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May 2014

Drilling Into Hydraulic Fracturing and the Associated Wastewater Management Issues

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Hydraulic fracturing (or "fracing")[1], a practice used in the oil and gas industry for more than half a century, breaks open crude oil and natural gas bearing rock-formations to increase output at oil and natural gas wells by using high pressure fluid injection. Since the 1980s, exploration and production (E&P) companies utilized horizontal drilling techniques to tap into previously inaccessible supplies of natural gas. In 2002, this technique was combined with hydraulic fracturing, and its success fueled the U.S. energy boom witnessed during the last decade. While oil and gas companies and the country are reaping huge benefits from these technological advances, fracing has not come without its detractors or increasing regulatory oversight.

Recently, it has been hard to go a few days without hearing of a lawsuit, proposed regulation, or new environmental study that relates to fracing. Controversies exist in part due to a level of scientific uncertainty, but also due to certain misperceptions surrounding the process which, when combined with social media, has created a firestorm. The film "Gasland", for example, featured a Weld County landowner igniting water from a faucet in his home with a cigarette lighter. While the film attributes the situation to natural gas exploration, the Colorado Oil and Gas Conservation Commission (COGCC) went on record after the movie was released "to correct several errors in the film's portrayal of the Colorado incidents."[1] The COGCC clarified that while methane had seeped into the landowner's water supply, the methane was naturally occurring and unrelated to any oil and gas activity in the area. Mischaracterizations and misinformation unfortunately are not unusual when it comes to fracing, nor are the issues limited to alleged tap water ignitability. Controversy exists with regard to the definition of fracing, chemicals used, the impacts of water injection, management of waste derived from fracing, and even with regard to subsurface rights and potential trespass claims associated with E&P activities. While the issues are varied and pervasive, this article will focus on wastewater management.

So What Is Fracing After All?

Hydraulic fracturing is just one step in a much longer well drilling and development process. It is a stimulation technique that assists in extracting oil and natural gas, trapped in tight shale formations.

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[1] Is it fracing or fracking?" It is a common question these days. Although one receives substantially more hits in google when searching the term "fracking", and google itself tries to correct the spelling, those in the oil and gas industry (including our clients and The Unconventional Oil and Gas Reporter where we have a separate article being published shortly) refer to "hydraulic fracturing" as "fracing." The term "fracking" was adopted by the anti-fracing movement.

The most common approach to fracing is through the injection of a pressurized water-based solution into shale formations to create fractures in the sedimentary rock. These fractures expose much greater surface areas to the well and increase the potential for oil and gas production at the wellhead.

Generally, drilling a single well takes about four to five weeks. Operators typically drill vertically into a target formation and then horizontally to reach areas that otherwise would require separate surface wells to access. Horizontal wells may exist more than a mile below the surface and may extend up to two miles in length. It is only after this drilling is complete that a service company enters the scene to fracture a well, a process that occurs in stages over a two to five day period. Before the process begins, the well casing is perforated so the fracing fluid may flow out and natural gas or oil may flow back into the well. Thereafter, the service company injects a solution such as hydrochloric acid to dissolve cement and drilling mud that could otherwise block the flow of oil or gas. This solution is followed by the injection of high-pressure fracturing fluids, composed of water and chemical additives. After the shale fractures, the company injects additional fluids that contain a “proppant” such as silica or sand to hold open the fractures and then flushes the wellbore and equipment with pure water.

At this point, pressure on the wellbore is removed and fracturing fluid, together with brines and other dissolved material in a formation return to the surface as “flowback.” After production commences, “produced water” continues to rise from within the formation with brines and residual fracturing fluids. Flowback and the produced water (referred to collectively herein as “wastewater”) must be treated, recycled, and/or disposed by the operator.

Fractious Reactions and Regulatory Developments

One concern often cited by opponents of fracing is contamination, or alleged contamination, of surface and groundwater by contaminated wastewater, fracing’s largest waste product. The amount of water needed for drilling and fracturing varies by shale play and well length, but can range from 3 to 10 million gallons of water during two to five day period of fracturing a well (although reports vary). The rate of return of water utilized in fracing is highest during the first few days after injection, and, depending on the characteristics of the formation, may include anywhere from 3% to 80% of the fluid introduced. Opponents’ concerns frequently center on the chemical additives introduced to fracturing fluids to facilitate the fracing process and to the naturally occurring brines and other materials such as heavy metals (e.g. arsenic, selenium, strontium, and barium) and radionuclides brought to the surface in wastewater from within shale formations. By volume, fracturing fluid consists of 98% to 99.5% water and proppant, and 2% or less of the chemical additives.

In 2013, the Associated Press reported that hundreds of complaints were filed in Pennsylvania, Ohio, West Virginia, and Texas relating to allegations of surface or groundwater contamination, with approximately 400 of those claims filed in Pennsylvania alone. Over the past few years, however, the number of confirmed cases of contamination from fracing activities was substantially lower than alleged.[2] In fact, Lisa Jackson, the EPA Administrator, testified before the U.S. Senate that “there have been no known and proven groundwater contamination events in the U.S. as a result of hydraulic fracturing activities.”[3] With regard to surface water issues, that is a somewhat different story. And, state agencies have increased their enforcement initiatives and focus on potential impacts to the environment from releases to surface water. Perceptions regarding surface water contamination may be aggravated by occasional violations of existing rules by entities such as the former owner of an Ohio oil and gas services contractor that pled guilty in March of 2014 to dumping untreated fracturing fluids into a stormwater drain and the Mahoning River. These activities were investigated and recently addressed by the Ohio Department of Natural Resources and Ohio Environmental Protection Agency.[4]

Not surprisingly, with the increase in claims relating to surface and groundwater contamination being filed across the country and the upsurge in state enforcement of wastewater management practices, there is increased attention being paid by industry on cost-effective compliance measures. This focus is further spurred by the ongoing promulgation of new and more stringent wastewater management rules, chemical disclosure regimes, and, in some cases, bans or effective bans on fracing activities while the impacts of fracing on the environment are studied.

To date, most of the oversight of fracing operations occurs at the state level, with the Federal government cautiously examining whether and how to expand its role in the future. The primary approaches for managing wastewater, while varying by jurisdiction, include underground injection, treatment and discharge into surface waters, and minimization, recycling and re-use.[5]

Produced Water Management Options by Shale Gas Basin[6]

Shale Gas Basin	Water Management Technology	Availability	Comments
Barnett Shale	Class II injection wells	Commercial and non-commercial	Disposal into the Barnett and underlying Ellenberger Group
	Recycling	On-site treatment and recycling	For reuse in subsequent fracturing jobs
Fayetteville Shale	Class II injection wells	Non commercial	Water is transported to two injection wells owned and operated by a single producing company
	Recycling	On-site recycling	For reuse in subsequent fracturing jobs
Haynesville Shale	Class II injection wells	Commercial and non-commercial	
Marcellus Shale	Class II injection wells	Commercial and non-commercial	Disposal into the Barnett and underlying Ellenberger Group
	Treatment and discharge	Municipal wastewater treatment facilities, commercial facilities reportedly contemplated [This method was more common in Pennsylvania in 2009 when this chart was generated.]	Primarily in Pennsylvania
	Recycling	On-site recycling	For reuse in subsequent fracturing jobs
Woodford Shale	Class II injection wells	Commercial	Disposal into multiple confining formations
	Land application		Permit required through Oklahoma Corporation Commission
Antrim Shale	Class II injection wells	Commercial and non-commercial	
New Albany Shale	Class II injection wells	Commercial and non-commercial	

As plaintiff attorneys and regulators become increasingly focused on wastewater management issues, operators must keep a keen eye on the evolution of these regulations and the technologies under development to assist with compliance. Regardless of where fracing occurs, operators should stay abreast of reporting and disclosure obligations, on-site and off-site wastewater management alternatives, and wastewater storage and transportation issues.

I. Reporting and Disclosure Obligations

Chemical disclosure rules represent one of the most prevalent forms of regulation applicable to hydraulic fracturing.[7] Aside from concerns associated with the disclosure of trade secrets, these rules create challenges for developers, operators, and wastewater management firms due to the variation in how they are being implemented in the various states. At one end of the spectrum, states require disclosure of only those chemicals added to base fluids before injection; at the other end of the spectrum, states are requiring disclosure of any chemical returned to the surface whether generated in a subsurface chemical reaction or naturally occurring and returned to the surface with fracing fluids.[8] Some states require disclosure before fracing occurs,[9] while others have a post fracturing disclosure obligation.[10] At a minimum, most states require the disclosure of the Chemical Abstracts Service Registry Number ("CASR #") for chemicals added to base fluids[11] and require some form of disclosure to healthcare professionals and to address spills or leaks should they occur.[12]

Not to be left out, the Federal government is contemplating the implementation of disclosure rules. The Bureau of Land Management ("BLM") proposed regulations in 2013 (replacing its 2012 proposal), which were modeled after Colorado's regulations, for companies fracturing on Federal and Tribal lands.[13] EPA also announced its intention to consider disclosure regulations as well. If the EPA follows the lead of BLM, operators may be required to file disclosures post-fracturing and include: (i) volume of water used; (ii) product name, CASR #, vendor, and description of each chemical ingredient; and (iii) maximum chemical ingredient concentration of each additive in the fracturing fluid. There would be a process by which operators could seek trade secret protection, and the disclosures themselves would occur on FracFocus.[14] BLM's proposal generated 1,348,451 comments and demonstrates the tensions at play between environmental groups (desiring that they be more stringent), states (including a number that characterized the proposed rules as duplicative of their own and unnecessary),[15] and industry[16] (wanting to ensure appropriate protection of trade secrets and minimize the burden on industry) when it comes to fracing regulations.

II. On-site and Off-site Wastewater Management Alternatives

A. Minimization, Recycling and Reuse

On-site minimization, recycling and reuse of wastewater provide viable alternatives to (or at least reduce the need for) storage, transportation, treatment, and off-site disposal of wastewater (especially for flowback). Significantly, these alternatives reduce the quantity of fluid destined for disposal and the potential for impacts to the environment. But, these alternatives are not without challenges.

Minimization and on-site recycling and re-use of wastewater avoid transportation concerns and injection difficulties (discussed below), but implementation can be costly. For hydraulic fractured natural gas wells, water use, and wastewater minimization technologies are still being developed. Recycling technologies themselves can be energy intensive and tend to concentrate residual by-products, which must still be properly managed. To date, filtration, reverse osmosis, ion exchange, and wetland decomposition are all successfully being employed.[17] However, the diversity of geology and water chemistry pose particular challenges to large scale technology development and the adoption of a one-size-fits-all approach.[18] For this reason, some companies have turned to off-site recycling as an alternative means for managing wastewater, but this re-introduces transportation concerns and costs to the equation.[19] Additionally, to re-use wastewater in the fracing operations may require the addition of fresh water if salt concentrations remain high.

The Texas Railroad Commission reports that the primary reason cited by operators for not recycling and reusing wastewater is its expense.[20] When managing up to 10 million gallons of wastewater per production well, costs become a relevant factor. Despite the expense, trends are showing an increase in recycling and re-use. Between 2010 and 2012, operators in central Pennsylvania reportedly transitioned from recycling less than 1% of its wastewater to over 14%.[21] Colorado public radio reported that 2013 marked the first time that Noble Energy completed fracturing in state using recycled water, despite the associated higher costs.[22] And, while less than 10% of wastewater was recycled throughout most of the United States in 2013, operators in Pennsylvania reported recycling and reusing up to 85% of fracturing fluids that year, a result that was driven by more stringent regulations and geology made disposal simply a more expensive option.[23] With Pennsylvania leading the way, other states are starting to influence wastewater management choices through regulation.

Texas adopted rules in 2013 to encourage water conservation efforts throughout the state. The rules eliminate the need for a recycling permit when operators recycle fluid on their own leases or transfer fluids to another operator's lease for recycling.[24] In addition, they established a new approach for reuse of treated fluids in non-well site situations, creating five new categories of commercial recycling permits.[25] The five categories of commercial recycling permits, intended to reflect industry standard, include:

- On-lease Commercial Solid Oil and Gas Waste Recycling;
- Off-lease or Centralized Commercial Solid Oil and Gas Waste Recycling;
- Stationary Commercial Solid Oil and Gas Waste Recycling;
- Off-lease Commercial Recycling of Fluid; and
- Stationary Commercial Recycling of Fluid.

Further, Texas established a tiered approach for reuse of treated fluid — including for non-oil field related uses.[26]

As states continue to influence behavior through regulation, we will likely see more advances in recycling technologies, a corresponding decrease in the use of treatment and underground injection as a means of managing wastewater, and an effort to generally reduce fresh water demands.

B. Wastewater Treatment

Since direct discharge of wastewater from fracing operations to surface waters is prohibited, when wastewater is not recycled or disposed through re-injection (discussed below), it must be treated before being discharged.[27] To accomplish this, operators typically transport wastewater to publically-owned treatment works ("POTW") or private centralized waste treatment facilities ("CWTs"). While the treatment and discharge of fracing wastewater is generally regulated under the federal Clean Water Act, which establishes permitting standards for treatment facilities and water quality standards for water being discharged into surface waters, "[n]o comprehensive set of national standards exists at this time for the disposal of wastewater discharged from natural gas extraction activities [and many POTWs and CWTs] are not properly equipped to treat this type of wastewater."[28] As such, much of the regulation associated with the treatment of fracing wastewater remains with the states. And, not surprisingly, regulation of these facilities varies throughout the United States.

Flowback and produced water poses particular challenges to these facilities because they contains constituents not typically found in POTW influent, including total dissolved solids, bromide, chloride, and radium.[29] These contaminants are often left untouched and discharged from the POTWs into nearby streams and rivers creating problems in the environment and adding ammunition to the arsenal of fracing opponents. CWTs generally do a better job of removing dissolved solids and may be used to "pre-treat" wastewater from fracing for later transportation to POTWs or discharge into surface water. Nonetheless, CTWs are criticized for still failing to remove all contaminants, including bromide, from the waste stream.[30]

The Water Environment Federation ("WEF"), a not-for-profit technical and educational organization representing water quality professions, has encouraged wastewater treatment facilities to coordinate with local regulators before accepting wastewater to ensure compliance with regulations, and to investigate the constituents and any pretreatment performed on wastewater from fracing operations before accepting it. While certainly a viable solution, this begs the following questions:

(1) As regulations and potential penalties or litigation costs increase, will treatment facilities begin rejecting shale gas wastewater?

(2) Will there be increased reliance on minimization and recycling as costs at treatment facilities go up and/or access goes down?

In those states where treatment regulations exist to address fracing wastewater, the approaches employed are varied. Texas and Wyoming are two states with fewer hydraulic fracturing specific wastewater regulations. Pennsylvania, on the other hand, went so far as to ban the treatment of all fracing fluids in POTWs without any pre-treatment and set maximum concentration levels for total dissolved solids and chlorides released from non-exempt CWTs.[31] Ohio also banned the treatment of fracing fluids at POTWs and went one step further to also ban treatment at CWTs. New Jersey is currently evaluating a bill that would prohibit any disposal and treatment of fracturing wastewater generally in the state (the last bill was vetoed by Gov. Chris Christie, where he noted potential inconsistencies with the commerce clause).[32] The bill is reported as favored by environmentalists and opposed by business groups. Given this regulatory diversity, hydraulic fracturing operators must closely examine the existing and developing regulations in their surrounding area to insure that treatment options remain viable alternatives for managing wastewater during the remaining production life of their wells. To the extent states promulgate tighter regulations and/or the elimination of the use of POTWs and CWTs for the treatment of fracing fluids, operators necessarily must transport waste further, turn to underground injection or utilize minimization, recycling and re-use technologies, which ultimately may result in greater advances in these technologies such that they become the more cost effective solution for wastewater management.

C. Reinjection/Disposal Wells

When operators seek to dispose of wastewater with little or no treatment, it is predominantly done through underground injection. Reports indicate that an increasing number of wastewater disposal wells are being approved in regions where there is significant fracing activity.[33] However, these wells are best suited for areas with porous sedimentary rock, such as the Great Plains and in the mid-continent, with conditions being less favorable in New England, the Appalachian Mountains and along the Atlantic Coast. Through the use of Class II disposal wells,[34] operators may re-inject water, which is no longer potable, underground into a closed reservoir. Currently, there are approximately 168,000 Class II wells in 31 states across the U.S. These are classified as (i) salt water disposal wells, enhanced oil recovery wells, and hydrocarbon storage wells.[35] Because there are extensive underground injection control (UIC) regulations in place at both the federal and state level, such disposal is highly regulated and arguably creates the least risk of any wastewater management alternative for the environment. However, in recent years this view has come under debate due to an uptick in seismic activity noted in the vicinity of these deep injection well locations. Hence, underground injection is facing a new level of scrutiny with seismic activity fueling the litigation flames and generating regulatory developments.

At the federal level, BLM has proposed regulations that would require operators on Tribal and Federal lands to submit a plan for handling and disposing of wastewater as part of submitting the notification for approval of hydraulic fracturing before commencement of operations.[36] That plan would require, for example, operators to provide for BLM approval information about handling recovered fluids, estimates of volumes of fluid to be recovered, management methods planned, and proposed disposal methods.[37] Among the states, there is a range of activities with certain states developing regulations specifically designed to address seismic activity concerns, while others are actively studying potential links between the use of wastewater disposal wells and seismic activity. To date, at least two states (Arkansas and Vermont) and several cities have banned wastewater underground injection wells altogether.[38]

Ohio had temporarily banned the injection of wastewater in disposal wells around Youngstown after concerns were raised regarding their link to earthquake activity.[39] Interestingly, while legislation was pending in 2013 to permanently ban Class II injection wells in the area, citizens of Youngstown twice voted against an outright ban on fracing activities within the city limits.[40] As concerns regarding seismic activity continue, however, Ohio has developed strict rules for shale gas wastewater disposal and transport — specifically geared towards addressing concerns that hydraulic fracturing / wastewater disposal from fracturing could contribute to earthquakes.[41] The Ohio regulations, among other things, (1) prohibit any new wells from being drilled in the Precambrian basement rock formation; (2) require well operators to submit extensive geological data before drilling; and (3) require using pressure and volume monitoring devices with automatic shut-off switches and electric data recorders.[42] Ohio has asserted that its wastewater disposal rules are among the toughest in the nation, and tied the rules to concern over seismic activity.[43] Despite the concerns, Ohio continues to rely primarily on underground injection for the management of fracturing fluid wastewater and accepts fluids transported from other states.[44] Ohio's approach to wastewater management reflects a relatively stringent approach to regulation that permits ongoing operations.

In Texas, underground injection remains a viable alternative for wastewater management while citizen groups and the State closely examine the potential for links between underground injection and seismic activity.[45] At present, the Texas Railroad Commission continues to actively permit and inspect disposal and injection wells, and as of 2013, the State had approximately 27,500 active, permitted oil and gas injection wells and 7,500 disposal wells.[46] A New York Times article described how the State is balancing concerns regarding the proliferation of disposal wells against the risks associated wastewater disposal.[47] In the article, representatives of the Texas Railroad Commission emphasized its primacy in UIC issues and stated that, thus far, it had not identified a significant correlation between seismic activity and injection, although it was continuing to study the issue and stated it could suspend or terminate permits if studies conclude a problem exists.[48]

Unlike Ohio and Texas, Arkansas implemented a ban on the use of wastewater disposal wells due to concerns associated with seismic activity.[49] Citizens in Arkansas were among the first to file claims in court based on allegations of property damage resulting from shale gas wastewater injection and associated local seismic activity.[50] These cases also were among the first where compensation was paid by drilling companies based on such allegations.[51] As these cases settled, new ones were filed, demonstrating a need for industry to monitor such developments and adopt a consistent litigation strategy.[52] Even more recently, residents and officials in Brady Township, Pennsylvania challenged an EPA UIC permit before the Environmental Appeals Board, on the basis that EPA's failure to weigh risks of seismic activity was inconsistent with its responsibilities under the Safe Drinking Water Act ("SDWA"). The litigation arose after EPA issued a report with recommendations on assessing potential seismic activity during the permitting process. That report noted that regulators should consider and take steps to minimize seismic risks, although it added that "the agency is 'unaware' of any contamination of underground sources of drinking water (USDWs) resulting from seismicity related to underground injection."[53] In addition, the EPA was noted as stating that it has no evidence that UIC well injection has led to contamination.[54] The report and recent litigation highlight one of the latest battle grounds for the industry.

On the regulatory front, the various competing strategies for managing wastewater underscores how regional risk/benefit calculations and local politics may influence regulatory developments and suggests the importance of and participating in local rulemakings and educating regulators (where appropriate) on actual risks and best management practices.

III. Wastewater Storage and Transportation Issues

A. Storage

Storage of wastewater is generally required at most well sites — particularly on a temporary basis before arrangements are made for recycling, re-use, or disposal. As with all other aspects of wastewater management, there is increased focus and regulation of these activities in connection with fracing operations. For example, North Dakota only allows temporary use of lined pits and requires removal of wastewater within 72 hours. Pennsylvania also authorizes the use of lined pits and sets permeability and thickness standards, but Colorado and Wyoming require tanks be used for produced water from new well sites within a specific distance of drinking supplies.[55] Vermont's ban of fracing in Act No. 152 includes a ban on disposal or storage of wastewater in state.

At the Federal level, BLM's proposal would regulate storage and provide that all recovered fluids be stored in tanks or lined pits."[56] BLM has acknowledged comments regarding the use of storage pits and protections (such as the requirement that pits be double-lined and equipped with leak detection systems), however, highlighted that its 2012 Instruction Memorandum included Best Management Practices for reducing risks that might be caused by storage of wastewater.[57]

When it comes to litigation, storage facilities have provided yet another avenue for attack. However, the Fourth Circuit recently affirmed a district court's decision granting summary judgment for defendants in a case where the plaintiff claimed trespass based on above-ground impacts from waste disposal pits. The Fourth Circuit stated that the surface activities were disclosed in the wastewater permits and to establish a prima facie case of trespass, the plaintiffs needed to show that the waste disposal pits imposed a "substantial burden" on the surface or that the defendants surface use was not "reasonably necessary" to their drilling operations.[58] On the other hand, in Pennsylvania at least two Judges deferred ruling on motions to dismiss strict liability claims associated with the use of storage impoundments, leaving open the door for the bar to be lowered when plaintiffs pursue damage claims in the future.[59]

B. Transportation Issues

Regardless of whether operators choose to treat, recycle, or dispose of wastewater, it is likely that transportation will be required over at least some distance. Transportation today generally occurs via rail or truck from on-site storage facilities to recycling, treatment centers, or disposal locations.[60] Depending on the fracing location, transportation costs may play a critical role in the assessment of wastewater management alternatives. Given the limitation on use of wastewater treatment facilities and the limited number of re-injection wells in Pennsylvania, for example, out of state transport plays a primary role in the management of wastewater from operations in that state. However, as transportation and other regulatory standards become more stringent in Ohio and New Jersey reconsiders a ban on wastewater treatment, disposal wastewater management decisions for operators in the Marcellous shale may change.[61] In fact, as noted above operators in Pennsylvania have already turned increasingly to recycling and re-use alternatives. Operators that rely on transportation for wastewater management must continue to re-examine overlapping regulatory regimes and monitor the litigation landscape to minimize risks to future operations.

Primary transportation concerns cited by fracing opponents relate to spills or leaks that occur in transit. These concerns are fueled by incidents such as the truck that crashed into a rockwall in 2012 while transporting treated fracing fluid to a gas well site and reportedly spilled an excess of 4,600 gallons of wastewater in Lycoming County, Pennsylvania,[62] or the truck that tipped over and spilled approximately 160 gallons of fracturing fluid in Casper, Wyoming in 2013.[63] While it is unclear whether the trucking companies in either of these situations have been sued, significant press was generated and litigation could well be forthcoming. In Oklahoma, plaintiffs did file a putative class action against a number of companies in state court for issues relating to the generation, transportation and disposal of coal combustion waste and fracing wastewater. In that case, however, the court found that truckers hauling fluid waste should not be held strictly liable for transporting waste fluids.[64] In other jurisdictions, the result could come out differently.

As the debates rage on regarding safety concerns, states are developing more stringent regulations to cover in-land/overland transportation of wastewater from fracturing operations. Ohio, for example, now requires fracing wastewater haulers to install electronic transponders that monitor all shipments. New placarding with regard to cargo contents is also under consideration in several states. Additionally, a number of local municipalities have taken it on themselves to ban the import of fracing wastewater into or through their jurisdictions. Cities prohibiting the transport of fracing fluids include Niagara Falls City, NY and Lafayette, Colorado.[65]

At the federal level, the Coast Guard sought comments in the fall of 2013 on a proposal to authorize barge owners to transport wastewater via inland waterways in Ohio, Texas, and Louisiana.[66] The Coast Guard reported that the wastewater could not be treated as "listed cargo" for bulk transport by tank vessel due to the varying chemical composition of the fluid and potential inclusion of radioactive isotopes or other hazardous materials. Over a thousand comments were filed in response to the inquiry with groups opposing water transport and others espousing it as safer than other means of transportation, such as truck transport.[67] This inland water transport could provide an additional solution for operators and wastewater management entities, although it would be accompanied by yet another overlapping regulatory regime.

As with all other aspects of regulation relating to fracturing issues, there is a patchwork of approaches that vary from non-invasive to outright bans. Regardless of where operations occur, however, transportation is yet another issue that will influence how operators mange wastewater in years to come.

IV. Federal Government Is Hesitant to Wade Into the Fray

As reflected above, much (though not all) regulation of fracturing wastewater occurs at the state level. The EPA and other Federal regulators (such as the BLM and Occupational Safety and Health Administration ("OSHA")) have taken a cautious role — proposing limited rules and guidance thus far. The EPA has spent substantial time studying fracing, however, given the various state differences in approach and perspectives, industry focus, and ambiguous scientific studies, it has been reluctant to wade into the fray. This year, however, EPA appears to be sticking its toe in the water. The long awaited results from an EPA fracing study are expected, action could be taken on BLM's regulations, and EPA will issue an advance notice of proposed rulemaking on chemical disclosures by May/June. The EPA stated that it "intends to first develop an Advance Notice of Proposed Rulemaking (ANPRM) and initiate a stakeholder process to provide input on the design and scope of the [Toxic Substances Control Act] TSCA reporting requirements that would be included…."[68]

Various factors may be contributing to the Federal government's wariness of embroiling itself in fracing oversight/disputes. First, per the Energy Policy Act of 2005 ("EPAct 2005"), the SDWA program on UIC excludes regulation of fracing fluids — except when diesel fuels are used.[69] Similarly, the Resource Conservation and Recovery Act ("RCRA") exempts oil and gas wastes from regulation as a hazardous waste under Subtitle C. Second, under the UIC Program, States, Territories, and Tribes may submit an application to the EPA to obtain primary enforcement authority over compliance with program requirements.[70] So far, the EPA reports that it has "primacy" in 33 States and three Territories and that it shares responsibility with only seven States/Tribes.

Another fact to be considered is that the EPA's efforts to litigate wastewater matters to date have not been an unmitigated success. The EPA's probe and emergency order against Range Resources Corporation for water contamination in Texas, for example, was questioned by the Texas Railroad Commission in 2011 and examined in 2013 for an over-reach of authority.[71] The EPA ultimately settled the case and withdrew its order against the company.[72] In Pennsylvania — a state with significant fracing and state level rules impacting fracing — the EPA is the state National Pollutant Discharge Elimination System ("NPEDS") permitting authority for all regulated discharges and its grant of permits has led it to attract the ire of litigators claiming harm from fracing in their areas.[73] There is also a divide between states (primarily in the Northeast) seeking greater Federal oversight and states which emphasize their desire and right to maintain autonomy in their regulation over fracturing issues.[74] This litigation exposure and state divide places the EPA between a rock and a hard place, where doing less rather than more may be safer for now.

However, despite what some environmental groups indicate, the EPA and the Federal government have not stayed completely out of fracing regulation. CWA effluent guidelines prohibit on-site direct discharge of wastewater from fracturing operations. This means that where wastewater is not recycled/reused/reinjected on-site, the wastewater must be treated.[75] Additionally, BLM regulations for fracing activities on Federal and Tribal are now pending. Further, the EPA completed a report in

January 2014, as referenced above, including guidance for on assessing potential seismic risks during UIC permitting. Even more recently, the EPA provided a pre-publication copy of the anticipated advance notice of proposed rulemaking ("ANPR") on Hydraulic Fracturing Chemicals and Mixtures under the Toxic Substances Control Act ("TSCA") to the White House Office of Management & Budget ("OMB"). The EPA anticipates filing the ANPR in the federal register by the end of May or June. There will then be an opportunity for comments. It will be important to monitor this latest rulemaking effort as it matures and for stakeholders to actively voice their positions as part of the record (particularly in light of probable overlapping Federal and state rules, similar to the BLM proposal).[76]

While the Federal government appears to be walking a fine line that favors circumspect involvement in fracing regulation, it is moving forward, albeit cautiously, due to (i) limits to the scope of its oversight; (ii) deference to States and Tribes; and (iii) wariness of becoming a lightning rod for litigation in an area where technology and information is still evolving.

V. Conclusion

Fracturing wastewater management issues are not going away. Yet, regulations seem to remain in somewhat nascent stages as discourse continues on (i) reasonably feasible best management practices; (ii) potential advances in hydraulic fracturing technology; (iii) our scientific understanding of the impact of the fracturing processes and wastewater management practices; and (iv) overlapping regulatory authority. Active participation in pending proceedings is one significant way for industry participants to help ensure that reasonable feasible regulatory requirements which also account for overlapping legal regimes are implemented. In addition, a robust culture of compliance and organized compliance programs can help entities manage their existing obligations. Industry, states, and other interested parties have a multitude of interacting legal and practical issues to monitor and navigate as part of the evolving nature of hydraulic fracturing wastewater management.

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If you have any questions concerning these developing issues, please do not hesitate to contact any of the following Paul Hastings Washington, D.C. lawyers:

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[1] *Common Hydraulic Fracturing Questions and Answers*, BLM (last visited March 15, 2014), *available at* http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/elko_field_office/information/communications_forum/03_14_13.Par.26009.File.dat/Hydraulic%20Fracturing%20FAQ.pdf. *See also* Colorado Oil and Gas Conservation Commission (COGCC). (n.d.). Gasland Statement. Retrieved from http://cogcc.state.co.us/library/GASLAND%20DOC.pdf.

[2] *See* Kevin Begos, *Oil and gas drilling pollutes well water, states confirm*, http://usnews.nbcnews.com/_news/2014/01/05/22190011-oil-and-gas-drilling-pollutes-well-water-states-confirm?lite (including discussion of empirical data, as well as subjective characterization regarding environmental risks of hydraulic fracturing).

[3] *Common Hydraulic Fracturing Questions and Answers*, BLM (last visited March 15, 2014), *available at*http://www.blm.gov/pgdata/etc/medialib/blm/nv/field_offices/elko_field_office/information/communications_forum/03_14_13.Par.26009.File.dat/Hydraulic%20Fracturing%20FAQ.pdf

[4] *See US v. Lupo et al.,* case number 4:13-cr-00113 (N.D. Oh. 2014); *and* Kira Lerner, *Drilling Co. Owner Pleads Guilty To Fracking Waste Dump*, Law360 (Mar. 24, 2014), *available at* http://www.law360.com/energy/articles/521436?nl_pk=2d8a24a2-2e48-4278-b494-8d51a20f6f32&utm_source=newsletter&utm_medium=email&utm_campaign=energy .

[5] *See*, John A. Veil, *Final Report: Water management Technologies Used by Marcellus Shale Gas Producers*, U.S. Department of Energy National Energy Technology Laboratory, at p. 13 (July 2010), *available at* http://fracfocus.org/sites/default/files/publications/water_management_in_the_marcellus.pdf.

[6] *See also,* Modern Shale Gas Development in the United States: A Primer, Ground Water Protection Council and ALL Consulting, at Exhibit 39 (April 2009), *available at* http://fracfocus.org/sites/default/files/publications/shale_gas_primer_2009.pdf.

[7] FracFocus, which is managed by the Ground Water Protection Council and Interstate Oil and Gas Compact Commission, is the national hydraulic fracturing chemical registry. The chemical disclosure registry at FracFocus.org is used by many states and operators to disclose chemical additives. *See e.g.* FracFocus.org (including registration of over 60,000 well sites).

[8] *See e.g.* Kansas, pending regulation K.A.R. 82-3-1400-1402.

[9] *See e.g.* Arkansas at 178 Ark. Code §001, Rule B-19; Idaho at Idaho Admin. Code Rule 20.07.02.056; West Virginia at W.Va. Code § 22-6A (also applying post-fracturing requirements); and Wyoming at Chapter 3, Section 45 of Wyoming drilling rules (including the same). *See also* Colorado at 2 Colo. Code Regs. §404-1:205A (applying requirements after fracturing begins).

[10] *See e.g.* Louisiana La. Admin. Code Title 43: Part XIX, Section 118, Mississippi at Mississippi Rule 26, Montana at Mont. Admin. Rule 36.22.1015-1016., New Mexico at New Mex. Code Rule § 19.15.16.19(B), North Dakota at North Dakota Admin. Code § 43-02-03-27.1. , Ohio at Ohio Rev. Code § 1509.10., Oklahoma at OAC 165:10-3-10(b), Oregon at Oil and Gas Rule 632-010-0017; *and* Utah at Utah Ann. Code § 649-3-39.

[11] *Supra* n. 7-9.

[12] *See e.g.* Montana, at Mont. Admin. Rule 36.22.1015-1016.; Nebraska at Nebraska Proposed Oil and Gas Code Rule 3.043 and 3.044; Pennsylvania at 58 Pa.C.S. § 3222-3222.1; and Texas at 16 TAC § 3.29.

[13] BLM regulates hydraulic fracturing under 43 C.F.R. § 3160.

[14] *See* 43 CFR 3162.3-2 Revisions.

[15] *See e.g.* Laura Hancok, *Wyoming delegation: Exempt state from fracking rules*, Wyoming Star Tribune (Aug. 20, 2013), *available at* http://trib.com/business/energy/wyoming-delegation-exempt-state-from-fracking-rules/article_f2636973-f4a2-5738-aa1f-1432706b2b6f.html; *see also*, Pete Kasperowicz, *House votes to block federal fracking rules*, The Hill (Nov. 20, 2013), *available at*, http://thehill.com/blogs/floor-action/votes/190977-house-votes-to-block-federal-fracking-rules (regarding potential legislation to exclude states with existing rules).

[16] *See e.g.* Julia Bell, *Oil, Gas Producers: BLM Hydraulic Fracturing Rule Unnecessary; Undermines State Authority*, IPAA (Aug. 22, 2013), *available at* http://www.ipaa.org/press-releases/oil-gas-producers-blm-hydraulic-fracturing-rule-unnecessary-undermines-state-authority/.

[17] *Fluid Recycling*, FracFocus.org, *available at* http://fracfocus.org/hydraulic-fracturing-how-it-works/drilling-risks-safeguards.

[18] David Wethe and Peter Ward, *Fracking Bonanza Eludes Wastewater Recycling Investors* (Nov. 25, 2013), *available at* http://www.bloomberg.com/news/2013-11-26/fracking-bonanza-eludes-wastewater-recycling-investors.html.

[19] *Id.*

[20] *Saltwater Disposal Wells Frequently Asked Questions (FAQs),* Texas Railroad Commission (last updated June 25, 2013), *available at* http://www.rrc.state.tx.us/about/faqs/saltwaterwells.php.

[21] Scott Detrow, *Fracking Fluid ,* NPR (Nov. 19, 2012), *available at* https://stateimpact.npr.org/pennsylvania/2012/11/19/more-drillers-are-recycling-their-fracking-fluid/ . *See also*, Alison Sider, Russell Gold, and Ben Lefebvre, *Drillers Begin Reusing 'Frack Water': Energy Firms Explore Recycling Options for an Industry That Consumes Water on Pace With Chicago* (Nov. 12, 2012).

[22] Grace Hood, *Recycled Fracking Fluid? CO Companies Look To Ease Water Worries*, KUNC (Jul. 16, 2013), *available at* http://kunc.org/post/recycled-fracking-fluid-co-companies-look-ease-water-worries.

[23] David Wethe and Peter Ward, *Fracking Bonanza Eludes Wastewater Recycling Investors* (Nov. 25, 2013), *available at* http://www.bloomberg.com/news/2013-11-26/fracking-bonanza-eludes-wastewater-recycling-investors.html.

[24] *See e.g. Railroad Commission Today Adopts New Recycling Rules to Help Enhance Water Conservation By Oil & Gas Operators*, Texas Railroad Commission (Mar. 26, 2013), *available at* http://www.rrc.state.tx.us/pressreleases/2013/032613.php.

[25] *Id.*

[26] *Id.*

[27] CWA Effluent Guidelines. 40 C.F.R § 435.32.

[28] *See Natural Gas Extraction - Hydraulic Fracturing*, EPA, (last updated Mar. 14, 2014), *available at* http://www2.epa.gov/hydraulicfracturing#swdischarges.

[29] Adrienne Beckman, *et. al.*, *Considerations for Accepting Fracking Wastewater at Water Resource Recovery Facilities*, Water Environment Federation, *available at* http://www.wef.org/uploadedFiles/Access_Water_Knowledge/Wastewater_Treatment/Fracking%20Factsheet%20Final.pdf (providing that the steps to accepting fracking wastewater should be: (i) Discuss NPDES requirements with state regulatory agencies and the EPA, determine fracking wastewater constituents, determine pretreatment undergone, and consider effects on both final effluent quality and biosolids).

[30] *Id.*; *and* Kyle J. Ferrar, *et. al.*, Assessment of Effluent Contaminants from Three Facilities Discharging Marcellus Shale Wastewater to Surface Waters in Pennsylvania, (Mar. 4, 2013) (Environ. Sci. Technol., DOI: 10.1021/es301411q), *available at*, http://cgi.cen.acs.org/cgi-bin/cen/trustedproxy.cgi?redirect=http://pubs.acs.org/doi/abs/10.1021/es301411q?source=cen.

[31] PA Chapter 95 Rules http://www.pacode.com/secure/data/025/chapter95/chap95toc.html.

[32] *See e.g.* Wayne Perry, *NJ eyes ban on fracking waste from any state*, Miami Herland (Mar. 17, 2014), *available at* http://www.miamiherald.com/2014/03/17/4000938/nj-eyes-ban-on-fracking-waste.html.

[33] Terrance Henry and Kate Galbraith, *As Fracking Proliferates, So Do Wastewater Wells*, (Mar. 28, 2013), *available at*http://www.nytimes.com/2013/03/29/us/wastewater-disposal-wells-proliferate-along-with-fracking.html?pagewanted=all&_r=0

[34] Class II wells inject fluids associated with oil and natural gas production. The EPA notes that there are approximately 144,000 Class II wells in the U.S., and that most oil and gas injection wells are in Texas, California, Oklahoma, and Texas. Class II Wells - Oil and Gas Related Injection Wells (Class II), EPA.Gov (last updated May 9, 2012), *available at* http://water.epa.gov/type/groundwater/uic/class2/.

[35] *Injection Wells: An Introduction to Their Use, Operation, & Regulation*, Groundwater Protection Council, at pp. 13-16 (Sept. 2013), *available at* http://fracfocus.org/sites/default/files/publications/injection_wells-_an_introduction_to_their_use_operation_and_regulation.pdf.

[36] BLM Rule, 43 CFR § 3162.3-3(d)(5).

[37] *Id.*, *and Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands*, Docket No. RIN 1004-AE26, BLM, at p. 56, *available at* http://www.blm.gov/pgdata/etc/medialib/blm/wo/Communications_Directorate/public_affairs/hydraulicfracturing.Par.91723.File.tmp/HydFrac_SupProposal.pdf.

[38] Vermont has also banned treatment, disposal, or storage of fracturing fluids. Vermont Act No. 152 (H. 464), 2011-2012 Legislative Session, An Act Relating to Hydraulic Fracturing Wells for Natural Gas and Oil Production, http://www.leg.state.vt.us/database/status/summary.cfm?Bill=H.0464&Session=2012 ("Act No. 152").

[39] Henry Fountain, *Disposal Halted at Well After New Quake in Ohio,* NY Times (Jan. 1, 2012), *available at* http://www.nytimes.com/2012/01/02/science/earth/youngstown-injection-well-stays-shut-after-earthquake.html?_r=2.

[40] Barclay Nicholson, *Fracking Bans in Colo. And Ohio May Be Unenforceable*, Law360 (Nov. 20, 2013), *available at* http://www.law360.com/articles/488030/fracking-bans-in-colo-and-ohio-may-be-unenforceable (noting failed attempts to pass a local Ohio ban in two cities and highlighting potential unenforceability of bans that are passed).

[41] *Ohio Considers Rules for Fracking Wastewater Sites*, Associated Press (Oct. 11, 2013), *available at* http://www.ohio.com/news/break-news/ohio-considers-rules-for-fracking-wastewater-sites-1.435899;*Ohio Department of Natural Resources permits wastewater injection wells in the state,* Ohio.gov Department of Natural Resources, (Mar. 9, 2012), *available at* http://www.ohiodnr.com/home_page/NewsReleases/tabid/18276/EntryId/2711/Ohios-New-Rules-

for-Brine-Disposal-Among-Nations-Toughest.aspx (Noting, "The comprehensive list of proposed new regulations includes:

Requires a review of existing geologic data for known faulted areas within the state and a prohibition on locating new Class II disposal wells within these areas;

Requires a complete suite of geophysical logs…;

Authority for ODNR to require the plugging with cement of wells penetrating into the Precambrian basement rock and prohibiting injection into the Precambrian basement rock;

Requires the submission, at time of permit application, of any information available concerning the existence of known geological faults within a specified distance of the proposed well location, and submission of a plan for monitoring any seismic activity that may occur;

Evaluates the potential for conducting seismic surveys;

Requires a measurement or calculation of original down hole reservoir pressure prior to initial injection;

Requires conducting a step-rate injection test to establish formation parting pressure and injection rates;

Requires the installation of a continuous pressure monitoring system, with results being electronically available to ODNR for review;

Requires the installation of an automatic shut-off system set to operate if the fluid injection pressure exceeds a maximum level to be set by ODNR; and

Requires the installation of an electronic data recording system for purposes of tracking all fluids…."

42 Ohio Admin. Code 1501:9-3.

43 *Id.*

44 Michael Kiparsky and Jayni Foley Hein, *Regulation of Hydraulic Fracturing in California: A Wastewater and Water Quality Perspective* (April 2013), *available at* http://www.law.berkeley.edu/files/ccelp/Wheeler_HydraulicFracturing_April2013(1).pdf.

45 E.g. Cliff Frohlich, Eric Potter, Chris Hyward, Brian Stump, *Dallas-Fort Worth earthquakes coincident with activity associated with natural gas production*, The Leading Edge (Mar. 2010), *available at* http://smu.edu/newsinfo/pdf-files/earthquake-study-10march2010.pdf.

46 *Saltwater Disposal Wells Frequently Asked Questions (FAQs)*, Railroad Commission of Texas, (last updated June 25, 2013), *available at* http://www.rrc.state.tx.us/about/faqs/saltwaterwells.php.

47 Terrance Henry and Kate Galbraith, *As Fracking Proliferates, So Do Wastewater Wells*, (Mar. 28, 2013), *available at* http://www.nytimes.com/2013/03/29/us/wastewater-disposal-wells-proliferate-along-with-fracking.html?pagewanted=all&_r=0

48 *Saltwater Disposal Wells Frequently Asked Questions (FAQs)*, Railroad Commission of Texas, (last updated June 25, 2013), *available at* http://www.rrc.state.tx.us/about/faqs/saltwaterwells.php.

49 *See Arkansas commission votes to shut down natural gas drilling wastewater wells*, Associated Press (July 27, 2011), *available at* http://www.syracuse.com/news/index.ssf/2011/07/arkansas_commission_votes_to_s.html.

50 Hearn v. BHP Billiton Petroleum (Fayetteville), 4:11-cv-0474 (E.D. Ark.).

51 Mica Rosenberg, *Arkansas homeowners settle suit charging fracking wastewater caused quakes*, Reuters (Aug. 28, 2013), *available at* http://www.reuters.com/article/2013/08/28/us-usa-fracking-quakes-idUSBRE97R16320130828.

52 *Lawsuit blames fracking for Arkansas earthquakes*, UPI (Feb. 19, 2014), *available at* http://www.upi.com/Top_News/US/2014/02/19/Lawsuit-blames-fracking-for-Arkansas-earthquakes/UPI-32591392857700/.

53 Novel Suit Seeks To Mandate EPA Review Of Seismic Risks For UIC Permits, InsideEPA (Mar. 28, 2014) (discussing litigation *In re: Windfall Oil and Gas* and EPA report *Minimizing and Managing Potential Impacts of Injection-Induced Seismicity from Class II Disposal Wells: Practical Approaches*" (Jan. 17, 2014)).

54 *Id.* (noting that the EPA report suggests a "decision model" for assessing potential risk of seismicity.

55 U.S. Government Accountability Office, *Unconventional Oil and Gas Development: Key Environmental and Public Health Requirements*, GAO-12-874, Sept. 2012, p. 58, *available at* http://www.gao.gov/assets/650/647782.pdf.

56 BLM Rule, 43 CFR § 3162.3-3(h).

[57] *See* BLM Instruction Memorandum No. 2013-033, 1110/2800/3100/3200 (230/300/310/350) P, *available at* http://www.blm.gov/wo/st/en/info/regulations/Instruction_Memos_and_Bulletins/national_instruction/2013/IM_2013-033.html.

[58] *See* Whiteman v. Chesapeake Appalachia, L.L.C., 2013 WL 4734969 (4th Cir. 2013), *available at* http://www.google.com/url?sa=t&rct=j&q=&esrc=s&frm=1&source=web&cd=2&cad=rja&uact=8&ved=0CC4QFjAB&url=http%3A%2F%2Fwww.ca4.uscourts.gov%2Fopinions%2FPublished%2F121790.p.pdf&ei=3iclU7iWL4TE0gH73YHQCg&usg=AFQjCNF5DcnHUMfQ9Z_0fAcl9qK1AoUApA. *See also*, Nathan Bass, *Fourth Circuit affirms Judge Stamp in trespass suit against Chesapeake*, West Virginia Record (Sept. 10, 2013), *available at* http://wvrecord.com/news/262413-fourth-circuit-affirms-judge-stamp-in-trespass-suit-against-chesapeake.

[59] *Berish v. Southwestern Energy Prod. Co*., 763 F. Supp. 2d 702 (M.D. Penn. 2011), *available at* http://scholar.google.com/scholar_case?case=6362610872032719782&q=763+F.+Supp.+2d+702&hl=en&as_sdt=2,33 ; *and Fiorentino v. Cabot Oil & Gas Corp*., 750 F. Supp. 2d 506 (M.D. Penn. 2010), *available at*http://scholar.google.com/scholar_case?case=9722809431329695149&q=750+F.Supp.2d+506&hl=en&as_sdt=2,33

[60] *See e.g. Injection Wells: An Introduction to Their Use, Operation, & Regulation*, Groundwater Protection Council, at pp. 13-16 (Sept. 2013), *available at* http://fracfocus.org/sites/default/files/publications/injection_wells-_an_introduction_to_their_use_operation_and_regulation.pdf.

[61] *See also*, *Marcellus Shale Wastewater Issues in Pennsylvania—Current and Emerging Treatment and Disposal Technologies,* Penn State (2011), *available at* http://extension.psu.edu/natural-resources/water/marcellus-shale/waste-water/current-and-emerging-treatment-and-disposal-technologies (summarizing treatment/disposal options for flowback water in Pennsylvania and their relative advantages and disadvantages).

[62] Scott Detrow, *Truck Spills Fracking Fluid In Lycoming County*, NPR (Sept. 26, 2012), *available at* http://stateimpact.npr.org/pennsylvania/2012/09/26/ap-truck-spills-fracking-fluid-in-lycoming-county; Scott Detrow, *Lycoming County Fracking Spill: Truck Belongs To Spill Response Company*, NPR (Sept. 26, 2012), *available at* http://stateimpact.npr.org/pennsylvania/2012/09/26/lycoming-county-fracking-spill-truck-belongs-to-spill-response-company/; Terrence Henry and Kate Galbraith, *As Fracking Proliferates, So Do Wastewater Wells*, NYTimes (Mar. 28, 2013), *available at*http://www.nytimes.com/2013/03/29/us/wastewater-disposal-wells-proliferate-along-with-fracking.html?pagewanted=all&_r=0.

[63] Leah Todd, Overturned semitrailer, fracking fluid spill shut down busy Casper intersection, Star-Tribune (May 30, 2013), *available at* http://trib.com/news/local/casper/overturned-semitrailer-fracking-fluid-spill-shut-down-busy-casper-intersection/article_002d4785-ace1-5741-8726-5eadf0b729bc.html.

[64] *Reece v. AES Corp*., Case No. No. CIV-12-0457-JH (E.D. Okla. Jan. 8, 2014).

[65] Mireya Navarro, Wastewater Becomes Issue in Debate on Gas Drilling, NY Times (May 3, 2012), *available at* http://www.nytimes.com/2012/05/04/nyregion/wastewater-is-an-issue-in-hydrofracking.html ; Sara Peters, *Year-In-Review: Fracking developments from 2013*, (Jan. 2, 2014), *available at* http://www.law360.com/articles/494634.

[66] *Carriage of Conditionally Permitted Shale Gas Extraction Waste Water in Bulk*, Docket ID: USCG-2013-0915 (Oct. 30, 2013), *available at* http://www.regulations.gov/#!docketBrowser;rpp=25;po=0;D=USCG-2013-0915; http://eponline.com/articles/2013/12/01/barge-shipments-of-fracking-waste-water-opposed.aspx.

[67] *Id.*

[68] The ANPRM will likely be published in August 2014 and is now pending. *See Hydraulic Fracturing Chemicals; Chemical Information Reporting under TSCA section 8(a) and Health and Safety Data Reporting under TSCA section 8(d)*, EPA, Docket No.: EPA-HQ-OPPT-2011-1019 *available at* http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2070-AJ93?opendocument.

[69] UIC Class II permitting guidance exists when diesel fuels are used in the fracking process http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/hydraulic-fracturing.cfm.

[70] 40 CFR Part 145.

[71] Eric Waeckerlin, *The Texas Railroad Commission Finds EPA's Claims Against Range Resources Without Merit* (Mar. 11, 2011), *available at,* http://www.frackinginsider.com/litigation/the-railroad-commission-of-texas/ ; Mark Drajem, *EPA's Fracking Probe of Range Resources Met Rules, Review Says*, Bloomberg (De. 25, 2013), *available at* http://www.bloomberg.com/news/2013-12-24/epa-fracking-probe-of-range-resources-met-requirements-ig-says.html.

[72] Id.

[73] *See e.g.* Eliza Griswold, *The Fracturing of Pennsylvania*, NYTimes (Nov. 17, 2011), *available at* http://www.nytimes.com/2011/11/20/magazine/fracking-amwell-township.html?pagewanted=all.

[74] http://www.oag.state.ok.us/oagweb.nsf/0/23B407A5F6B5131886257B600077ACF1!OpenDocument (2013) (stating that when the EPA declined to regulate methane emissions from oil and gas facilities, "northeastern states of New York, Connecticut, Delaware, Maryland, Rhode Island, Vermont and Massachusetts disagreed with the EPA's decision and filed a notice of intent to sue the EPA for backing off of new oil and gas regulations"; also asserting opposition by States with significant fracking activity of a potential suit or "sue and settle" strategy to generate EPA oversight where other States disagree or lack input).

[75] General Permit No. CAG280000 (2014 NPDES General Permit), *available at* http://www.epa.gov/region9/water/npdes/pdf/ca/offshore/general-permit.pdf (including a requirement to maintain an inventory of the chemicals used to formulate well treatment, completion and workover fluids, and if there is a discharge of the fluids, to report the chemical formulation with the quarterly discharge monitoring report). The CWA was also recently used as the basis for the EPA's exercise of oversight into off-shore drilling in California, and thus exhibits its potential for use to expand Federal oversight in the area of hydraulic fracturing (frequently thought of as a province of the states).

[76] *See Hydraulic Fracturing Chemicals; Chemical Information Reporting under TSCA section 8(a) and Health and Safety Data Reporting under TSCA section 8(d)*, EPA, Docket No.: EPA-HQ-OPPT-2011-1019 *available at* http://yosemite.epa.gov/opei/rulegate.nsf/byRIN/2070-AJ93?opendocument.