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THE U.S. OIL AND GAS BOOM: DRILLING DOWN ON ISSUES, RISKS AND OPPORTUNITIES FOR THE CONSTRUCTION INDUSTRY

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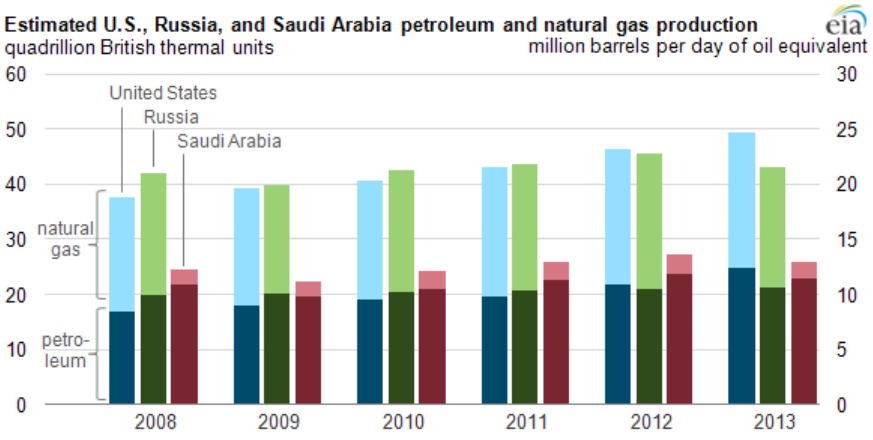
INTRODUCTION

The U.S. is now the world's top producer of petroleum and natural gas. New technologies in exploration and production have reshaped the oil and gas industry and led to a boom in economic and construction activity that has rippled across the country. Exploration and production, and building the infrastructure necessary to bring products to market, involves many of the same issues and risks inherent to the construction industry, as well as those unique to the oil and gas industry.

In 2009, the U.S. passed Russia as the world's largest producer of natural gas.[1] Some government and industry analysts have projected that the U.S. will overtake Saudi Arabia in 2020 as the world's largest producer of crude oil. In terms of total liquid petroleum production, which includes crude oil, natural gas liquids, and condensates, the U.S. is already the world's leading producer. Over the last 8 years, U.S. production has accounted for almost all of the increase in global supply.



Source: U.S. Energy Information Administration
Note: Petroleum production includes crude oil, natural gas liquids, condensates, refinery processing gain, and other liquids, including biofuels. Barrels per day oil equivalent were calculated using a conversion factor of 1 barrel oil equivalent = 5.55 million British thermal units (Btu).

[1] Production data is from U.S. Energy Information Administration. www.eia.gov.

To say that this would have been a dream a few years ago is an understatement. However, energy companies have learned over the last decade to tap previously inaccessible shale oil and gas by drilling down into and then horizontally through the shale formations; then pumping fluids into the shale at high pressure to hydraulically fracture the rock and release the oil and gas trapped inside. Meanwhile, conventional sources of oil and gas in the North Sea and Middle East have reached maturity or begun to decline, while overall demand has remained steady, making shale more commercially attractive. Horizontal drilling and hydraulic fracturing or "fracking" has changed the oil and gas industry and is in the process of changing the world.

Since 2008, domestic natural gas production has increased by over 25%, with 50% of our total gas production coming from shale and tight sands and 80% expected by 2035. Similar monumental changes in oil production have also occurred. In 2003, shale produced only 100,000 barrels of oil per day in the U.S. In contrast, by the end of 2013 domestic production from shale was exceeding three million barrels per day. That level is conservatively expected to rise to nearly 5 million barrels of oil per day in the coming years. Overall U.S. petroleum production is at its highest point since 1970, and shows no signs of slowing down.[2]

Due to fracking, Texas, North Dakota, Montana, Oklahoma, Louisiana, Pennsylvania, Ohio, New York, and West Virginia are, among others, known as the states with the largest potential shale oil and/or natural gas reserves. Texas, with its Eagle Ford and Permian Basin formations, and North Dakota, with the Bakken, are

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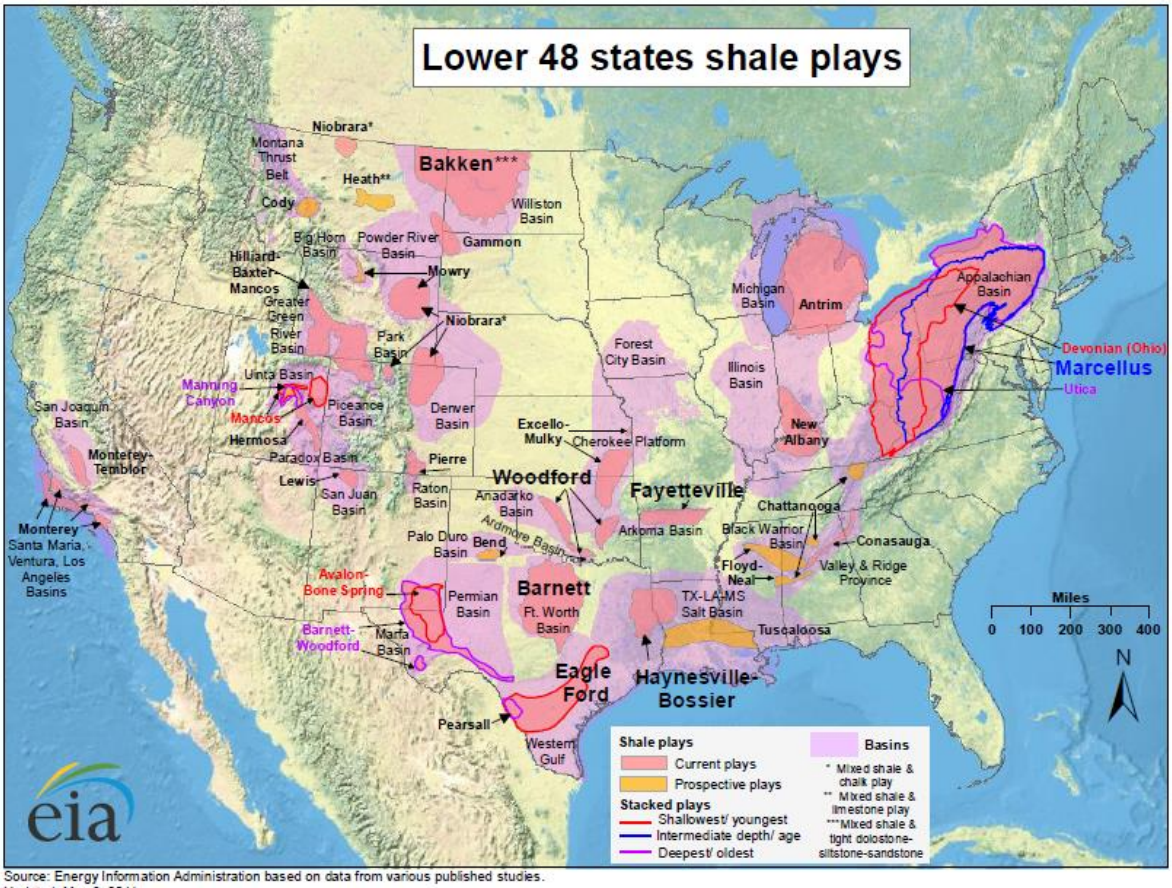
[2] Financial Times. "U.S. petroleum production hits 44-year high." FT Online. June 15, 2014.

leading the way in oil production. Most of the increase in natural gas production is occurring in the upper Midwest and eastern U.S., with the richly productive Marcellus and Utica shale formations being tapped across several states.



Source: Energy Information Administration based on data from various published studies.
Updated: May 9, 2011

The boom in production has caused oil imports to drop by 50% since 2005, to their lowest level in 30 years. It is conceivable that within the next 10 years the U.S. could become a net exporter of oil and gas. These developments have already had a massive impact on the U.S. economy, and will continue to have such an impact in the decades to come. For example, the lower imports have helped to shrink the U.S. trade deficit, and the boom in the domestic oil and gas industry has directly generated trillions

of dollars in new economic activity—roughly $481 billion in 2011 alone.[3] Cheap and abundant natural gas has caused a surge in U.S. manufacturing.

The oil and gas revolution has also had a major impact in the construction industry. Aside from the significant increase in exploration and drilling activity (which is itself a form of construction, when the associated site development work is considered), it has spawned a wave of new heavy civil, infrastructure construction, expansion and upgrades in the midstream and downstream sectors of the industry. However, like any construction-related activity, the oil and gas boom has come with associated legal and regulatory challenges and risks. The remainder of this paper will discuss the construction-related aspects of the oil and gas industry, and the legal challenges and risks associated with the boom.

CURRENT LEGAL ISSUES AFFECTING THE OIL AND GAS INDUSTRY: UPSTREAM, MIDSTREAM AND DOWNSTREAM

The oil and gas industry is logically divided into three sectors known as upstream, midstream, and downstream. The focus of the upstream sector involves the search for underground and underwater crude oil and natural gas, drilling wells to explore those resources, and operating those wells to recover oil and natural gas for surface use. The midstream sector generally consists of the transportation (by pipeline, rail, truck, barge, etc.), storage and wholesale marketing of petroleum and natural gas. The downstream sector generally consists of the refining of crude oil petroleum and the processing and purifying of raw natural gas. All three sectors have some degree of overlap with one another.

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[3] Washington Post. "U.S. imports are falling to their lowest level since 1987." WP online. January 9, 2013.

I. UPSTREAM—EXPLORATION AND PRODUCTION

Most construction projects proceed either up or out. Few are designed to burrow miles into the earth in search of the sole purpose of its existence. The drilling of an oil and gas well does exactly that.

A. The Drilling Process

The drilling of a well is proposed and conducted by the owner of the "right to drill," otherwise known as the operator. The operator is the construction equivalent of a general contractor. The operator will, in most cases, supervise through the on-sight "company man," with the actual drilling and related operations generally conducted by subcontractors. In an oil and gas operation, the subcontractors include, among others, the company that is hired to drill the well, the company that is hired to provide support, such as drilling fluids, as well as other subcontractors that are brought in, for example, to run casing and, with any luck, complete the well as a "commercial" producer. Fracking operations are also typically performed by subcontractors, some of whom provide a full spectrum of oilfield services.

A rig generally drills 24 hours a day, 7 day a week, 365 days a year. Shifts commonly run 8 hours, and an onshore rig crew will typically be comprised of 5 to 6 "rig hands" including the "driller" who oversees drilling operations. The driller answers to the "tool pusher," who answers to the company man. The company man is often an engineer who has full knowledge of drilling operations, as well as what is going on and is expected downhole. In contrast, the drilling crew is typically relatively unskilled except with regard to the operation of the rig.

Drilling contractors, as well as other subcontractors, have well-established, almost boiler-plate form contracts that are used by most everyone in the industry. Of particular import are the exculpatory and indemnification provisions. These form contracts are often characterized as contracts of adhesion and are contested when something goes wrong, which is not unusual.

As in the construction of a building, the subcontractors work in a confined space, known as the "location." The equipment needed to drill a well to 20,000 feet, considered relatively deep as wells go, weighs many tons. A drilling rig is manufactured to carry loads of many, many tons of drill pipe string, and consequently, most everything on the drilling rig is big and presents a safety risk to all involved. A hard hat is generally no match for a 15-pound bolt that falls 30 feet out of a derrick. Expiring leases, day rates for drilling rigs, and other expense burdens make for tight pressure-filled schedules, which also sometimes contribute to the risk of accident and injury assumed by an operator. The risk of death for an oilfield worker is eight times the national average for all workers. Drilling rigs penetrate extremely high pressure zones, and result in the production of high temperature liquids and gasses, which have to be anticipated. Though not as frequent today as yesteryear, blowouts and associated fires are among the most significant and dangerous risks assumed.

Too often, an operator's time and resources are devoted to litigation involving not injury to person, but rather injury to land. Pollution and environmental issues raise private as well as regulatory concerns and disputes. While the oil and gas industry oftentimes receives criticism, there is in large part no industry that is more highly

regulated by local, state, and federal laws, and more closely scrutinized by locally affected land owners and the media.

B. Current Upstream Legal Issues

There are a number of potential legal and regulatory issues surrounding fracking. These issues include concerns about seismic disturbances on the surface possibly induced by the deep underground explosions used to initiate fracking, and the fracking itself; concerns relating to the amount of water used in the fracking process; concerns relating to the disposal of the "flowback" water that is produced from the wells; and, perhaps most notably, claims related to the possible contamination of ground and surface waters. The nature of horizontal drilling and fracking, in which a horizontal wellbore may extend laterally through the shale deposit for nearly two miles underneath the ground, also raises a number of common law issues related to mineral rights and trespass, which have been the subject of litigation.[4]

Of particular interest in recent years are increased reports of earthquakes in various oil and gas producing states, including Oklahoma. However, in 2012 the National Research Council issued a report concluding that fracking of wells for natural gas production does not pose a high risk for causing earthquakes.[5] The report did note, however, that deep well injection for disposal of wastewater derived from energy technologies (as well as for carbon sequestration purposes), may pose some risk for induced seismic activity. Very few events have been documented relative to the large

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[4] See Christopher S. Kulander, *Common Law Aspects of Shale Oil and Gas Development*, 49 Idaho L. Rev. 367 (2013).

[5] National Academy of Sciences. "Hydraulic Fracturing Poses Low Risk for Causing Earthquakes, But Risks Higher for Wastewater Injection Wells." www.nationalacademies.org. June 15, 2012.

number of disposal wells in operation, although due to the large net volumes of injected fluids in recent years, there is "potential for inducing larger seismic events." In that regard, fracking, according to the report, is "suspected, but not confirmed" as the cause of only one seismic event large enough to be felt in the United States (Oklahoma), and only one case of seismicity is confirmed to have been caused by fracking anywhere in the world (Great Britain).

The contamination issue largely revolves around the chemicals that are used in fracking fluids and the question of whether those chemicals can get into ground and surface waters. Though most wells are lined with concrete and steel known as "casing" to protect groundwater, among other things, if casing is not installed properly, fracking fluids can conceivably seep into the groundwater. Moreover, during the fracking process, there is usually some flow-back of fracking fluids which run from the well to the surface. This “flowback” water is often stored in lined storage ponds onsite which have been known, on occasion, to result in surface spills if the ponds are not properly constructed or maintained, or in extreme weather events. Such incidents often lead to regulatory action and claims by the lessor or nearby land owners who allege contamination of surface or ground water

Currently, many aspects of exploration and production, including the fracking process itself, are exempt from the Safe Drinking Water Act, the Clean Water Act and other federal environmental laws. However, these laws certainly do apply to the disposal of flowback and other wastewater generated from drilling activities.[6] Rather,

[6] The scope of these exemptions was expanded in Energy Policy Act of 2005, when the Safe Drinking Water Act definition for “underground injection” was revised to expressly exclude the injection of fluids

exploration and production (and fracking) is largely governed by state and local regulations. Many states have recently begun to require disclosure of the types of chemicals used in fracking, which have long been considered trade secrets by the industry.[7] Further, regulations have been implemented which govern the use and disposal of fracking fluids.

The general consensus is that fracking fluid left in wells does not present an environmental hazard, so long as the well is drilled and completed properly. That is because gas reservoirs are typically thousands of feet below groundwater aquifers and water wells. It is considered to be a fundamental principal of natural gas geology that, without an effective seal from a rock formation above a reservoir, natural gas would not have built up in the reservoir to begin with. Therefore, the conclusion is that the same rock that sealed the natural gas in the reservoir also prevents fracking fluids from migrating upward into groundwater aquifers and water wells.

Notwithstanding the above principles, there are numerous regulatory investigations and lawsuits currently underway in state and federal courts. The EPA has indicated that it may take a more active regulatory role, despite questions regarding the scope of its authority in light of the aforementioned exemptions enshrined in federal law. The agency is currently investigating allegations of illegal disposal of fracking fluids and has initiated a broad study of the effects of hydraulic fracking on drinking water

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and propping agents (except diesel fuel) used for hydraulic fracturing purposes. Therefore, the EPA still retains the power to regulate the use of diesel fuel in fracking fluid.

[7] States that currently require some level of disclosure related to hydraulic fracturing fluids include Arkansas, Colorado, Louisiana, Michigan, Montana, New Mexico, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, and West Virginia and Wyoming. States with proposed disclosure requirements include California, Idaho, Illinois, Nebraska, and New York.

resources.[8] A draft report is expected to be released for public comment and peer review in late 2014. It also recently announced its intent to propose rules for disclosure of fracking chemicals and mixtures used.[9]

Some states are considering, or have already imposed, moratoriums on fracking. New York, for instance, recently imposed a moratorium on fracking in some areas of the Marcellus Shale pending the completion of the study of its affects. In 2012, North Carolina imposed a moratorium on permitting for fracking operations, only to recently lift it as part of an energy modernization law intended to encourage exploration and production in the state.[10] Numerous local governments have also imposed bans on fracking within their jurisdictions. These actions have resulted in legal challenges by the industry, many of which have been successful, based on claims of state law preemption, inverse condemnation and other constitutional arguments.

Most of the lawsuits involve claims of ground-water contamination. The claims typically involve alleged links in illness and disease in humans and livestock with purported contamination from nearby fracking operations. While most recent cases apparently have been resolved through settlement, those which are decided by judge or jury more often than not resolved in favor of the defense, due to the plaintiffs' difficulty proving causation.

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[8] EPA's Study of Hydraulic Fracturing for Oil and Gas and Its Potential Impact on Drinking Water Resources. www.epa2.gov/hfstudy.

[9] "Hydraulic Fracturing Chemicals and Mixtures; Advance Notice of Proposed Rulemaking." Federal Register, May 9, 2014.

[10] Reuters. "North Carolina governor signs law paving way for fracking." Reuters online. June 4, 2014. The energy bill also prohibits local governments from outlawing fracking and makes it illegal to reveal the chemicals used to extract oil or gas from wells using fracking.

For example, in a 2012 case in Colorado, the trial court dismissed a toxic tort claim brought by a family who lived nearby a gas drilling operation in which fracking was employed.[11] The court issued a "Lone Pine" order requiring the plaintiffs to provide, prior to discovery, a detailed expert report and all available evidence purporting to establish specific elements of contamination and causation. When the plaintiffs failed to produce sufficiently conclusive testimony or evidence, the court dismissed the action. The Colorado Court of Appeals reversed the decision, holding that there is no provision for "Lone Pine" orders under Colorado law.[12] The case is now on appeal to the Colorado Supreme Court.

Occasionally plaintiffs have had success at trial on fracking-related claims. One recent case illustrates the problems and potential for prejudice that can arise from the sometimes negative attention that fracking has received in the media and popular culture. A plaintiff who alleged that her house had been damaged by vibrations resulting from nearby drilling activity was awarded $100,000 in compensatory and $200,000 in punitive damages by a federal jury on her claims for negligence, nuisance and trespass.[13] The trial court denied the driller's motion for a new trial, concluding that sufficient evidence existed to submit the punitive damages claim to the jury. The court also rejected the driller's claim that the jury considered extraneous prejudicial information regarding "fracking." The jurors had apparently discussed fracking and had sent the Court a note asking "Were they drilling only or were they also fracking?"

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[11] *Strudley et al. v. Antero Resources Corporation, et al.*, No. 2011-CV-2218, in the 2nd Judicial District Court of Denver County, Colorado.

[12] *Strudley v. Antero Resources Corporation*, 2013 WL 3427901 (Colorado Ct. of App., July 3, 2013).

[13] *Hiser v. XTO Energy, Inc*., 2013 WL 1749731 (E.D.Ark. Sept. 30, 2013)

Numerous fracking-related cases are winding their way through the courts, and the law on the subject is in the early stages of development.[14]

As with anything, fracking involves competing interests which must be balanced. On one hand, America has tapped a vast new supply of natural gas and oil that could be both a national and international game-changer. On the other hand, there is always the danger of pollution, and in these times of valid concerns relating to the long-term availability of fresh water, contamination has to be considered. There is reason to believe that, in time, continued advancements in science and technology will solve many of the health, safety and environmental challenges the industry currently faces. The only certainty at this point is that the fight over fracking will rage on for many years.

II. MIDSTREAM—PIPELINES AND TRANSPORTATION

Finding and extracting oil and gas from miles underground is only half the battle, for, once above ground, it must be transported to locations where it can be refined or processed, and eventually consumed.

A. Midstream Infrastructure and Construction

The boom in production from shale and tight sands has strained the nation's midstream infrastructure and transportation capacity. Moreover, much of the new shale oil production is occurring in remote areas that are not adequately served by existing pipelines, which has resulted in bottlenecks. These problems are being addressed through improvisation and plans for the construction of new pipelines and other takeaway infrastructure.

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[14] For an in-depth review of recent fracking-related litigation, see Michael Goldman, *A Survey of Typical Claims and Key Defenses Asserted in Recent Hydraulic Fracturing Litigation*, 1 Tex. A&M L.Rev. 303 (Fall, 2013).

Traditionally, the midcontinent pipeline system was configured to deliver crude oil imported to the U.S. Gulf Coast and domestic production from West Texas to the refineries in the Midwest via the hub of Cushing, Oklahoma.[15] However, the recent steep increases in production from Alberta and the Bakken have turned that system on its head, and the limited pipeline capacity into and out of Cushing has led to severe bottlenecks in the region. One of the effects of these transportation constraints is that Bakken crude typically trades at a discount to WTI (West Texas Intermediate).

Pipelines are the most cost-effective way to transport crude oil in the United States, but they are expensive to build and face regulatory hurdles. The Keystone XL pipeline is probably the most prominent example. For these reasons, companies (particularly those operating in the Bakken, Niobrara, Eagle Ford and Permian Basin) have turned to rail and truck transport to increase takeaway capacity and deliver crude oil across the nation, thereby avoiding the bottlenecks, until new pipelines are eventually built.[16] This has led to a sharp increase in the construction of crude-by-rail terminals. Even as additional pipeline infrastructure is put in place, crude oil is expected to continue moving by rail and truck as economics dictate.

Transporting natural gas from the wellhead to the final customer involves several physical transfers of custody and multiple processing steps. In short, a natural gas pipeline system begins at the natural gas producing well or field. Once the gas leaves

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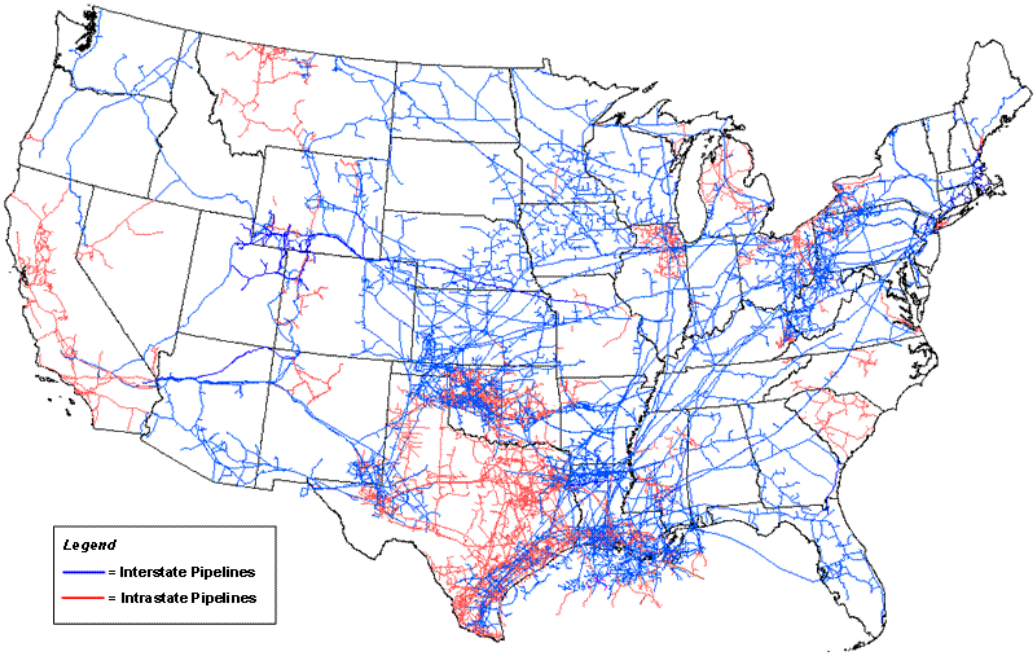
[15] U.S. Energy Information Administration, Today In Energy. "Bakken crude oil price differential to WTI narrows over last 14 months." March 19, 2013.

[16] U.S. Energy Information Administration, Today In Energy. "Crude-by-rail transportation provides Bakken Shale production access to major markets." June 10, 2014.

the producing well, a pipeline gathering system directs the flow either to a natural gas processing plant or directly to the mainline transmission grid, depending upon the initial quality of the wellhead product.

The U.S. Natural Gas Pipeline Network, 2009



Source: Energy Information Administration, Office of Oil & Gas, Natural Gas Division, Gas Transportation Information System

In contrast to the limited pipeline capacity for transporting crude oil to refineries, the U.S. natural gas pipeline network is quite robust. Hundreds of major pipeline projects (new pipelines, laterals and expansions) have been completed in recent years in response to the shale gas boom, with most of the new capacity added in the northeast to alleviate bottlenecks from the Marcellus. Although the pace of new pipeline construction seems to be slowing, many more projects are scheduled for the next 1-2 years to increase capacity and improve distribution.

B. Current Midstream Legal Issues

The construction, operation and maintenance of oil and gas pipelines and midstream infrastructure is heavily regulated by various agencies of the federal

government. The Federal Energy Regulatory Commission determines the rate-setting methods for interstate pipeline companies, sets rules for business practices, and has the sole responsibility for authorizing the siting, construction, and operations of interstate pipelines, natural gas storage fields, and liquefied natural gas (LNG) facilities.[17] The U.S. Department of Transportation's Office of Pipeline Safety implements and enforces safety standards, procedures, and oversees the actual development and expansion of pipeline systems, and retains jurisdiction for safety over the lifetime of the pipeline.

The Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011 reauthorizes federal pipeline safety programs through fiscal year 2015, provides for enhanced safety, reliability and environmental protection in the transportation of energy products by pipeline.[18] The Act also increases federal enforcement authority, grants the federal government expanded authority over pipeline safety, provides for new safety regulations and standards, and authorizes or requires the completion of several pipeline safety-related studies.

Regulatory attention and enforcement has increased in recent years following a series of high profile pipeline spills and other incidents. For example, the Pipeline and Hazardous Materials Safety Administration (PHMSA) recently imposed new safety requirements for the Keystone XL pipeline, in response to the high rate of dangerous construction defects discovered in the southern leg of the pipeline between Oklahoma

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[17] U.S. Energy Information Administration. www.eia.gov.

[18] Pipeline Safety, Regulatory Certainty, and Job Creation Act of 2011. Pub. L. 112–90. Jan. 3, 2012. 49 U.S.C. 60101.

and the Texas Gulf Coast.[19] The defects included bad welds, dented pipe and damaged pipeline coating, and were attributed to unqualified welders and TransCanada's failure to use approved welding procedures. PHMSA will require TransCanada to hire an approved third party contractor to monitor the construction of the northern leg of the pipeline (if approved by the Obama Administration) and report to the PHMSA on whether the work is sound, as well as adopt a quality management program.

Also, the increase in crude-by-rail transport has not come without controversy. Although railcars have been used for decades to ship a variety of hazardous materials, the spike in crude-by-rail shipments and several recent derailments, one of which resulted in a catastrophic explosion, has led to calls for increased regulation. Rail shipments of Bakken crude have come under special scrutiny, given that the oil is particularly volatile, that shipments travel on average 1,600 miles to their destination, and Bakken crude accounts for approximately 70% of crude-by-rail shipments nationwide.[20] The U.S. DOT recently issued an order requiring railroads to notify states of crude-by-rail shipments from the Bakken region greater than 1,000,000 gallons (or approximately 35 tank cars) so firefighters and first responders can better prepare for accidents.[21] Meanwhile, PHMSA has been studying railcar design and is expected to announce in 2015 new permanent design standards for crude carrying railcars,

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[19] Associated Press. "New safety requirements set for Keystone pipeline." Bozeman Daily Chronicle, May 28, 2014.

[20] Associated Press. "Oil train dangers extend past Bakken." Great Falls Tribune. June 24, 2014.

[21] U.S. Department of Transportation. Emergency Order re Petroleum Crude Oil Railroad Carriers, Docket No. DOT-OST-2014-067.

including requirements for additional shielding and advanced valves.[22] Additional regulations can be anticipated as crude-by-rail shipments increase.

Aside from the applicable regulatory regimes, the construction and maintenance of oil and gas pipelines and other midstream infrastructure is not much different than construction in general. Pipeline construction and expansion is typically commissioned by the owner/operator or a consortium, with the work being performed by heavy civil contractors and their subs that specialize in such projects. Longer pipelines are typically constructed in segments, called "spreads," simultaneously as conditions and resources allow. Regulations and project specifications primarily determine the standard of care. Structural integrity and welds must be closely inspected. Water crossings present increased risk in design, construction and maintenance, and typically involve compliance with additional laws protecting water resources and wildlife.

In spite of the regulatory oversight, pipeline failures do occur for a variety of reasons, including design and construction defects, inadequate maintenance, or factors completely beyond the owner/operator's control. Pipeline failures can be extremely costly, and frequently result in environmental harm, severe fines, toxic tort claims and damaged reputations. Class action litigation can arise when spills or leakage occurs over a long period of time or impacts a large geographical area.[23]

A U.S. District Court in Missouri recently certified a proposed property class defined in geographic terms, as "all persons who currently own property within a 0.25 mile radius of" the identified location of a leak in a pipeline system owned by

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[22] Oil & Gas Journal. "PHMSA to propose rail tank car safety improvements." September 5, 2013.

[23] Dallas Morning News. "Lawsuits against Exxon Mobil mount over big oil pipeline spills. September 14, 2013.

ConocoPhillips Pipe Line Co., and all persons who reside on or who have resided on such a property since 2002.[24] The court found, based on the report of the plaintiffs' experts, sufficient preliminary evidence of contamination in the defined area to support the proposed property class definition. However, the court rejected the plaintiffs' proposed medical monitoring class definition based on the plaintiffs' failure to offer evidence of actual physical exposure to the benzene and/or lead contaminants at issue.

In another recent pipeline spill case, a federal court in Louisiana, applying Wyoming substantive law, held that a pollution exclusion in a CGL insurance policy excluded coverage for damages resulting from a ruptured pipeline that spilled over 4,000 barrels of crude oil, requiring nearly $5,000,000 in cleanup and remediation.[25] The plaintiff policyholder and pipeline owner argued that crude oil is not a "pollutant" since it is not enumerated as such in the policy definition of the term, and since it has never been held to be a pollutant under Wyoming law. The court rejected that argument, reasoning that crude oil, when released into the environment, contaminates the natural world, and that in this particular case it was undisputed that the crude contaminated the soil and groundwater.

Another frequent subject of pipeline-related litigation is condemnation, including claims of common carrier status asserted by pipeline operators who seek to use the power of eminent domain. The Texas Supreme Court recently held that "merely making a pipeline available for public use" is not sufficient to confer common-carrier status, and that a private enterprise cannot acquire condemnation power simply by checking a box

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[24] Smith v. ConocoPhillips Pipe Line Co., 2014 WL 1314942 (E.D.Mo. March 31, 2014).

[25] Bridger Lake, LLC v. Seneca Ins. Co., Inc., 2013 WL 2458758 (W.D.La. June 6, 2013).

on a one page form filed with the Railroad Commission.[26] The Court held that when a landowner-condemnee challenges a pipeline operator's common-carrier designation, the operator then has the burden of proving that it will transport products "to or for the public for hire" by selling to one or more third-party customers.

III. DOWNSTREAM—REFINING AND PROCESSING

The downstream sector of the oil and gas industry generally consists of the refining of crude oil and the processing and purifying of raw natural gas, to the point where the finished, or partially finished, products can be distributed and sold to the end users, or exported.

A. Downstream Infrastructure

Unprocessed crude oil is generally not useful in industrial applications or as a direct source of energy. Through refining, its numerous hydrocarbon components are separated into various products that can be used as fuels, lubricants and petrochemical feedstock (for conversion into plastics, fertilizers, detergents, solvents and fibers). The refining of crude oil occurs at oil refineries, which are typically sprawling industrial complexes with extensive piping and stacks, and which operate 24 hours a day, 365 days a year.

There are currently 142 operable oil refineries in the U.S., down significantly from the 300 plus that existed in the early 1980s.[27] This steep decline is due to the retirement of numerous smaller, older and obsolete refineries, as well as mergers and acquisitions in the downstream oil and gas industry. No new complex refineries with significant downstream capacity (more than 30,000 barrels per day) have been built in

[26] *Texas Rice Land Partners, Ltd. v. Denbury Green Pipeline-Texas LLC,* 363 S.W.3d 192 (Tex. 2012).

[27] U.S. Energy Information Administration, www.eia.gov.

the U.S. since 1977. This is due to a variety of factors including the difficult regulatory climate and unstable refining margins in recent decades.[28] Nevertheless, overall U.S. refining capacity has remained relatively constant during that time at approximately 17.9 million bpd, due to the addition of capacity at existing refineries through de-bottlenecking, upgrades and expansion.[29]

Top 10 U.S. Refineries Operable Capacity

(As of January 1, 2013)[30]

Rank	Corporation	Company	State	Site	Barrels per calendar day
1	Motiva Enterprises LLC	Motiva Enterprises LLC	Texas	Port Arthur	600,250
2	Exxon Mobil Corp	Exxonmobil Refining & Supply Co	Texas	Baytown	560,500
3	Marathon Petroleum Corp	Marathon Petroleum Co LLC	Louisiana	Garyville	522,000
4	Exxon Mobil Corp	Exxonmobil Refining & Supply Co	Louisiana	Baton Rouge	502,500
5	BP PLC	BP Products North America Inc	Texas	Texas City	460,196
6	PDV America Inc	Citgo Petroleum Corp	Louisiana	Lake Charles	427,800
7	BP PLC	BP Products North America Inc	Indiana	Whiting	399,000
8	Exxon Mobil Corp	Exxonmobil Refining & Supply Co	Texas	Beaumont	344,500
9	Carlyle Group	Philadelphia Energy Solutions	Pennsylvania	Philadelphia	335,000
10	WRB Refining LP	WRB Refining LP	Illinois	Wood River	333,000

For example, capacity at Motiva's Port Arthur, TX and Marathon's Garyville, LA refineries has more than doubled since their original construction. In general, it is substantially less costly to expand an existing refinery, leveraging its existing infrastructure and personnel, than to build a new "grassroots" refinery.

The resurgence in domestic oil production has spurred continued upgrade, expansion and modification of existing refineries and other downstream infrastructure. Existing refineries, particularly along the Gulf Coast are being modified and expanded to

[28] Id.

[29] Id.

[30] Id.

handle a greater volume of domestic light tight oil (LTO), in lieu of heaver, imported crude on which the U.S. has relied in recent decades.[31]

Construction is underway on several new, smaller capacity refineries to meet localized demand. For example, in March 2013 construction began on a new 20,000 bpd refinery in Dickinson, North Dakota.[32] The Dakota Prairie refinery will utilize crude from the nearby Bakken fields and produce mostly diesel fuel to meet the spike in local demand resulting from the Bakken shale oil boom. The facility is scheduled to open in December 2014. Quantum Energy recently announced plans to construct a second grassroots 20,000 bpd refinery in nearby East Fairview, ND.[33] Plans are in the works for numerous other "micro" refineries across the country, including "crude by rail" projects in areas that are not adequately served by pipeline infrastructure.

In addition, there are numerous facilities being planned or constructed for the export of refined petroleum products and liquefied natural gas, largely in response to the abundance of shale gas in the U.S. Construction is under way on Cheniere Energy's Sabine Pass LNG export terminal in Cameron Parish, LA.[34] The project, scheduled to be finished in 2015, will allow for the export of 2.5 billion cubic feet of gas per day. Six other LNG export facilities have recently been approved by the FERC, while dozens

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[31] Oil & Gas Journal. "EPA grants final approval for Texas refinery expansion." OJG Online, May 29. 2014 (Discussing final EPA approval of "Domestic Crude Project" at Flint Hills Resources' "West Refinery" in Corpus Christi, TX, aimed at increasing the processing capabilities for Eagle Ford crude).

[32] Oil & Gas Journal. "North Dakota diesel refinery to process Bakken crude." OJG Online, February 5, 2013.

[33] Oil & Gas Journal. "Second small diesel refinery planned for North Dakota." OJG Online, March 21, 2014.

[34] Fuel Fix. "Cheniere's massive export plans arise on Gulf Coast." December 12, 2013.

more are under review.[35] Kinder Morgan Energy Partners is constructing a 100,000 bpd condensate processing "splitter" facility on the Houston ship channel, which will allow for the processing and eventual export of condensate from the Eagle Ford shale.[36] The project is among $35 billion worth of investment and oil and gas-related construction occurring along the Houston Ship Channel between 2012 and 2015.[37]

B. Refinery Maintenance and Turnaround

In terms of downstream construction-related activity, equally as significant as new construction and expansion is refinery maintenance and turnaround. The caustic nature of the hydrocarbon compounds that are processed in a refinery, and the extreme pressures and temperatures involved, necessarily cause an extraordinary amount of corrosion of the metallic components in a refinery. Corrosion eventually leads to decreases in efficiency and the failure of equipment, creating unacceptable safety and environmental risks. Therefore, the maintenance of refineries is a constant and critical part of operations.

A turnaround is a planned, periodic shutdown of a refinery processing unit (or possibly the entire refinery) to perform maintenance, inspection, and repair of equipment, and to replace process materials and equipment that have worn out or broken, in order to ensure safe and efficient operations. Turnarounds frequently include the installation of new and upgraded equipment to improve operations or meet

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[35] Fuel Fix. "Houston company wins federal approval for gas export project." June 14, 2014.

[36] Pipeline and Gas Journal. "Kinder Morgan and BP North America enter into long-term agreements." Vol. 239, No. 7. July 2012.

[37] Houston Business Journal. "Oil and gas ventures flood Houston Ship Channel with wave of business growth." February 1, 2013.

environmental regulations. Routine turnarounds on key refinery production units are planned for every 3 to 5 years, and involve 1-2 years of advance planning.

By nature turnarounds are large, complicated and expensive. They are typically coordinated and supervised by the refinery's own turnaround unit, and designed and executed by outside contractors which specialize in such work. They can last from several weeks to several months, and involve the mobilization of several hundred to several thousand outside contract workers on site at the same time, which could triple the size of a refinery's normal operating staff. These workers perform countless inter-related jobs, skilled and unskilled, which require extensive coordination.

Safety is obviously a major concern, given the volatile and toxic nature of the materials, and the high temperatures and pressures involved. During a 2005 turnaround at the Texas City refinery then owned by BP, an explosion and fire killed 15 workers and injured more than 170 others. BP eventually paid approximately $64 million in OSHA fines and more than $2 billion to settle civil claims arising out of the accident.[38] The suspected release of pollutants into the atmosphere typically results in regulatory enforcement action and, as will be discussed in the following section, personal injury claims by workers or those in the surrounding community who claim exposure.

Turnarounds are carefully planned to minimize the time the refinery is shutdown, since each day of shutdown typically results in millions of dollars in lost revenue to the refinery owner. Turnaround planners use sophisticated planning and scheduling software to optimize the process. Due to the carefully planned schedule and large

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[38] Chicago Tribune. "U.S. to announce settlement with BP over Texas City refinery." July 11, 2012.

commitment of labor, equipment and materials, changes and delays can cause severe impacts to cost and safety.

C. Current Downstream Legal Issues

Not surprisingly, turnarounds are a frequent source of litigation in the downstream sector. As with construction litigation generally, the cases generally fall into two categories: contract disputes and workplace injuries, both of which will be briefly surveyed herein.

1. Contract Disputes

Contract disputes frequently arise from delays and cost overrun in turnarounds. In response to a critical path delay or cost overrun, the refinery may terminate a contract or withhold payment from the turnaround contractor, and the contractor may respond by filing a construction lien and making a claim for delay and impact damages. Through litigation or arbitration, the parties argue over the cause of the delay and any available indemnity. Contractors may complain when work is stopped or disrupted while inaccuracies, omissions, or other shortcomings in the plans and specifications are resolved; unworkable elements of the design are modified; or new features are added to the project. Refineries may argue that the turnaround contractor failed to assign a sufficient number of skilled workers on the project, or failed to follow agreed upon procedures and the critical path, thereby causing defective work and delays. In contrast to a typical construction project, in which delays may involve weeks or months, delays in turnarounds are measured in hours or days.

A recently reported case between Haskell Corporation, a turnaround contractor, and ConocoPhillips, the refinery operator, is illustrative.[39] The case arose out of the termination of a $26 million turnaround contract, the scope of which was significantly expanded through written and unwritten change orders and amendments. The Court rejected Haskell's argument that ConocoPhillips had abandoned the original contract, noting that the contract provided that when ConocoPhillips or its project representative failed to initiate a written contract amendment to reflect a change in the work, it was incumbent upon Haskell to do so. The Court also found that both parties had substantially contributed to the breakdown of the normal work process--ConocoPhillips, by not delaying the start of Haskell's work until the site was ready for the contractor to work, and Haskell, by "purposefully inflating" its claims to recoup some of its underbidding losses. The Court also held that Haskell had failed to properly track its costs due to changes and impacts, as required by the contract's audit clause, and that Haskell's alleged impact costs were improperly included in its construction lien. Nevertheless, Haskell received a net judgment in the case, although the amount was significantly less than what it claimed due, and what ConocoPhillips had offered to pay, going into trial.

The case also involved a claim by ConocoPhillips against Safeco, the surety company providing the payment bonds on the turnaround, arising out of Safeco's refusal to pay the claims of Haskell's subcontractors. Safeco had argued that those payment claims were not yet "due" under the terms of the bonds, because ConocoPhillips disputed the amounts Haskell claimed due. The Court rejected this

[39] See *Haskell Corporation v. ConocoPhillips Company*, 2012 WL 845398 (Cal.App.1st **2012).**

argument, based on its previous finding that ConcoPhillips, despite its failure to pay some reasonable costs Haskell claimed were due, had substantially performed its obligations under the contract. The Court also rejected Safeco's argument that, because Haskell won net judgment, Safeco was not required to pay the subcontractors' claims on the bond, holding that there is no statutory provision for such a defense.

2. Workplace Injury Claims

Turnarounds and other refinery work frequently result in personal injury claims by contract workers who claim that they were exposed to dangerous chemicals as a result of the refinery operator's negligence. Plaintiffs generally have a high burden to meet in proving negligence and causation in such claims, particularly when the nature of the exposure is uncertain. In a 2011 case arising out of an alleged chemical exposure at the a Texas City refinery, owned at that time by BP, the Fifth Circuit U.S. Court of Appeals held that it was improper to give a *res ipsa loquitur* jury instruction when the Plaintiffs themselves were unsure of what chemical they were exposed to and, thus, whether the release even came from BP's property.[40] The Court held that without the *res ipsa loquitur* instruction, the Plaintiffs could not meet their burden of proof as to negligence, and overturned the jury's verdict awarding $325,000 in compensatory and $100,000,000 in punitive damages.

As with construction litigation generally, workers compensation laws often come into play. For example, in another recently reported case, an employee of a contractor on a turnaround project was barred from bringing a personal injury claim after being severely burned from a sudden blast of steam, based on a provision in the turnaround

[40] *Pearson v. BP Products North America, Inc*., 440 Fed.Appx. 389 (5th Cir.2011) (citing Marathon Oil Co. v. Sterner, 632 S.W.2d 571 (Tex. 1982)).

contract that designated the refinery owner as the "statutory employer" of the contractor's employees.[41] The Court held that, under the Louisiana Workers' Compensation Act, a qualified statutory employer is entitled to the same benefits and burdens of the direct employer, including the protection of the exclusive remedy provisions of the Act, thus conferring immunity from tort claims. While the Court did not expressly reach the issue, the opinion indicated that refinery turnaround work is the type of work that "is an integral part of, or essential to, the ability of the principal [refinery owner] to generate [its] goods, products or services" and, therefore, met the additional criteria for qualifying the refinery owner as a statutory employer.

CONCLUSION

The U.S. oil and gas boom presents significant challenges as well as significant opportunities. As the shale revolution matures over the coming decade(s), there will continue to be massive change and innovation in the processes, systems and infrastructure utilized across all sectors of the oil and gas industry. Along with it will come change and innovation in the legal and risk management aspects of the industry, and issues that seem novel today will, in time, be addressed through legal means and principles yet to be established. It is certainly an exciting time in the industry and the law.

[41] *McClain v. Motiva Enterprises, L.L.C.*, 2010 WL 3614310 (E.D.La. 2010).