Book Review:

Fracking Risks and Rewards

Defrocks the Facts of Fracking

Between 2006 and 2013, annual capital expenditure on shale gas extraction increased sixteen fold, from $5 billion to over $80 billion. Since 2007, the United States has added at least 27.5 billion cubic feet per day of shale gas to global energy production. Indeed, fracking is big business; and assessing the opportunities it truly holds, as well as the risks it poses, is also a large, complex and controversial endeavor.

In *Fracking Risks and Rewards*, experienced researchers and journalists, Barbara Hadley, Tom Rennell and Derek Austin, tackle the key facets of the shale gas industry through their careful presentation of facts; and provide readers with a thoroughly researched and well-written work. Industry stakeholders as well as the curious will, by reading this book, gain a valuable and broad understanding of the shale boom in its current state.

Initially, the authors devote substantial attention to the science of shale gas. Prepare to learn as *Fracking Risks and Rewards* thoroughly explains the geologic, hydrologic and chemical components of shale gas formation, exploration and extraction. Only when adequately prepared with this technical background may readers truly comprehend the potential economic opportunities, and the corollary environmental and safety risks (and how to mitigate those risks), associated with fracking the earth to extract natural gas.

Simply put, natural gas is formed when organic matter within rock formations is subjected to heat and pressure over very long periods of time. These rock formations are known as source rocks (the source of the gas) and are made of various shapes, sizes and geologic compositions. And while gas molecules formed in source rocks are very light and may migrate upward, sometimes to the earth's surface, much gas becomes "trapped" within various rock formations having low permeability. These could be the source rocks themselves, or rock formations sitting over the source rocks, closer to the earth's surface.

Conventional gas extraction has long existed, where quantities of gas have migrated upward from source rocks and collected beneath rock formations, known as a cap rock. This migrated gas forms an actual gas reservoir beneath the "cap rock." By drilling a single well through a cap rock to the surface of the reservoir, this conventional gas may be released and extracted.

Unconventional drilling, which includes fracking, occurs by going to the source rock itself and releasing the gas before it has migrated upward to a conventional reservoir. Because no reservoir yet exists for this source rock gas, its release is far more difficult, expensive and risky. One

must create fissures within the source rock to provide pathways for the gas to migrate to a main well for extraction. The means and methods for creating fissures or fractures within the source rock gave rise to the industry term "fracking."

Although its technology and accompanying methods may vary somewhat, generally fracking occurs when a vertical well is drilled and a connected horizontal well or series of wells is added within a layer of source rock. Once the wells are completed, a mixture of water, sand and chemical agents (known as "slickwater") is then injected through the wells at high volume, pressure and velocity. This mixture then interacts with the source rock, creating fissures within the source rock itself. Gas molecules within the vicinity of these fissures are then "freed" and capable of migrating to the horizontal well and up through the vertical well for extraction.

After thoroughly explaining the science and technology of fracking, the authors lay out the facts and expose much of the fiction surrounding the economic opportunities.

In the United States, shale gas is repeatedly identified as the largest economic and national security opportunity available today. As proponents might describe it, domestic shale formations holding natural gas are plentiful and vast, and with proper investments in fracking operations, gas transportation pipelines, liquefying processes and energy efficiency, the United States will surely and quickly become energy independent as well as the worldwide leading energy exporter – thus safeguarding financial security and geo-political superiority for generations to come.

However, beneath this beautiful picture lies complex economics built upon many assumptions. Extraction and production is expensive, very expensive; and much of the industry is highly leveraged, financing operations on borrowed funds – including the issuance of junk bonds. Profitability is far from a given at this juncture, and the complexities of the global energy marketplace in general only add to the unknowns. Yet, there can be no doubt that fracking for natural gas holds much economic opportunity. In certain geographic regions, fracking is red hot and, overall, fracking is rapidly becoming a firmly entrenched sector within the broad energy market.

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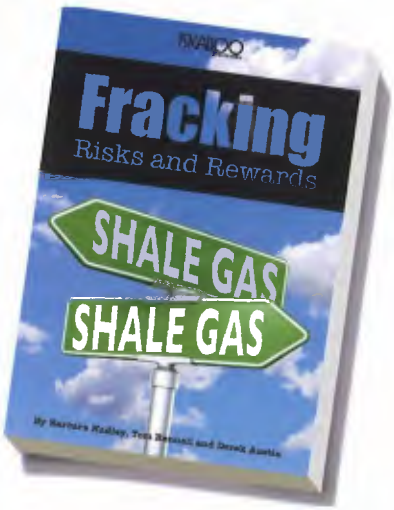

The risks most frequently associated with fracking generally relate to water usage and environmental contamination. Water usage concerns arise from the massive quantities of water required to create fissures within the source rock. A single horizontal well, over its useful life, may use as much as 8.9 million gallons of water. With many geographic areas experiencing chronic drought, the benefits of gas extraction through fracking must be balanced with the risks of such high water demands. A related risk arises because most wells are serviced by tanker trucks bringing water to remote well sites. For example, the 8.9 million gallons of water mentioned above would require 1100 truckloads, drawing heavy trucking traffic over road infrastructures that are often unsuited for this purpose. States, counties and municipalities have begun mitigating this risk by requiring drillers to post bonds for anticipated road improvements and repair costs.

In addition to concerns over the massive quantities of water utilized to frack, the slickwater itself, and its disposal, creates the risk of environmental contamination. Although the additives within slickwater typically comprise only .5 to 2 percent by volume, these additives contain chemicals. Some are harmless: salt or citric acid, for example. Others, however, are toxic: benzene, other volatile organic compounds, and possible human carcinogens regulated under the Safe Drinking Water Act. And again, much is unknown because many energy companies consider their slickwater recipes propriety and will not voluntarily make disclosures.

By accident, or through less-than-ideal disposal techniques, slickwater may migrate into a drinking water supply. In addition, the gas product itself, which is mostly methane, may also contaminate water. Such adverse results have given rise to multiple lawsuits and regulatory actions.

Fortunately, many contamination risks may be avoided or at least mitigated. State regulators are increasingly targeting the primary risks, by focusing on requirements for well casings, increased disclosures regarding the chemical constituents of slickwater, and regulating its disposal. However, not all states are on equal footing and regulations widely vary from state to state.

Of course, the market itself may self-regulate and the insurance industry will likely play a significant role here by demanding higher standards of risk control in exchange for insurance coverage. Transportation vendors, construction contractors, well or pipeline owners and operators, and other industry players each holds a distinct risk profile, and each plays a key role in risk mitigation. The insurers and reinsurers covering

Fracking (continued)

these business operations will also play an important role in mitigating and spreading the risks of contamination and other hazards. The investors who see fracking as a capital growth opportunity should also be concerned with these risks and are expected to positively influence the industry by encouraging the companies in which they invest to fully understand, disclose and mitigate against risk.

Fracking Risks and Rewards provides a thorough, intelligent and balanced assessment of the fracking industry and its complex facets, for both the curious and professionals with a need to critically understand this important, evolving and dynamic energy sector. The reader emerges with the distinct sense that the fracking industry is not yet fully formed. Much remains unknown and unproven, and much must improve – in terms of efficiency, risk mitigation and profitability – before the bright future its promise reportedly holds may be realized. *Fracking Risks and Rewards* brings clarity to this complex energy sector. The book is published by Iskaboo and may be purchased online through www.iskaboo.co.uk and other vendors. ●

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Fracking Risks and Rewards

By Barbara Hadley, Tom Rennell and Derek Austin

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139 pages, soft cover, may be purchased by AIRROC members at a discounted price of USD $51, regular price is $60. Please type AIRROC15 in the coupon field on the checkout page. http://iskaboo.co.uk.

Hydraulic Fracturing

A Retrospective of Key Legal Disputes in 2014 and Predictions for the Future

In 2014, hydraulic fracturing ("fracking") remained a hot national topic. Often making headlines, fracking also made its mark in litigation where key battles wound their way through the courts. Reviewing just some legal developments confirms the industry faces unique, sometimes prejudicial, challenges despite continued growth.

For example, the Eighth Circuit's decision in *Hiser v. XTO Energy*, 768 F.3d 773, illustrates how extraneous, prejudicial information in the media comes to the jury's attention and influences litigation. A drilling company appealed an award for damages allegedly caused by vibrations from drilling. During deliberations, the jury asked whether the company was "drilling only or were they also fracking?" One juror stated that earthquakes and other negative impacts "caused" by fracking were also discussed. The jurors largely agreed that a pre-instruction fracking discussion occurred but disagreed about its scope and significance. Finding the trial court's instruction eliminated the risk of prejudice, the Court of Appeals upheld the verdict.

It is not just negative press causing legal headwinds. High volume natural gas extraction involves a combination of risks and rewards that are ripening into various forms of legal disputes. Most commonly, disputes involve land use, contract and tort-based law[1] and, in 2014, various courts addressed several major issues. Our retrospective aims to provide insight into recent litigation trends and preview remaining, unresolved issues.

Contract Litigation

Numerous contracts are involved in natural gas extraction, such as landowner-energy company leases, contractor-subcontractor agreements and insurance contracts. Unsurprisingly, contract disputes dominated 2014 fracking litigation.

For example, in *Warren Drilling v. Equitable Production*, 2014 WL 1512699, an indemnification provision in a production company-drilling company contract was applied to an underlying water contamination claim advanced by certain landowners. The court determined the contract's language wherein the producer's duty to indemnify was plain and consequently was triggered by the contamination claim against the drilling company. The language at issue provided that the production company

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"shall assume full responsibility for and shall defend, indemnify, and hold Contractor harmless from and against any loss, damage, expense, claim, fine and penalty, demand, or liability for pollution or contamination."

The contract's language was not restricted to "loss" or "liability" but extended the producer's obligation to indemnify any "claim" or "demand." Based on expert reports that subsurface chemicals caused contamination, the court determined the producer was contractually required to defend and indemnify the drilling company. The court held the provision's broad language covering "any claim or demand" evidenced intent to expand Pennsylvania's triggering rule to include potential liability rather than actual legal liability.

Lease length provisions in older landowner-energy company leases were commonly litigated. In fact, New York, Ohio, and Kansas courts each addressed *habendum* and/or *force majeure* provisions. These cases illustrate a potential for