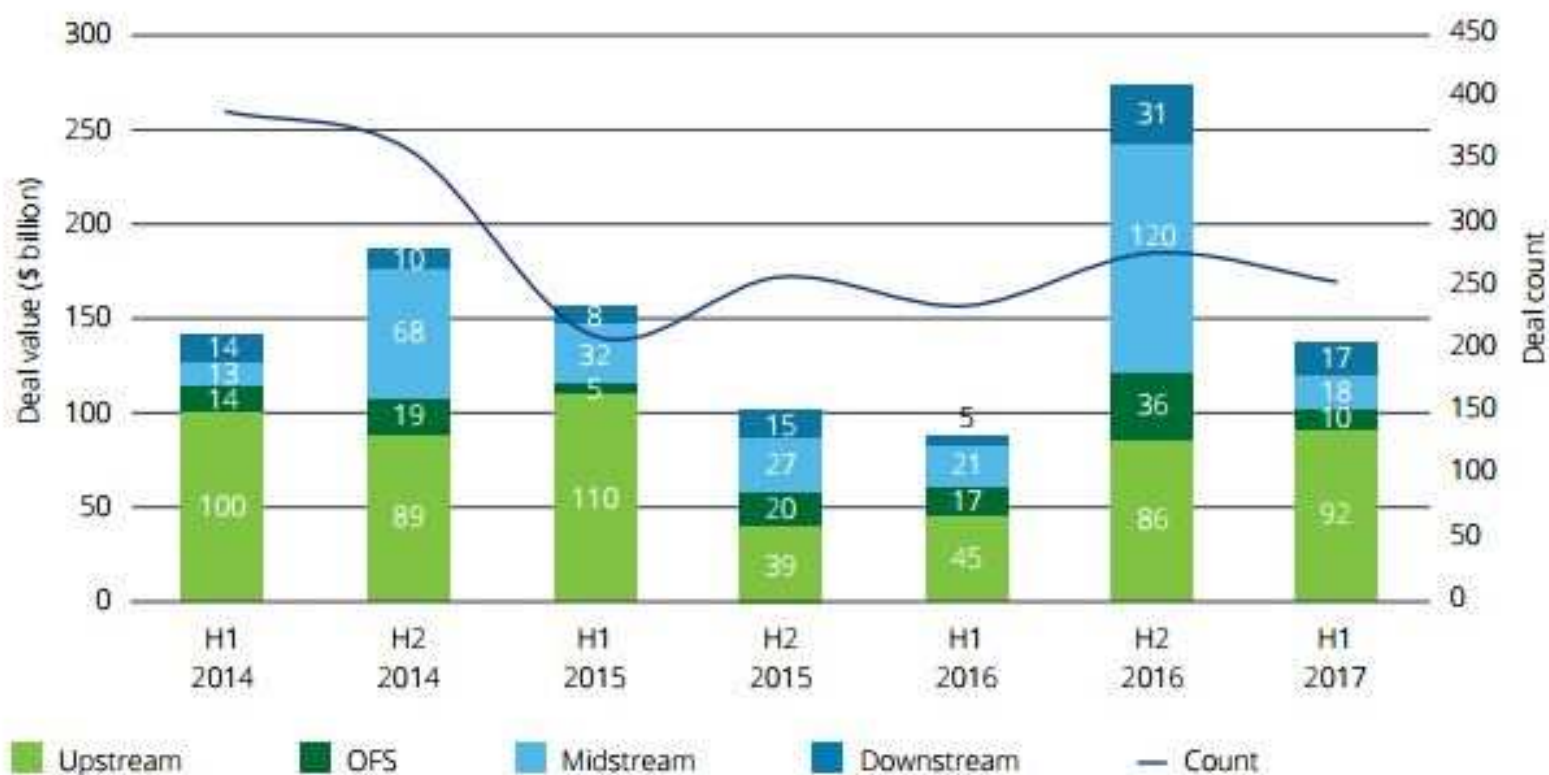


Figure 1. Global oil and gas M&A deals by value and count



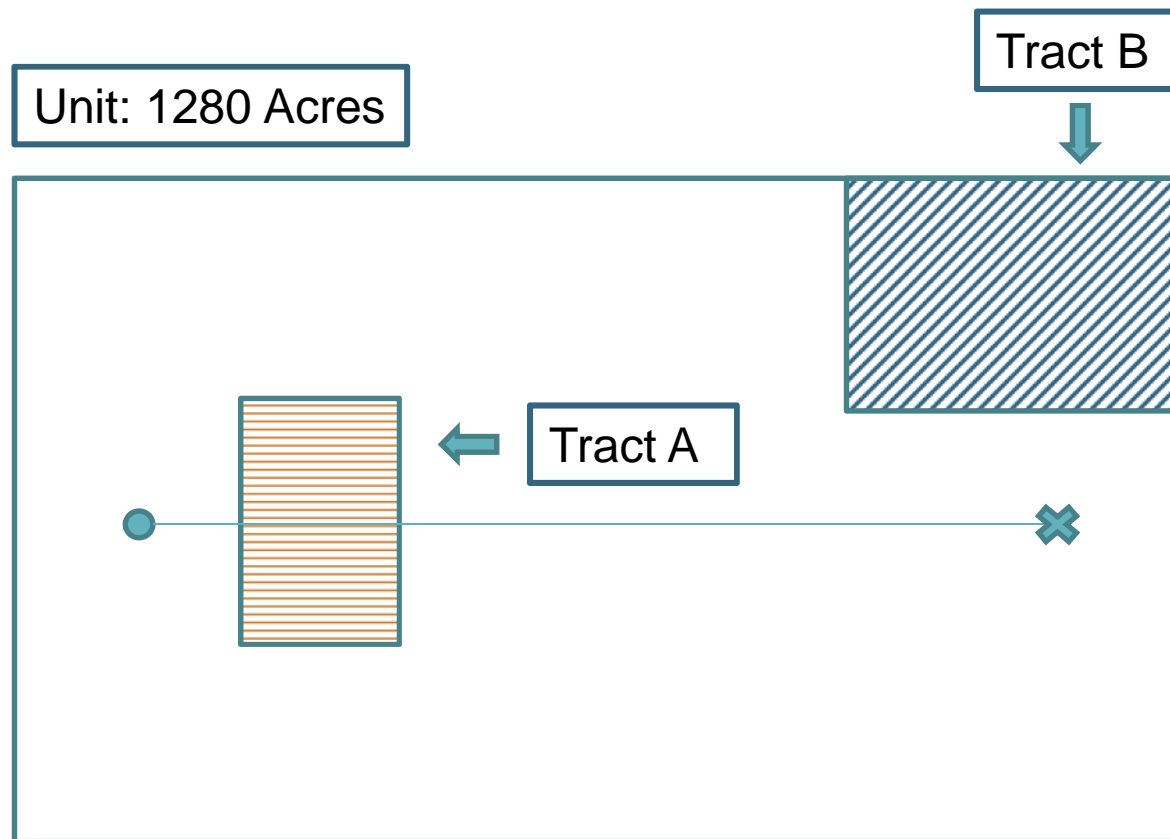
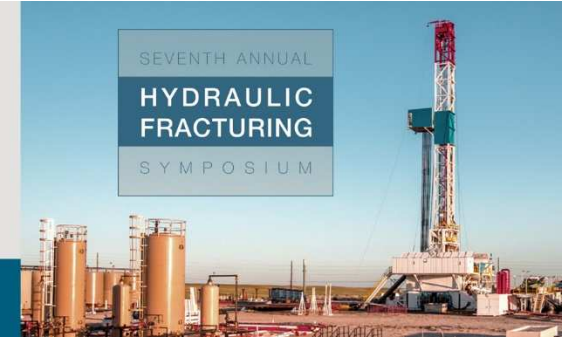
Sources: 1Derrick's M&A Database and Deloitte analysis

Deal Structure Trends/Issues



- Entity versus asset sales
- Joint ventures
- CFIUS
- Lease aggregation issues

Lease Aggregation Issues

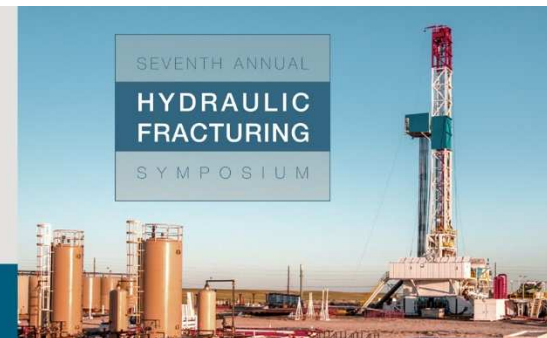


Midstream Trends



- Significance of midstream buildout
- Value of midstream infrastructure
- Acreage dedications
- Monetizing value of acreage dedications
 - upfront cash payments
 - earnout feature
 - option to purchase

Speaker Biography



+1.713.758.3316



jconnally@velaw.com

John B. Connally IV is a partner in the Houston office of Vinson & Elkins. He is co-head of the Energy Transactions and Projects Practice Group and is a member of the firm's Management Committee. John B.'s practice involves the representation of clients in domestic and international mergers and acquisitions, project development transactions, private equity investments, joint ventures, and a variety of energy matters.

John B. has spent his entire career with Vinson & Elkins, in both New York and Houston. He has worked on projects in more than 20 U.S. states and more than 25 countries. John B. received his J.D. with high honors from The University of Texas School of Law in 1997 (Chancellors; Order of the Coif; Texas Law Review) and graduated from Vanderbilt University with a B.A. in 1994 (Phi Beta Kappa; Founder's Medal). He is admitted to practice law in Texas and New York.

SEVENTH ANNUAL

HYDRAULIC FRACTURING

SYMPOSIUM

The background image shows an industrial oil field under a clear blue sky. On the left, there are several large, orange cylindrical storage tanks with metal ladders. In the center and right, a tall drilling rig with a red and white lattice structure is visible. The foreground is a flat, sandy area with some equipment and a blue-tinted overlay at the bottom.

Q&A