Mixology 101: Blending Trade Secret Protections and Fracking Chemical Reporting

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Whether you live in the East, the Great Plains, the Southwest, or the Rocky Mountain West, the oil and gas industry's use of hydraulic fracturing or "fracking" in oil and gas development is something you have likely heard a lot about lately. From New York's statewide fracking ban to potential political battles in Colorado over proposed ballot initiatives vesting local governments with plenary authority to regulate natural resource development, the industry's increasing use of this decades-old technique to extract oil and gas within the context of recent advances in horizontal drilling technology has started an energy revolution, and simultaneously engendered a vigorous debate over the perceived mutual exclusivity of energy production and environmental protection.

In the absence of comprehensive federal rules governing the disclosure of the various chemical components of the fluid mixtures used by oil and gas companies in the fracking process, state regulatory agencies have crafted disclosure requirements aimed at promoting the dissemination of well-specific information to the public, while simultaneously protecting the regulated companies' interests in protecting their proprietary fracking fluid blends. This task has proven to be more challenging than it might seem at first blush.

In simple terms, fracking is a technique by which a mixture of water, sand, and chemicals is forced under high pressure down a well bore thousands of feet below the surface, typically a mile or more beneath groundwater supplies, to create small cracks, called fissures or fractures, in porous rock formations to release natural resources that are trapped in pores smaller than the width of a hair. Because the shale rock within which the natural resources are trapped is porous, the pressurized water must be supplemented to prevent its seepage into the shale rock formation. To this end, frac fluids generally contain approximately 90 percent water, and 9.5 percent silica sand or ceramic particles, called proppants, that fill the fractures to keep them permanently open when hydraulic pressure is released so that the oil and gas can flow more freely to the well for extraction and processing. Various chemical additives account for the remaining one half of one percent of the frac fluid volume, and serve functions such as reducing friction, limiting the growth of bacteria, and preventing corrosion of the steel well casing. Exact frac fluid mixtures are unique to each company, and the specific types and quantities of chemical additives used to fracture a specific well depend on the conditions and characteristics of that well. However, because the contents and properties of a frac fluid mixture have a direct and measurable impact on the production value of the well, the precise makeup of each company's frac fluid has historically been a jealously guarded trade secret.

Although the debate over the use of chemicals in the fracking process is a relatively new phenomenon, hydraulic fracturing and the technology behind it are not new at all. The concept of blasting fractures into oil bearing sands was developed in the years immediately following the Civil War. However, the first commercial application of hydraulic fracturing for an oil or gas well is believed to have taken place either in Kansas in 1946, or near Duncan, Oklahoma, in 1949. Over the past sixty years, the industry has continuously improved on this technology and has used it more than 1.2 million times. Indeed, approximately 90 percent of all wells in the United States are fracked at some point during their lifespan. If fracking has been commercially accepted and utilized for the past sixty years, what is causing the recent spike in legal challenges and regulatory responses to the practice? The answer to these questions is multifaceted, but primarily centers on the industry's effective use of hydraulic fracturing within the context of horizontal drilling.

Although the first horizontal well may have been drilled as early as 1929, the widespread use of horizontal drilling did not become economical until the 1980s, with advances in equipment and technology, and attendant reductions in drilling and operating costs. As contrasted with vertical wells, which are drilled straight down into (and through) a resource bearing source rock formation, a horizontal well is drilled down into the formation and then turned to run horizontally within the geologic formation for thousands of feet. As a result, a horizontal well is able to reach a much broader section of source rock and thereby realize far greater production per well. These advances in drilling technology, coupled with the use of hydraulic fracturing to increase production from a single horizontal well have revolutionized U.S. domestic energy production. In fact, without the hydraulic fracturing of horizontal wells, as much as 80 percent of today's production from such tight shale rock formations would be virtually impossible.

Additionally, the oil and gas industry's initial reluctance to disclose the types and quantities of chemicals used in fracking fluids led many opponents to believe that the industry had something to hide. The industry's reluctance to disclose the

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Published in *Natural Resources & Environment* Volume 29, Number 4, Spring 2015.

chemical makeup of fracking fluids led, in large part, to fracking and the technology behind it being viewed with wide mistrust as a dangerous practice that sacrifices environmental stewardship in favor of unabashed profiteering.

Although the oil and gas industry has always been among the most highly regulated in the world, over the last few years, outspoken opponents have become increasingly vocal in their opposition to fracking in general, and to the industry's ability to avoid full disclosure of the types and precise quantities of fracking chemicals being used in particular. In addition to concerns that transporting the quantities of water necessary for fracking operations to the well site damages roads, pollutes the air, and harms the environment generally, or that the use of fracking to increase production of oil and gas distracts energy producers from investing in renewable resources and fosters continued reliance on fossil fuels, by far the leading argument against the use of fracking is the assertion that potentially harmful chemicals contained in the fluid mixture might escape the well bore and contaminate groundwater.

Fracturing fluid mixtures contain very small percentages of chemical additives relative to total fluid volume. However, the total amounts of chemicals being deployed in down-hole operations can nevertheless be sizeable.

Over the last few years, in response to this battle between the industry and environmental groups, and in an effort to promote both public health and the industry's continued use of ever-improving technology, many state and federal lawmakers and regulators have required that the industry disclose the composition of its fracking fluids, with some jurisdictions recognizing limited exceptions for trade secrets.

Common Chemical Additives and Their Functions

While a number of different chemical additives can be used in the fracking process depending on the company, the characteristics of the water being used, the geologic formation being fractured, and other job-specific considerations, a typical fracturing fluid mixture will contain three to twelve separate chemical additives, many of which can be found in a variety of everyday household items. Although the principal functions of the most commonly deployed chemical additives generally fall into a few categories, each chemical additive within a fluid mixture serves a job-specific, engineered function. Moreover, each chemical additive is used in extremely low concentrations relative to the total fluid volume of the mixture.

The main purposes of fracturing fluid are to extend fractures, lubricate the wellbore, and to transport proppant into the geologic formation. There are two fracturing methods by which the latter can be accomplished: high-viscosity and high-rate. High-viscosity fracturing creates large fissures within the formation, while high-rate fracturing creates much finer micro-fractures throughout the formation using a fluid mixture commonly referred to as *slickwater*. High-rate fracturing is the most commonly employed method for extracting natural gas from so-called unconventional, or shale formations in the United States. This predominant use of slickwater in most downhole operations is based on several factors.

Slickwater, as suggested by the moniker, is a water-based fluid containing friction reducers to lower the pressure of water and sand flowing through the pipe during high-rate pumping. The reduced friction increases the efficiency of the pumps by lowering the required horsepower output, and thereby also lowering air emissions from the pumps. One of the most commonly employed friction reducers is polyacrylamide, a chemical commonly used as adsorbent in baby diapers and as a flocculent in drinking water preparation.

Besides friction reducers, several other types of chemical additives are commonly used in fracturing fluid mixtures. For example, gels (polysaccharides) are used to make the water more viscous and ensure that the proppants and other chemical additives stay suspended instead of sinking to the bottom of the mixture. Gel breakers, such as oxidation agents and enzymes, deactivate the gelling agents and help return the water to a more liquid state so that the fracturing fluid can be pumped back to the surface more easily. Biocides may be added to prevent harmful bacteria from forming and breaking down the gels, as this would otherwise impair the carrying ability of the fracturing fluid; oxygen scavengers prevent the corrosion of metal casing pipes which, together with multiple layers of cement, create an impermeable barrier between the well and groundwater zones and isolate the oil or natural gas formations from the surrounding areas. Surfactants (tensides) are used to change the surface tension and prepare the rock for the fracturing process. Non-emulsifiers may be used to prevent the formation of emulsions in the frac fluid, and pH adjusting agents that balance the pH of mixture to ensure optimum effectiveness of the other chemical components are often added. Additionally, salt is commonly used to turn the fluid mixture into a brine, thereby stabilizing the clays in the reservoir and preventing them from swelling.

Some chemical additives commonly used among these categories include: guar gum and cellulose polymers, gels that are also common food additives; sodium chloride, a commonly used breaker also found in table salt; the antimicrobial agent glutaraldehyde, which is used commercially as a disinfectant and in municipal water treating systems; isopropanol, used as both a surfactant and oxygen scavenger to prevent the corrosion of metal well casing, and also found in rubbing alcohol and deodorant; and sodium carbonate and potassium carbonate, common pH adjusting agents that are also used in detergent.

The foregoing lists illustrate that many of the chemicals and components commonly used in fracking fluids are generally products that most people use or come across in their daily lives. Additionally, fracturing fluid mixtures contain very small percentages of chemical additives relative to total fluid volume. However, the total amounts of chemicals being

deployed in down-hole operations can nevertheless be sizeable. Moreover, even though the U.S. Environmental Protection Agency (EPA) has never found any connection between chemicals entering groundwater and the fracking process, fears persist that, absent more robust and uniform regulation, chemical additives used in the fracking process pose a significant threat to health and the environment.

To be sure, many commonly used fracking chemicals do not belong in the kitchen. Ethylene glycol, for example, is a common non-emulsifier used in frac fluid, and also winterizes your car in the form of antifreeze—not exactly a table condiment. So how should regulators balance the often competing interests of providing information to a concerned public, protecting health and the environment, and encouraging responsible oil and gas development by assuring operators that conducting business will not require the disclosure of their secret sauce? State oil and gas regulators have taken multiple and often divergent approaches to this conundrum.

Fracking Disclosure Requirements in the Information Age

In 2010, the Ground Water Protection Council, a private nonprofit organization governed by state drilling and water quality officials, and the Interstate Oil & Gas Compact Commission, both located in Oklahoma City, formed a joint partnership called FracFocus to promote responsible resource management and increase transparency within the context of hydraulic fracturing chemical reporting.

In April 2011, the organization launched its website FracFocus.org with sections dedicated to non-technical descriptions of the fracking process, various methods employed by the oil and gas industry to protect groundwater, and descriptions of various chemical components used in frac fluids and their respective purposes. One of the key functionalities of the website was and remains the ability of online users to search the fracking chemical records of individual wells, providing public access to a wealth of information including chemical additive trade names, suppliers, purposes within the frac fluid mixture, the maximum concentrations of each chemical (as required by the respective state rules), and, importantly, the Chemical Abstract Service (CAS) number of each chemical additive. This is notable because many chemicals may be known by many names. As a result, a user might search a particular chemical name and receive no hits. However, when searching by the chemical's CAS number, it will return the correct chemical even if the chemical name search within the FracFocus records failed to return a match. Thus, when a reporting company claims that a chemical constituent constitutes a protected trade secret, the CAS number will be listed by FracFocus as proprietary, disabling users from searching the precise chemical. In this way FracFocus is able to report to its member jurisdictions the existence of proprietary chemicals within a particular fluid mixture or well site without attempting to navigate the sundry laws governing trade secret protections, which vary from state to state.

Although FracFocus.org began as a voluntary disclosure site, since its launch it has become a multistate clearinghouse for public information about hydraulic fracturing chemicals. In fact, FracFocus is now a required regulatory tool in at least ten states, including Colorado, Louisiana, Mississippi, Montana, North Dakota, Ohio, Oklahoma, Pennsylvania, Texas, and Utah. At least nine other states, including California, Alaska, Alabama, West Virginia, Idaho, Illinois, Kentucky, New Mexico, and Nebraska, are considering the use of FracFocus for regulatory reporting.

Still, the adoption of FracFocus by various states and its concomitant expansion to date have not occurred in a regulatory vacuum, nor do they represent the totality of state disclosure regulations. To the contrary, whether a state has adopted FracFocus or not, the legislatures and various conservation agencies in the states where hydraulic fracturing is occurring have adopted widely varying regulatory regimes. Some states provide for public access to reported chemical information only by inspection of physical records at the offices of the state's regulatory agency. Those states that have adopted FracFocus as a regulatory tool have also done so within the context of a much larger regulatory framework, with varying requirements for both the types and quantities of chemicals that must be reported. For example, a state may have enacted strict chemical disclosure requirements in some areas, but elected not to require disclosure in other areas as a means of balancing competing geographic, economic, social, or policy interests. This is important because a regulated company's trade secret claim may be based upon the type or quantity of a particular additive being used, or both.

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Some states mandate advance disclosure of proposed chemicals before the well is fractured. Other states require the disclosure of both the chemical additives and their respective concentrations in the fluid mixture, but such disclosure is not required until after the well has been completed. Others require disclosure of only the specific additives being used in down-hole operations but not the amounts of those additives. Other states have no disclosure requirements at all, viewing such regulation as a barrier to energy development.

One such state is North Carolina, which, according to the U.S. Energy Information Administration, currently has no oil or natural gas production. In an effort to change this status quo and attract oil and gas production and the jobs it creates, the North Carolina state senate recently passed proposed legislation that would grant trade secret protection to all fracking chemical information, and make disclosure of any fluid additive a crime in most instances. Under North Carolina's Energy Modernization Act, a state geologist would be the custodian of chemical information about fracking fluids, with that information being treated as confidential. Disclosure would be permitted to healthcare providers and public safety officials only in cases of emergency.

As a result of the lack of uniform regulation, EPA now appears to be entering the fray, having started receiving public comment as part of its information gathering process to determine whether it should draft uniform federal rules governing fracking fluid chemical disclosure. This is not to say that the federal government has not or does not already regulate fracking fluids through various schemes, as the U.S. Bureau of Land Management has draft regulations that apply solely to wells drilled on federal land, and EPA previously regulated hydraulic fracturing injections under the Safe Water Drinking Act of 1974. However, since passage of the Energy Policy Act of 2005, the regulation of fracking chemicals has been largely left to the states. For example, the Energy Policy Act of 2005 subsequently exempted companies from disclosing the chemicals involved in fracking operations that otherwise would have been required under the Safe Drinking Water Act of 1974. This exemption is commonly referred to as the "Halliburton loophole" because the then-Vice President of the United States and former Halliburton CEO Richard B. Cheney was thought to have been instrumental in the passage of the 2005 law.

With the widely differing and often contradictory regulatory environments existing among the several states, and the federal government in and out of the regulatory picture, there seems to be two constants: the demand for greater transparency by industry critics, and the insistence on the protection of proprietary information by industry advocates. A balance, it seems, has yet to be struck.

Protecting Trade Secrets

While both the specific definition and protections afforded trade secrets vary from state to state and differ among nations, trade secret protections in the United States are generally afforded to information that (i) the owner has taken reasonable measures to keep secret, and (ii) derives independent economic value, actual or potential, from not being generally known to, and not being readily ascertainable through proper means by, the public.

Unlike patents, which require disclosure of confidential information to the patent office, or trademarks used in commerce, trade secrets do not require acts of registration or other procedural formalities to ensure their protection. Because information simply needs to fall within the relevant jurisdictional definition of trade secret in order to qualify for non-disclosure, there are typically no other requirements that a company using fracking fluids must satisfy to secure a disclosure exemption from the governing regulatory agency. In states with less comprehensive mandatory reporting rules, formal disclosure exemptions are unnecessary because so little information is required that no identifiable trade secret information is requested in the first instance.

In a few states, when a company makes a trade secret claim to avoid public disclosure of fracking chemicals, the governing oil and gas agency may require the claiming company to submit factual bases for its trade secret claim to demonstrate that it is entitled to avoid public disclosure of the information being withheld. If the company's proffered justification is accepted, the regulatory agency will issue a disclosure exemption based on the specific facts submitted. In Wyoming, this evaluation process is itself a clearly defined regulatory protocol. In Arkansas, however, the process is not well-defined and has been criticized for lacking a clear regulatory process for evaluation. Regardless of the regulatory scheme, in all states that follow this process, the respective oil and gas agencies have been criticized for granting too many exemptions.

Other states have implemented regulatory processes by which trade secret exemptions can be challenged ex post facto. For example, Colorado, Ohio, Pennsylvania, and Texas have each adopted processes by which the public can challenge disclosure exemptions granted by their states' respective oil and gas regulatory agencies. Nevertheless, critics argue that these challenge processes are too narrowly drawn. In Texas, for example, companies are not required to disclose trade secret information. A landowner or state agency can challenge a trade secret exemption, but overturning that exemption requires intervention by the state's Attorney General or a court.

The cacophony of voices supporting and opposing both the kind and degree of existing and proposed fracking chemical disclosure regulation is only becoming louder. Many devoted advocates believe that more comprehensive or, at least, uniform disclosure requirements are needed to protect the environment and ensure public health and safety. Others argue vigorously that broad, mandatory disclosure requirements are violative of companies' rights to protect the trade secret information that serves as their proverbial keys to the market share kingdom. Attempting to strike a balance between these competing interests, regulators have unwittingly concocted a murky interstate brew of regulatory schemes governing mandatory chemical disclosures. Although individually intended to bring clarity to the multijurisdictional mixture of fact and passion, the resulting patchwork of state disclosure requirements has not led to a uniform standard. To the contrary, it has left energy producers and developers with the seemingly impossible task of navigating this vast regulatory maze and fueled an even larger debate over how oil and gas companies can reasonably protect proprietary information in any state if its disclosure is mandated in another. In the absence of some balance being stricken between fundamental trade secrets protections and mandatory disclosure requirements going forward, one might assume without fear of successful contradiction that what comes next could be the federal bartender deciding that the industry is no longer fit to drive, and confiscating its keys altogether.