DRILLING INTO HYDRAULIC FRACTURING AND SHALE GAS DEVELOPMENT: A TEXAS AND FEDERAL ENVIRONMENTAL PERSPECTIVE

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I. INTRODUCTION

Recently, a respected energy economist stated that energy self-sufficiency is now in sight and that within a decade, the U.S. will no longer need to import crude oil and will be a natural gas exporter.[1] According to one oil and gas executive, by 2020, the U.S. overall will be the largest hydrocarbon producer in the world; bigger than Russia or Saudi Arabia.[2] Small energy companies using hydraulic fracturing, along with horizontal drilling, are unlocking vast oil and natural gas deposits trapped in shale all over the United States.[3] Over the past few years, several key technical, economic, and energy policy developments have spurred increased use of hydraulic fracturing for oil and gas extraction over a wider diversity of geographic regions and geologic formations.[4] However, with the expansion of hydraulic fracturing, there have been increasing concerns voiced by the public about potential impacts on drinking water resources, public health, and the environment.[5]

The development and production of oil and gas in the U.S., including shale gas, are regulated under a complex set of federal, state, and local laws that address exploration and operation.[6] The laws and regulations that apply to conventional oil and gas exploration and production activities also apply to shale gas development.[7] The U.S. Environmental Protection Agency ("EPA") administers most of the federal laws.[8] Many of the federal laws are implemented by the states under agreements and plans approved by the appropriate federal agencies.[9] This paper will first discuss the existing federal laws and regulations and proposed federal laws which apply to hydraulic fracturing activities as well as current studies and enforcement actions concerning the same. The paper will then discuss Texas statutes and regulations and various activities that are currently being pursued by the regulatory agencies that govern shale gas exploration in Texas. With respect to local matters, the paper will also briefly consider municipal regulation of the industry. With the rapid growth of shale gas exploration as a result of hydraulic fracturing, increased litigation has likewise grown. The paper will also review recent litigation trends which relate to hydraulic fracturing including an analysis of the typical claims asserted as well as the key applicable defenses under Texas law.

II. FEDERAL

A. Federal Statutes and Regulations

A series of federal laws govern most environmental aspects of hydraulic fracturing and shale gas development.[10] The main statutes include the Safe Drinking Water Act which regulates the underground injection of fluids from shale gas activities; the Clean Water Act which regulates surface discharges of water associated with shale gas drilling and production; and the Clean Air Act which limits air emissions from engines, gas processing equipment, and other sources associated with drilling and production. Additional environmental statutes may also apply to such operations. The following section provides a brief summary of certain provisions from each of these statutes, particularly as those provisions apply to hydraulic fracturing and shale gas development.

1. Safe Drinking Water Act

In 1974, Congress passed the Safe Drinking Water Act ("SDWA") to protect public health by regulating the nation's public drinking water supply.[11] The SDWA authorizes the EPA to set national health-based standards for drinking water to protect against both naturally occurring and man-made contaminants that may be found in drinking water.[12] EPA, states, and municipal water system agencies then work together to make sure that these standards are met.[13] As one aspect of the protection of drinking water supplies, the SDWA establishes a framework for the Underground Injection Control ("UIC") program to prevent the injection of liquid wastes into underground sources of drinking water ("USDW").[14] The EPA and states implement the UIC program, which sets standards for safe waste injection practices and bans certain types of injection altogether.[15]

Prior to 1997, EPA considered hydraulic fracturing to be a well stimulation technique associated with production and therefore not subject to the UIC program under the SDWA.[16] However, in 1994, the Legal Environmental Assistance Foundation challenged EPA's opinion on hydraulic fracturing regulation and in 1997 the Eleventh Circuit ruled that hydraulic fracturing of coalbed methane wells was indeed subject to the SDWA and UIC regulations under Alabama's UIC program.[17]

In 1999, EPA then began a study on hydraulic fracturing used in coalbed methane reservoirs to evaluate the potential risks to USDWs.[18] The study focused on coalbed methane reservoirs because they are typically closer to the surface and in greater proximity to USDWs compared to conventional gas reservoirs.[19] EPA published the coalbed methane study in 2004.[20] In the report, EPA concluded that there was little to no risk of fracturing fluid contaminating underground sources of drinking water during hydraulic fracturing of coalbed methane production wells.[21] EPA had, nonetheless, as a precautionary measure, entered into a Memorandum of Agreement in 2003 with companies that conduct hydraulic fracturing of coalbed methane wells to eliminate use of diesel fuel in fracturing fluids.[22]

In 2005, the Energy Policy Act was passed by Congress which amended SDWA to exclude "the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations related to oil, gas, or geothermal production activities" from regulation under the UIC program.[23]

On March 15, 2011, the Fracturing Responsibility and Awareness of Chemicals Act ("FRAC Act") was re-introduced in both the U.S. Senate and House of Representatives.[24] The Energy Policy Act of 2005 amended the SWDA to preclude EPA from regulating the underground injection of fluids by hydraulic fracturing. The FRAC Act amends the SDWA to repeal the 2005 restriction on EPA and would require oil and gas companies to disclose the chemicals used in hydraulic fracturing operations. The bill also notes that in case of a medical emergency the chemicals and formulas must be immediately disclosed to the state oversight agency or the treating physician regardless of confidentiality agreement.

On April 27, 2011, EPA's Administrator, Lisa Jackson, stated that EPA will soon issue guidance on the use of diesel fuel as a chemical additive in hydraulic fracturing fluids for oil and natural gas production. Soon thereafter, EPA detailed the anticipated scope of the guidance in a series of presentations to stakeholders in May 2011.[25] The proposed guidance is drawing objections from industry officials that fear the guidance is predicate to target other aspects of hydraulic fracturing in the future beyond the use of diesel fuel.[26]

2. Clean Water Act

The Clean Water Act ("CWA") is the primary federal law governing pollution of surface water.[27] It was established to protect water quality, and includes regulation of pollutant limits on the discharge of oil and gas related produced water.[28] This is conducted through the National Pollutant Discharge Elimination System permitting process.[29] The CWA made it unlawful to discharge any pollutant from a point source into the navigable waters of the U.S., unless done in accordance with a specific approved permit.[30] Shale gas extraction produces large volumes of wastewater from hydraulic fracturing in addition to relatively small volumes of produced water from the formation.[31] According to the EPA, the CWA applies to both direct discharges as well as indirect discharges of wastewaters into waters of the U.S. through sewer systems connected to publicly owned treatment works.[32]

a. Stormwater Exemption

However, an oil and gas exemption from environmental regulation is contained within the CWA for certain storm water discharges. Typically, industrial facilities that generate stormwater runoff (as "pollutant" under the Act) must obtain a stormwater permit under the CWA for this runoff; they are required to have a permit both for constructing the facility (at which point soil sediment may run off the site) and operating it (at which point polluted substances may continue to run off the site during precipitation events, for example).[33] The CWA does not require oil and gas operators, however, to obtain a permit for uncontaminated "discharges of stormwater runoff from . . . oil and gas exploration, production, processing, or treatment operations."[34] In the Energy Policy Act of 2005, Congress expanded the definition of oil and gas exploration and production under the Clean Water Act[35] -- a definitional change that potentially allowed for the exemption of more oil and gas activity from stormwater permitting requirements. The EPA subsequently revised its regulations to exempt oil and gas *construction* activities from the NPDES stormwater permitting requirements.[36]

In 2008, the United States Court of Appeals for the Ninth Circuit in *Natural Resources Defense Council v. EPA* vacated these regulations.[37] The EPA has since reinstated its prior requirements for stormwater permits along with "clarification" based on Energy Policy Act of 2005.[38] In sum, oil and gas operators must obtain a stormwater permit under the Clean Water Act for the construction of a well pad and access road that is one acre or greater, but they need not obtain such a permit for any uncontaminated stormwater from the drilling and fracturing operation.[39]

b. Spill Prevention, Control and Countermeasure

In addition, Congress passed the Oil Pollution Act ("OPA") in 1990 which added Section 311 to the CWA which provides for spill prevention requirements, spill reporting obligations, and spill response planning.[40] Section 311 regulates the prevention of and response to accidental releases of oil and hazardous substances into navigable waters, on adjoining shorelines, or affecting natural resources belonging to or managed by the United States.[41] This authority is primarily carried out through the creation and implementation of response plans.[42] These plans are intended to establish measures that will prevent discharge of oil into navigable waters of the U.S. or adjoining shore-lines as opposed to response and cleanup after a spill occurs.[43]

A cornerstone of the strategy to prevent oil spills from reaching the nation's waters is the oil Spill Prevention, Control and Countermeasure ("SPCC") plan.[44] EPA promulgated regulations to implement this part of the OPA of 1990.[45] These regulations specify that: (1) SPCC Plans must be prepared, certified (by a professional engineer) and implemented by facilities that store, process, transfer, distribute, use, drill for, produce, or refine oil; (2) facilities must establish procedures and methods and install proper equipment to prevent an oil release; (3) facilities must train personnel to properly respond to an oil spill by conducting drills and training sessions; and, (4) facilities must also have a plan that outlines steps to contain, clean up and mitigate any effects that an oil spill may have on waterways.[46] Before a facility is subject to the SPCC rule, it must meet three criteria: (a) it must be non-transportation-related; (b) it must have an aggregate aboveground storage capacity greater than 1,320 gallons (31.4 bbls) or a completely buried storage capacity greater than 42,000 gallons (1,000 bbls); and (c) there must be a reasonable expectation of a discharge into or upon navigable waters of the U.S. or adjoining shorelines.[47]

c. Proposed Effluent Guidelines

On October 26, 2011, EPA published the final 2010 plan for effluent guidelines, which are regulations that improve water quality by controlling discharges from industrial sources.[48] EPA is initiating a rulemaking to control wastewater produced by natural gas extraction from underground shale formations.[49] According to the EPA, shale gas wastewater contains high concentrations of total dissolved solids (salts). Shale gas wastewaters also contain various organic chemicals, inorganic chemicals, metals, and naturally occurring radioactive materials ("NORM").[50]

Currently, wastewaters associated with shale gas extraction are prohibited from being directly discharged to waterways and other waters of the U.S.[51] In order to meet this prohibition, some of the shale gas wastewater is reused or re-injected, but a significant amount still requires disposal.[52] Some operators re-inject the wastewater into disposal wells.[53] Other shale gas wastewater is transported to public and private treatment plants, which may not be equipped to treat this type of wastewater, resulting in the discharge of pollutants to rivers, lakes or streams where they can impact drinking water or aquatic life.[54] This rule would add a pretreatment standard to the existing regulation pertaining to oil and gas extraction.[55] EPA plans to propose a rulemaking for Shale Gas Extraction in 2014.[56]

3. Clean Air Act

The Clean Air Act ("CAA") is the primary means by which EPA regulates potential emissions that could affect air quality.[57] The CAA requires EPA to set national standards to limit levels of certain pollutants.[58] EPA regulates those pollutants by developing human health-based and/or environmentally and scientifically based criteria for setting permissible levels.[59] When an oil or gas operator drills and fractures a well, this process emits air pollutants, including nitrogen oxides and volatile organic compounds (VOCs), among others.[60] These pollutants may arise from the following sources:

- wellhead (natural gas leaks);
- flared gas (gas that escapes from the well during drilling and fracturing and is burned);
- equipment used for drilling, fracturing, and dehydrating gas (equipment exhaust)
- pipelines (natural gas leaks);
- flowback water tanks and pits (evaporating volatile organic compounds); and
- compressor stations ("When natural gas leaves a well, it is sent to a gathering station and the gas is then compressed by an internal combustion . . . engine(s) and conveyed to a processing facility via pipeline.")[61]

Through the CAA, the EPA has established National Ambient Air Quality standards for certain "criteria" pollutants—common pollutants from an array of sources, which endanger public health and welfare.[62] It also has set separate, technology-based standards for hazardous air pollutants, or HAPs, which cause serious and chronic human health effects, such as cancer.[63] Oil and gas development emits both criteria and hazardous air pollutants.[64] These pollutants often face little regulation under the Clean Air Act, however, because the Act focuses most of its controls on "major" sources, which are defined as sources that emit a certain number of tons per year of a pollutant, and particularly on new sources.[65] Oil and gas operations often are minor sources and are thus regulated—if at all—under state minor source programs.[66] Oil and gas operations—even minor ones—tend to face the strictest regulations in "nonattainment" areas—those areas that have exceeded the National Ambient Air Quality Standard (NAAQS) for a criteria pollutant and that require control of all air pollution sources.[67] This is the case for the Barnett Shale, much of which is located in or near the Dallas-Fort Worth ozone nonattainment area.[68] As a result, Barnett Shale production activities must comply with much more stringent regulations than similar operations proposed outside of a nonattainment area.[69]

a. Minor and Major Sources

The EPA's current methodology for defining "major" sources could bring many more oil and gas sites beneath the major source umbrella, even in relatively clean "attainment" areas.[70] A major source includes "any group of stationary sources located within a contiguous area and under common control" that emits a certain number of tons of regulated pollutant annually.[71] Newly built and existing compressor stations that make a modification and increase their hourly

emissions already are subject to new source performance standards (technology-based emissions controls) for "stationary spark ignition internal combustion engines."[72]

It should be noted that on March 17, 2011, the Bringing Reductions to Energy's Airborne Toxic Health Effects Act ("BREATHE Act") was introduced in the U.S. House of Representatives.[73] The BREATHE Act Amends the Clean Air Act to: (1) include hydrogen sulfide in the list of hazardous air pollutants; (2) repeal the prohibition on aggregating emissions from any oil or gas exploration or production well and emissions from any pipeline compressor or pump station with emissions from other similar units to determine whether such units or stations are major sources of hazardous air pollutants; (3) repeal the prohibition on aggregating emissions from any oil or gas exploration or production well for any purpose relating to hazardous air pollutant emission standards; and (4) repeal the prohibition against the EPA listing oil and gas production wells as an area source category of hazardous air pollutants.

b. Proposed New Air Pollution Standards

In addition, on July 28, 2011, the EPA also proposed new air pollution standards to reduce the emissions of methane and volatile organic compounds from the oil and gas industry.[74] The EPA released a "Fact Sheet" which states that the proposal will require VOC reductions for: (1) completions of new hydraulically fractured natural gas wells and re-completions of existing natural gas wells that are fractured or re-fractured; (2) compressors; (3) pneumatic controllers; (4) condensate and crude oil storage tanks; and (5) natural gas processing plants.[75]

With respect to hydraulic fracturing, the EPA states that VOC emissions would be minimized through the use of "green completions," also called "reduced emissions completions."[76] In a green completion, special equipment separates gas and liquid hydrocarbons from the flowback that comes from the well as it is being prepared for production.[77] The gas and hydrocarbons can then be treated and sold.[78] EPA estimates that use of this equipment for the three- to 10-day flowback period reduces VOC emissions from completions and recompletions of hydraulically fractured wells by 95 percent.[79] When gas cannot be collected, VOCs would be reduced through pit flaring, unless it is a safety hazard.[80] The green completion requirements would not apply to exploratory wells or delineation wells (used to define the borders of a natural gas reservoir) which can use pit flaring to burn off the emissions.[81]

According to the EPA, the proposed rules will reduce VOC emissions from two types of compressors: (1) centrifugal compressors will have to be equipped with dry seal systems; (2) owners/operators of reciprocating compressors will have to replace rod packing systems every 26,000 hours of operation.[82] With respect to pneumatic controllers, the proposed rules will eliminate VOC emissions by using controllers that are not gas-driven.[83] For controllers used at other sites, such as compressor stations, the emission limits could be met by using controllers that emit no more than six cubic feet of gas per hour.[84] Condensate and crude oil storage tanks with a throughput of at least 1 barrel per day of condensate or 20 barrels per day of crude oil (equivalent to about 6 tons of VOC emissions per year) must reduce VOC emissions by 95 percent.[85] In addition, EPA is proposing to amend the existing NSPS for natural gas processing plants to

strengthen the leak detection and repair requirements that apply to these plants to reduce VOC emissions.[86]

With regard to costs and benefits, EPA estimates the combined annual costs of meeting the proposed requirements would be $754 million in 2015.[87] However, the estimated value of the natural gas and condensate that would be made available for sale is $783 million – a net savings of $29 million when the rules are combined.[88] According to the EPA, in January 2009, WildEarth Guardians and the San Juan Citizens Alliance sued EPA, alleging that the Agency had failed to review the new source performance standards and air toxic standards for the oil and natural gas industry.[89] In February 2010, the U.S. Court of Appeals for the D.C. Circuit entered a consent decree that requires EPA to sign proposals related to the review of these standards. EPA must issue final standards by Feb. 28, 2012, which was later extended to April 3, 2012.[90] On April 2, 2012, EPA and parties have agreed to a two-week extension – until April 17, 2012 - on a consent decree to issue final air rules for the oil and natural gas industry.[91] The agency requested the additional time to fully address the issues raised in the more than 156,000 public comments we received on the proposed rules.[92]

4. Toxic Substance Control Act

The Toxic Substance Control Act ("TSCA") of 1976 provides EPA with authority to require reporting, record-keeping and testing requirements, and restrictions relating to chemical substances and/or mixtures.[93] The TSCA complements other federal environmental statutes that regulate pollution by controlling chemical products prior to entering the environment. The core of the TSCA is informational: chemical manufacturers must provide EPA with information on the chemicals they produce.

On August 4, 2011, Earth Justice sent a petition to EPA entitled "Citizen Petition under Toxic Substances Control Act Regarding the Chemical Substances and Mixtures Used in Oil and Gas Exploration or Production."[94] In the letter, Earth Justice petitioned EPA to promulgate rules pursuant to: (1) TSCA section 4 to require manufacturers and processors of E&P chemicals to develop test data sufficient to evaluate the toxicity and potential for health and environmental impacts of all substances and mixtures that they manufacture and process; and (2) TSCA section 8(a) requiring manufacturers and processors of E&P Chemicals to maintain various records related to E&P chemicals including data on potential or demonstrated environmental and health effects of E&P chemicals.

On November 2, 2011, EPA responded and denied the TSCA section 4 request in the petition for issuance of a test rule on the basis that the petition does not set forth sufficient facts to support the assertion that it is "necessary to issue" the requested TSCA section 4 rule, as required by TSCA section 21(b)(I). [95] Specifically, EPA stated that the petition did not set forth facts sufficient to support the required findings under TSCA section 4(a)(I)(A) or 4(a)(I)(B) for issuance of a test rule covering all chemical substances and mixtures used in oil and gas exploration and production.[96] EPA requested an extension until November 23, 2011 to respond to the requests under TSCA section 8(a) and section 8(d).[97]

On November 23, 2011, EPA responded to the remaining requests asserted in the petition.[98] In the response, EPA stated that it has decided to partially grant the TSCA section 8(a) and section 8(d) requests in the petition.[99] The EPA believes there is value in initiating a proposed rulemaking process using the TSCA authorities to obtain data on chemical substances and mixtures used in hydraulic fracturing.[100] In this regard, EPA will convened a stakeholder process to develop an overall approach that would minimize reporting burdens and costs, take advantage of existing information, and avoid duplication of efforts.[101] This dialogue will also focus on how the information reported could best be aggregated and disclosed to maximize transparency and public understanding.[102] These efforts to gather information will not duplicate, but instead complement, the well-by-well disclosure programs of the states.[103] However, the EPA denied the request to invoke the TSCA authorities to collect information on chemicals used in the E&P section in addition to those used in hydraulic fracturing.[104]

5. Resource Conservation and Recovery Act

The Resource Conservation and Recovery Act ("RCRA") was passed in 1976 to address the growing problems of the increasing volume of municipal and industrial waste.[105] RCRA Subtitle C established a federal program to manage hazardous wastes from cradle to grave to ensure that hazardous waste is handled in a manner that protects human health and the environment.[106]

However, most E&P wastes ("exploration and production" wastes) from fracturing and drilling are exempt from the hazardous waste disposal restrictions in Subtitle C, meaning that states—not the federal government—set the required disposal procedures for the waste.[107] Although Subtitle C of RCRA originally covered oil and gas wastes—thus requiring that oil and gas operators follow federally-established procedures for handling, transporting, and disposing of the wastes—in the 1980s Congress directed the EPA to prepare a report on oil and gas wastes and determine whether they should continue to be federally regulated.[108]

In its report, the EPA noted that some of the wastes were hazardous but ultimately determined that due to the economic importance of oil and gas development and state controls on the wastes, federal regulation under RCRA Subtitle C was unwarranted.[109] The EPA did note some state regulatory deficiencies in waste control, however, and relied on the development of a voluntary program to improve state regulations.[110] This voluntary program has since emerged as the State Review of Oil and Natural Gas Environmental Regulations ("STRONGER")—a non-profit partnership between industry, nonprofit groups, and regulatory officials[111] that has developed guidelines for state regulation of oil and gas wastes, periodically reviews state regulations, and encourages states to improve certain regulations.[112] Despite the RCRA exemption, in all states, non-exempt oil and gas wastes, such as unused hydraulic fracturing fluids and other oil and gas wastes that tend to have higher levels of hazardous substances, still must be disposed of in accordance with federal RCRA requirements.[113]

In September 2010, the Natural Resource Defense Council ("NRDC") filed a petition calling on EPA to reverse its determination and end the RCRA exemption.[114] In the petition., NRDC argues that hazardous waste rules under RCRA subtitle C are "necessary to ensure safe management of these wastes throughout their life cycle from cradle to grave, including generation, transportation, treatment, storage and disposal."[115] If EPA were to subject wastewater from drilling operations to Subtitle C regulations, it would force UIC directors to apply Class I rules for hazardous waste wells instead of Class II.[116] The Class I well category requires more extensive and stringent siting considerations during the permitting process, including a determination of seismicity in an area being evaluated as a potential site.[117] Further, Class I regulations expressly prohibit siting of wells in areas where earthquakes could occur and compromise the integrity of the injection zone, endangering groundwater, whereas Class II rules do not.[118]

6. Comprehensive Environmental Response, Compensation and Liability Act

The Comprehensive Environmental Response, Compensation, and Liability Act ("CERCLA") commonly known as "Superfund," was enacted by Congress on December 11, 1980.[119] The law provides a broad legal framework that creates potential liability for the cost of cleaning up property contaminated with hazardous substances. However, Section 101(14) of CERCLA (a/k/a "the petroleum exclusion") excludes certain substances from the definition of hazardous substance, thus exempting them from CERCLA regulation.[120] These substances include petroleum, meaning crude oil or any fraction thereof that is not specifically listed as a hazardous substance, natural gas, natural gas liquids, liquefied natural gas, and synthetic gas usable for fuel.[121] However, oil and gas operators still must report spills of other hazardous substances of a threshold quantity (those that are not oil and gas) and ultimately may be liable for clean-up of these wastes.[122]

As discussed in greater detail below, despite this exemption, EPA has recently used its authority under CERCLA to investigate and address hazardous substances found in drinking water wells in Pavillion, Wyoming and Dimock, Pennsylvania that the agency is signaling could have been caused by natural gas drilling.[123]

7. Emergency Planning and Community Right-to-Know Act

In addition, the following environmental statutes may also apply to hydraulic fracturing operations. Congress enacted the Emergency Planning and Community Right-to-Know Act ("EPCRA") in 1986 to establish requirements for federal, state and local governments, and industry regarding emergency planning and "community right-to-know" reporting on hazardous and toxic chemicals.[124] Section 304 of EPCRA requires reporting of releases to the environment of certain materials that are subject to this law.[125] This requirement would apply to any releases of petroleum products that exceed reporting thresholds, even if those products are exempt from CERCLA reporting.[126]

8. Endangered Species Act

The Endangered Species Act ("ESA") was enacted in 1973 and protects plants and animals that are listed by the federal government as "endangered" or "threatened."[127] Sections 7 and 9 apply to oil and gas activities.[128] Section 7 concerns not to private parties, but to federal agencies.[129] This section covers not only federal activities but also the issuance of federal permits for private activities, such as Section 404 permits issued by the Corps of Engineers, to people who want to do construction work in waters or Wetlands.[130] Section 7 imposes an affirmative duty on federal agencies to ensure that their actions (including permitting) are not likely to jeopardize the continued existence of a listed species (plant or animal) or result in the destruction or modification of critical habitat.[131] Section 9 makes it unlawful for anyone to "take" a listed animal, and this includes significantly modifying its habitat.[132] This applies to private parties and private land; a landowner is not allowed to harm an endangered animal or its habitat on his or her property.[133] Both Sections 7 and 9 allow "incidental takes" of threatened or endangered species, but only with a permit.[134]

9. Migratory Bird Treaty Act

The Migratory Bird Treaty Act ("MBTA") implements a series of treaties that provide for the international protection of migratory birds.[135] The statute makes it unlawful to pursue, hunt, take, capture, kill or sell birds listed therein. The statute does not discriminate between live or dead birds and also grants full protection to any bird parts including feathers, eggs and nests. Over 800 species are currently on the list. The MBTA is a strict-liability law wherein there is no requirement to prove intent to violate any of its provisions. Accordingly, operators should ensure that their rigs and surface pits do not attract and birds protected under the MBTA.

B. Enforcement Actions and Investigations

1. EPA v. Range Resources (Region 6)

a. Factual and Procedural Background

Range Production Company and Range Resources Corporation (collectively "Range") are involved in drilling gas wells in the area of Fort Worth, Texas.[136] In 2009, Range drilled two such wells, which were drilled vertically several thousand feet below the surface before the drill bore horizontally to finish the drilling of the well.[137] The horizontal bores of the wells at issue are approximately one mile below the surface.[138] These gas wells attempt to draw gas from the Barnett Shale Formation.[139]

On December 7, 2010, the EPA Region 6 issued an Emergency Administrative Order ("the Emergency Order") against Range pursuant to its claimed authority under Section 1431 of the SDWA.[140] In the Emergency Order, the EPA alleges that Range's activities had affected the water within two domestic water wells in Hood County, Texas which may create "an imminent and substantial endangerment to the health of persons," noting that the level of methane found in the

wells could be flammable, and consumption of the benzene present in the wells could contribute to various health problems.[141]

In a section entitled "Conclusions of Law," the Emergency Order concluded that contaminants were present in an underground source of drinking water, that Range had caused or contributed to the endangerment of persons through such contaminants, and that action taken by the EPA as proscribed in the Emergency Order was necessary to protect the health of persons.[142] Range was directed in the Emergency Order to: (1) notify the EPA of whether it intended to comply with the Emergency Order within 24 hours; (2) provide re-placement water supplies to the recipients of water from the affected water wells within 48 hours; (3) install explosivity meters at the affected dwellings within 48 hours; (4) submit a survey listing water wells within 3,000 feet of the gas wells at issue with a plan for EPA approval to sample those wells to see if they have been contaminated, including a air and water samplings; (5) submit a plan for EPA approval to conduct soil gas surveys and indoor air concentration analysis of the dwellings served by the affected water wells within 14 days; and (6) submit a plan for EPA approval to identify gas flow pathways to the Trinity Aquifer, eliminate gas flow to the Trinity Aquifer if possible, and remediate areas of the Trinity Aquifer that have been impacted.[143] The Emergency Order notified Range that violation of the Emergency Order could subject it to a civil penalty of up to $16,500 per day of violation. Range contended that the Emergency Order, in only providing for an informal conference with no evidentiary hearing or opportunity to challenge the Emergency Order, does not provide Range with any process to challenge the EPA's findings.[144]

On December 8, 2010, one day after the Emergency Order was issued, the Railroad Commission called a hearing to consider whether Range's operation of the gas wells caused or contributed to the contamination of the water wells.[145] As this proceeding continued, Range informed the EPA that it disputed the validity of the Emergency Order and would not abide by some of its terms.[146] The EPA brought a civil enforcement action on January 18, 2011, seeking injunctive relief and civil penalties against Range for its failure to comply with three of the six requirements of the Emergency Order.[147] Range filed a petition for review of the Emergency Order with the Fifth Circuit Court of Appeals on January 20, 2011 pursuant to 42 U.S.C. § 300j–7(a)(2).[148] Range argued to the Fifth Circuit that Section 1431 would be unconstitutional if it were construed to be a final agency action in this context, and contended that enforcement of the Emergency Order would violate Range's due process rights.[149] The Fifth Circuit's decision is pending.[150]

Despite its objections to the Emergency Order, Range consulted with the EPA and provided the homes whose water wells were contaminated with alternative water and installed explosivity meters, complying with the first three requirements of the Emergency Order.[151] Range claims that this was done at the request of the Railroad Commission.[152] Range also hired experts to perform gas, water, soil-gas, and geologic tests, and Range contends that the tests demonstrate that Range is not responsible for the contamination of the water wells.[153] Range also deposed John Blevins of the EPA on January 25, 2011, and provided his testimony in which he notes that the EPA could not be certain of Range's role in the contamination of the water wells, and that the EPA

did not investigate other possible causes of the contamination.[154] Range alleges that this deposition reveals various ways in which Range was not afforded due process.[155]

On January 19 and 20, 2011, the Railroad Commission held its hearings concerning Range's possible role in the contamination of the water wells.[156] On March 22, 2011, the Railroad Commission issued an order in which it determined that Range had not caused and is not causing or contributing to the contamination of the water wells at issue.[157] The Railroad Commission determined that the gas in the water wells was from the Strawn formation, a different source than the source that the Range gas wells were tapping that is closer in depth underground to the water wells.[158] Range claims that the Railroad Commission's preliminary findings are accurate, and that the contamination is due to the Strawn formation, not Range's wells attempting to tap into the Barnett formation.[159]

b. District Court Stays EPA's Lawsuit Against Range Resources

On January 18, 2011, the EPA filed an action in district court for the Northern District of Texas seeking to obtain an injunction forcing Range to comply with the terms of the Emergency Order.[160] Noting that Range had not complied with the fourth, fifth, and sixth requirements of the Emergency Order, the EPA sought penalties adding up to $16,500 per day that Range has failed to comply with these terms of the Order under 42 U.S.C. § 300i(b).[161]

On March 21, 2011, Range filed a motion to dismiss the EPA's action under Federal Rule of Civil Procedure 12(b)(1) or, alternatively, Rule 12(b)(6).[162] A hearing regarding this Motion was held on June 14, 2011.[163] Although the district court denied Range's motion, it made several positive findings for the company. With respect to causation, the court stated:

> "[T]he Court is struggling with the concept that the EPA can enforce the Emergency Order and obtain civil penalties from Range without ever having to prove to this Court, or another neutral arbiter, that Range ***actually caused*** the contamination of the [private drinking wells], or without ever giving Range the opportunity to contest the EPA's conclusions.[164]

The court then noted that this difficult issue, important though it is, need not be resolved at this time because the Fifth Circuit is presently considering whether the Emergency Order was issued arbitrarily or capriciously.[165] The court reasoned that while Range may be correct that this review is insufficient to satisfy due process, and that compelling the EPA to plead and prove that Range caused or contributed to the contamination of the water wells would satisfy due process, the Fifth Circuit's pending decision may either (1) moot this action by invalidating the Emergency Order, or (2) at least provide the Court with guidance and a framework with which to proceed in this case, as it could provide the Court and the parties with the answer to whether the Fifth Circuit's review sufficiently satisfies due process.[166] On this basis, the district court *sua sponte* stayed this district court action pending the Fifth Circuit's opinion on whether the Emergency Order was issued arbitrarily or capriciously.[167] The court further ordered that there will be no

daily civil penalties sought by the EPA for continuing violation of the Emergency Order for any day in which this litigation is subject to the stay.[168]

c. Fifth Circuit

Oral argument occurred on October 3, 2011. In its brief, Range has asked the Fifth Circuit to resolve whether: (1) the Emergency Order is a "Final Agency Action" under the SDWA where the Order is an administrative order issued unilaterally by EPA, based upon the Agency's mere receipt of information, without notice or an opportunity for hearing; (2) whether the arbitrary and capricious standard of review provides Range with a sufficient amount of due process to contest EPA's actions, and if so, whether EPA acted arbitrarily and capriciously in issuing the Emergency Order; and (3) if the arbitrary and capricious standard of review is not sufficient to provide due process, what is the proper standard of review. Range also provided supplemental authority to the Fifth Circuit which referenced that on June 28, 2011, the U.S. Supreme Court had granted certiorari in *Sackett v. EPA*.[169]

d. EPA Withdraws Emergency Administrative Order

In *Sackett*, the U.S. Supreme Court was to address whether delaying judicial review while waiting for EPA to bring an enforcement action violates due process in light of the CWA's penalty scheme for non-compliance. Range made a similar due process claim under the SDWA arguing that its judicial review scheme is unconstitutional if EPA is not required to prove causation prior to seeking enforcement. On March 21, 2012, a unanimous Supreme Court held in the *Sackett* case that administrative consent orders issued under the Clean Water Act constitute final agency action.[170] Accordingly, under the Administrative Procedure Act ("APA"), Respondents, like the Sacketts, are now afforded pre-enforcement review of the factual and legal basis of administrative consent orders and may bring a civil action under the APA to challenge them.[171]

On March 29, 2012, 8 days after the Supreme Court's ruling in *Sackett*, EPA withdrew its emergency administrative order against Range Resources. The following day, the EPA and Range filed a joint motion to dismiss both the district court action as well as the matter pending before the Fifth Circuit. In a letter from Range's counsel, the company agreed to monitor 20 private drinking water wells in the area of operations to determine whether they are contaminated. Range also agreed to conduct quarterly monitoring and sampling for dissolved gases, carbon dioxide, hydrogen, nitrogen, so called BTEX compounds, methane and other contaminants and submit the data to EPA Region VI for review.

2. EPA v. Murphy Exploration & Production Co., et al. (Region 8)

On December 16, 2010, EPA Region 8 similarly issued an "Emergency Administrative Order" under Section 1431(a) of the SWDA against Murphy Exploration & Production Co., Pioneer Natural Resources USA, Inc., and Samson Hydrocarbons Co. in response to alleged oil production-related contaminants in the public water supply that serves the city of Poplar, Montana, and the Fort Peck Indian Reservation.[172] The order requires the companies to monitor Poplar's

municipal water supply wells and also the private wells of residents in the potentially affected area, upon resident request.[173] The order also requires the companies to provide additional water treatment and/or alternate supplies if EPA determines the groundwater in wells is becoming a public health risk.[174] All three of the parties have filed a petition for review in the Third Circuit for which the matter is still pending.[175]

3. Pavillion, Wyoming Matter (Region 8)

EPA is using CERCLA authority to investigate contamination alleged to have come from drilling operations near Pavillion, WY. Using authority under CERCLA, EPA and the Agency for Toxic Substances & Disease Registry are studying, among other things, whether fluids from hydraulic fracturing operations contaminated drinking water wells.

On December 8, 2011, EPA released a draft analysis of data from its Pavillion, Wyoming ground water investigation.[176] At the request of Pavillion residents, EPA began investigating water quality concerns in private drinking water wells three years earlier.[177] According to EPA, since that time, in conjunction with the state of Wyoming, the local community, and the owner of the gas field, Encana, EPA has been working to assess ground water quality and identify potential sources of contamination.[178] EPA constructed two deep monitoring wells to sample water in the aquifer.[179] The draft report indicates that ground water in the aquifer contains compounds likely associated with gas production practices, including hydraulic fracturing.[180] EPA also re-tested private and public drinking water wells in the community.[181] The samples were consistent with chemicals identified in earlier EPA results released in 2010 and are generally below established health and safety standards.[182] EPA released these findings for public comment and will submit them to an independent scientific review panel.[183] The EPA noted that the draft findings are specific to Pavillion, where the fracturing is taking place in and below the drinking water aquifer and in close proximity to drinking water wells – production conditions different from those in many other areas of the country.[184]

Encana has since issued a press release refuting the EPA's findings.[185] According to the press release, EPA's data from existing domestic water wells aligns with all previous testing done by Encana in the area and shows no impacts from oil and gas development.[186] Of most concern, many of the EPA's findings from its recent deep monitoring wells, including those related to any potential connection between hydraulic fracturing and Pavillion groundwater quality, are conjecture, not factual and only serve to trigger undue alarm.[187] Encana states that it is especially disappointed that the EPA released its draft report, outlining preliminary findings, before subjecting it to qualified, third-party, scientific verification.[188] Encana claims that numerous discrepancies exist in the EPA's approach, data and analysis.[189] A few of these discrepancies are:

- The EPA report ignores well-known historical realities with respect to the Pavillion field's unique geology and hydrology;

- The EPA drilled two deep monitoring wells (depth range: 783 — 981 feet) into a natural gas reservoir and found components of natural gas, which is an entirely expected result.

The results in the EPA deep wells are radically different than those in the domestic water wells (typically less than 300 feet deep), thereby showing no connection. Encana claims that natural gas developers didn't put the natural gas at the bottom of the EPA's deep monitoring wells, nature did.

- There is unacceptable inconsistency between EPA labs' analysis for numerous organic compounds reported to have been found in the EPA deep monitoring wells. Data is not repeatable and the sample sets used to develop these preliminary opinions are inadequate.

- Several of the man-made chemicals detected in the EPA deep wells have never been detected in any of the other wells sampled. They were, however, detected in many of the quality control (blank) samples — which are ultra purified water samples commonly used in testing to ensure no contamination from field sampling procedures. These two observations suggest a more likely connection to what it found is due to the problems associated with EPA methodology in the drilling and sampling of these two wells.

- The EPA's reported results of all four phases of its domestic water well tests do not exceed federal or state drinking water quality standards for any constituent related to oil and gas development.[190]

Encana claims that the conclusions drawn by the EPA are irresponsible given the limited number of sampling events on the EPA deep wells and the number of anomalies seen in the data.[191] At the same time, the EPA repeatedly attempts to link limited instances of localized shallow groundwater contamination from historical production pit locations to its broader investigation.[192] In 2005, Encana identified and self-reported these pit locations and entered them into a voluntary remediation program administered by the State of Wyoming.[193] According to Encana, given the numerous flaws contained in this report, Encana believes genuine, qualified third-party review is essential.[194] Unfortunately, Encana does not believe that the EPA has subjected any of its data to a qualified, truly independent third party for peer review and urges EPA and other government officials to ensure that such an independent review is made.[195]

On February 7, 2012, the RRC sent a letter to EPA in response to the EPA Draft Report.[196] In the letter, the RRC urged EPA to classify the report as a "highly influential scientific assessment" as requested by several members of Congress.[197] If this classification is applied, the draft report will be subject to stringent peer review requirements, which the RRC believes is of paramount importance.[198] The RRC further stated that the "it appears EPA reached its conclusions based on limited and questionable data."[199] The RRC further said that, "Unfortunately, the EPA seems to be using the same template here that they did in the Range Resources case: first, make a preliminary, unproven assertion that will be perceived by the media and the public as a condemnation of hydraulic fracturing, then quietly back away once the science has proved the assertions to be false."[200]

4. Dimock, Pennsylvania Matter (Region 3)

EPA is also using its CERCLA authority to investigate contamination alleged to have come from drilling operations near Dimock, Pennsylvania. On January 19, 2012, EPA issues an action memorandum allowing Region III to undertake additional sampling activities at approximately 61 homes in Dimock Township, PA and provide residents with alternate water supplies, citing its authority under section 104(a) of CERCLA.[201] In the memorandum, the EPA acknowledges that it has rarely taken such action under CERCLA, given that petroleum and its constituents are exempt from the CERCLA definition of "hazardous substances," but says that conditions at the Pennsylvania site meet the requirements for a removal action under the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) "and exemption from the statutory limits."[202]

The EPA said that arsenic, barium, glycol compounds, manganese, phenol and sodium, all of which it notes are commonly used in drilling fluids, were found in wells used by four homes as primary drinking water sources as a result of Region III's recent sampling activities.[203] The EPA stated that historic drilling activities in the Dimock area may have used materials containing hazardous substances. . . The presence of hazardous substances in the four home wells constitutes a release or substantial threat of a release and the situation meets the criteria for conducting a removal action under the NCP.[204]

In addition to the action under 104(a), the agency has also filed a notice under section 104 (e) of the law with Cabot Oil and Gas Corporation – the drilling company the agency has suggested may be responsible for the Dimock contamination – seeking information on the company's operations, sampling and other issues that may be relevant to determining the source of the contamination.[205]

On March 15, 2012, the Associated Press reported that the U.S. Environmental Protection Agency sent an email to area residents which declared that well water testing at 11 homes in Dimock, PA showed no signs of contamination from natural gas development.[206] This represents the first release of information associated with testing conducted by the U.S. EPA in Dimock, PA.[207]

III. TEXAS

A. RRC v. TCEQ

Hydraulic fracturing is overseen by two primary entities in the Texas government that assert jurisdiction over oil and gas activities the: (1) Texas Railroad Commission ("RRC"); and (2) Texas Commission on Environmental Quality ("TCEQ"). For instance, the TCEQ is charged with the principal responsibility of implementing the state's policy of maintaining the quality of water in the state, except the RRC is expressly declared to be "solely responsible for the control and disposition of waste and the abatement and prevention of pollution of surface and subsurface water resulting from . . . activities associated with the exploration, development, and production of oil or gas."[208] The Water Code then grants the RRC authority to issue permits for discharge of oil and gas wastes into the waters of the state, but the discharges must meet the water quality standards

set forth by the TCEQ.[209] Similarly, while the TCEQ has jurisdiction over the Injection Well Act in Chapter 27 of the Water Code, the RRC is granted specific authority over injection wells that dispose of oil and gas wastes.[210]

The two agencies have adopted a Memorandum of Understanding ("MOU") which seeks to clarify the respective jurisdictions of the two agencies.[211] The MOU provides a very detailed listing and description of the types of waste, both hazardous and nonhazardous, under each agency's jurisdiction.[212] Under the MOU, the RRC regulates oil and gas wastes, including oilfield pits, discharges into surface waters, injections wells, and saltwater haulers and the TCEQ regulates solid, municipal, and hazardous wastes, water quality standards, and waste discharge permits and injection wells, except for permits and wells involving oil and gas wastes.[213]

B. Texas Statutes and Regulations

There are several other Texas statutes and regulations which apply to all oil and gas operations in Texas and therefore will likewise apply to hydraulic fracturing operations. Section 91.101 of the Texas Natural Resources Code gives the RRC broad powers to "to prevent pollution of surface water or subsurface water in the state" by regulating (1) the drilling of oil and gas wells; (2) the production of oil and gas, (3) the operation, abandonment, and proper plugging of wells; and (4) the discharge, storage, handling, transportation, reclamation, or disposal of oil and gas waste associated with any operation or activity regulated in the previous three categories.[214] The RRC regulates such activities primarily through various "statewide rules."

1. New Section 91.851 of the Texas Natural Resources Code

In 2011, Texas passed H.B. 3328 which added Section 91.851 to the Natural Resource Code which requires operators involved with hydraulic fracturing to disclose, among other things, the total amount of water used as wells as the chemical ingredients of the fracturing fluids subject to the requirements of 29 C.F.R. Section 1910.1200(g)(2).[215] The bill also requests the RRC to establish a process for operators to assert trade secret privilege for chemical ingredients of hydraulic fracturing fluids, and a process for providing notice of challenges to the assertion of the trade secret privilege.[216]

The legislation gave the Railroad Commission until July 1, 2013 to finalize regulations, but Commission members have stated that they will begin the process of developing regulations soon, and one Commissioner has said he will push to finalize regulations a year early, by July 1, 2012.[217] In this regard, on August 22, 2011, the RRC issued a memorandum with proposed rules to implement Section 91.851.[218] The Commission accepted comments on the proposed rules through October 11, 2011.[219]

On December 13, 2011, the RRC adopted rules to implement Section 91.851. [220] The rules require that not later than 15 days following the completion of hydraulic fracturing treatment(s) on a well, the supplier or the service company must provide to the operator of the well the following information concerning each chemical ingredient intentionally added to the

hydraulic fracturing fluid.[221] Additionally, operators of wells must disclose: (1) the operator name; (2) the date of completion of the hydraulic fracturing treatment(s); (3) the county in which the well is located; (4) the API number for the well; (5) the well name and number; (6) the longitude and latitude of the wellhead; (7) the total vertical depth of the well; (8) the total volume of water used in the hydraulic fracturing treatment(s) of the well or the type and total volume of the base fluid used in the hydraulic fracturing treatment(s), if something other than water; (9) each additive used in the hydraulic fracturing treatments and the trade name, supplier, and a brief description of the intended use or function of each additive in the hydraulic fracturing treatment(s); and (10) each chemical ingredient used in the hydraulic fracturing treatment(s) of the well that is subject to the requirements of 29 Code of Federal Regulations §1910.1200(g)[222] The information is to be disclosed on the FracFocus website.[223]

If a supplier, service company, or operator claims that the specific identity or amount of any chemical ingredient is entitled to protection as a trade secret, it need not disclose it.[224] The rules provide for the opportunity for certain persons to challenge a claim of entitlement to trade secret protection.[225] Should the RRC receive such a request, the owner of the trade secret will be required to provide certain information to the Office of the Attorney General, Open Records Division, to substantiate its claim of entitlement in accordance with Texas Government Code, Chapter 552.[226]

The owner of the trade secret must make a factual showing that the information meets the following factors, in accordance with the definition of "trade secret" in the Restatement of Torts, Comment B to Section 757(1939), as adopted by the Texas Supreme Court in *Hyde Corp. v. Huffines*, 314 S.W.2d 763, 776 (Tex. 1958): (1) the extent to which information alleged to be a trade secret is known outside the company; (2) the extent to which the information is known by employees and others involved in the company's business; (3) the extent of the measures the company has taken to protect the secrecy of the information; (4) the value of the information to the company and its competitors; (5) the amount of effort or money expended by the company to develop the information; and (6) the ease or difficulty with which a person could properly acquire and develop the same information.[227] The rule also states that only the following persons may challenge a claim of entitlement to trade secret protection: (a) the landowner on whose land the well-head is located; (b) the adjacent landowner; and (c) an agency with jurisdiction over a matter to which a claimed trade secret is relevant.[228] However, the rule also provides for disclosure to health professionals and emergency providers under certain circumstance even though a trade secret might be involved.[229]

It should be noted that on March 22, 2012, Earthjustice filed a petition on behalf of Powder River Basin Resource Council, Wyoming Outdoor Council, Earthworks and OMB Watch are asking a court to require the Wyoming Oil and Gas Conservation Commission ("WOGCC") to disclose information about chemicals used during hydraulic fracturing.[230] In particular, the groups are asking a court to rule whether WOGCC acted illegally in granting the trade secrets requests and arguing that companies must reveal the identities of chemicals used during hydraulic fracturing.[231]

Under regulations approved in 2010, Wyoming became the first state in the nation to

require well operators to disclose the identities of chemicals that are mixed with water and injected into the ground during hydraulic fracturing. However, according to Earthjustice, since the regulations were adopted, the Commission has approved some 50 chemical secrecy requests by various oil and gas service companies.[232] The case now before Wyoming's Seventh District Court could set a broad legal precedent – as the states of Texas, Arkansas, Pennsylvania, Colorado, Montana, and Michigan all have passed chemical disclosure regulations similar to Wyoming's statute.[233]

2. Statewide Rules

Various Statewide Rules will also apply to hydraulic fracturing and shale gas exploration. Like all oil and gas operations, operators participating in hydraulic fracturing operations will be required to obtain a permit to drill or deepen a well pursuant to Statewide Rule 3.5.[234] With respect to Statewide Rule 8, according to the RRC, it states that one of its greatest responsibilities is the protection of fresh water resources.[235] Water protection is a major consideration in many of the Commission's Statewide Rules and is the sole purpose of Statewide Rule 8. Rule 8(b) states that "no person conducting activities subject to regulation by the commission may cause or allow pollution of surface or subsurface water of the state."[236] However, some practitioners have argued that the rule only prohibits present actions, not historical conditions and that it does not address soil contamination unless it poses a threat to groundwater or surface water.[237] In addition, if past operations have resulted in extensive soil and groundwater contamination, but those operations have ceased, then arguably no violation of Statewide Rule 8 exists.[238] Rule 8(d) governs pollution control for disposal pits.[239] In Texas, pits are not required to be lined unless otherwise requested by RRC.[240] With regard to the timing of closure of pits, completion/workover pits must be closed w/in 30 days of completion of workover operations and backfilled, compacted w/in 120 days.[241] Reserve and mud circulation pits closed within one year of cessation of drilling operations for low chloride and 30 days for high chloride.[242]

Statewide Rule 13 regulates casing, cementing, drilling and completion requirements to ensure that "all usable-quality water zones [are] isolated and sealed off to effectively prevent contamination or harm, and all potentially productive zones [are] isolated and sealed off to prevent vertical migration of fluids and gases behind the casing."[243] The casing rules are lengthy with many technical requirements that implement Section 91.011 of the Texas Natural Resource Code which requires operators to encase wells to exclude freshwater contamination.[244] For instance, Rule 13 requires that "steel casing that has been hydrostatically pressure tested with an applied pressure at least equal to the maximum pressure to which the pipe will be subjected in the well."[245] It also requires that surface casing strings must stand until compressive strength of at least 500 psi in zone of critical cement and that cement in this critical zone "shall have a 72-hour compressive strength of at least 1,200 psi."[246] In addition, the operator is to provide completion and plugging report, basic electric log, and information on any "change in perforations, or open hole or casing records."[247] With respect to blowout prevention, Texas only requires that operator "keep the well under control at all times."[248]

Under the federal underground injection control regulations, wells used in oil and gas

operations are classified as Class II injection wells.[249] The RRC asserts its jurisdiction over Class II injection wells through Statewide Rules 9 and 46. Statewide Rule 9 regulates "disposal wells" that inject salt water and other oil and gas wastes into zones not productive of oil, gas, or geothermal resources.[250] Statewide Rule 46, on the other hand, regulates "fluid injection wells" that inject water (salt or fresh), steam, gas, or other energy sources into zones that are productive of oil and gas.[251] Rule 46 wells are often used for pressure maintenance, secondary and tertiary recovery, or cycling.[252] The RRC does not currently regulate hydraulic fracturing largely because the federal regulations for UIC do not include hydraulic fracturing within its definition of Class II underground injection.[253] However, if the federal law changes in this area in the future, Texas would likely regulate hydraulic fracturing operations through Statewide Rule 46.

With respect to seismic testing, Rule 100 requires a permit for a seismic hole or core hole that penetrates "protection depth" which is defined as "depth or depths at which usable quality water must be protected or isolated" as determined by the TCEQ."[254] The rule also requires plugging and a letter of protection depth from the TCEQ.[255] With respect to construction of a well pad, the Rule 30 states that the RRC regulates stormwater discharges to extent permitted by federal law.[256] According to Rules 8 and 37, Texas does not require any well or pit setbacks from natural resources or public water supplies.[257] Nonetheless, the Texas Government Code states that a well may not be drilled within 200 feet of a private residence located in a municipality.[258] As discussed below, by ordinance, some Texas cities have increased this distance even further.

With respect to the disposal of Naturally Occurring Radioactive Material ("NORM"), Texas prohibits the disposal into surface or subsurface waters or by spreading it on public or private roads.[259] However, Texas allows the disposal of NORM wastes "in a plugged and abandoned well" "at least 250 feet below the base of usable water quality," through treatment and burial at the site where NORM was generated, land farming at the site where the NORM waste was generated, "disposal at a licensed facility," or injection into a disposal well.[260]

3. Section 106.352 of the Texas Administrative Code

On January 26, 2011, the TCEQ repealed the existing Permit by Rule ("PBR") provisions for oil and gas handling facilities in the Barnett Shale area and adopted a new PBR and a new standard permit for oil and gas production facilities in that area.[261] The new PBR and standard permit include operating specifications and emissions limitations for typical equipment (facilities) during normal operation, which includes production and planned maintenance, start-up and shutdown.[262] The PBR and standard permit both include a list of best management practices and requires all oil and gas facilities at a site to be permitted under one authorization. The PBR and standard permit became effective on April 1, 2011.

4. Water Use Issues

Hydraulic fracturing consists of pumping into the formation very large volumes of fresh water that generally has been treated with a friction reducer, biocides, scale inhibitor, and surfactants, and contains sand as the propping agent.[263] The water treating fluid maximizes the

horizontal length of the fracture while minimizing the vertical fracture height.[264] The fractures, which are held open by the sand, result in increased surface area, which further results in increases in the desorption of the gas from the shale and increases in the mobility of the gas.[265] The result is more efficient recovery of a larger volume of the gas-in-place.[266]

a. Texas Water Development Board Study

The RRC estimates that hydraulic fracturing of a typical well in the Barnett Shale can use over 3.5 million gallons (over 83,000 barrels) of water.[267] In addition, the wells may be refractured multiple times after producing for several years.[268] Increasing water use due to growing population, drought, and Barnett Shale development has heightened concerns about water availability in North-Central Texas.[269] In January of 2007, the Texas Water Development Board published a study of a 19-county area in North Texas that includes the Barnett Shale development area.[270] The report, "Northern Trinity/Woodbine Aquifer Groundwater Availability Model, Assessment of Groundwater Use in the Northern Trinity Aquifer Due to Urban Growth and Barnett Shale Development," includes estimates of water used in Barnett Shale development.[271]

b. Regulation of Surface Water

In Texas, water flowing in Texas creeks, rivers, and bays is owned and managed by the State.[272] Anyone who diverts such surface water must have authorization – or a water right -- from the State of Texas through the TCEQ.[273] Therefore, a person who withdraws surface waters for hydraulic fracturing activities must obtain a water rights permit from TCEQ.[274]

c. Regulation of Groundwater

In Texas, groundwater ownership rights are subject to regulation and control by the courts and the State Legislature.[275] Groundwater may be managed individually by landowners under the rule of capture, or collectively by landowners and groundwater conservation districts ("GCDs").[276] Under the "Rule of Capture," landowners may pump as much water as they choose, without liability to surrounding landowners who might claim that the pumping is depleting their wells.[277] There are very few restrictions to the rule of capture.[278]

The Texas Legislature has authorized the creation of GCDs as the State's preferred method of groundwater management.[279] These districts are empowered and charged to conserve, preserve, protect, recharge, and prevent waste of groundwater resources within their boundaries.[280] GCDs may be created through a special legislative act, a landowner petition process to the TCEQ, a landowner petition process to join an existing GCD, or TCEQ initiative in a priority groundwater management area.[281] It should be noted that Section 36.117 of the Texas Water Code prohibits the issuance of a permit for the drilling of a water well used solely to supply water for a rig that is actively engaged in drilling or exploration operations for oil and gas.

In addition, the RRC regulates groundwater in Texas. According to the RRC, much of the water used in association with hydraulic fracturing activities is saline or brackish water produced

from the same formations where the oil fields are located.[282] A very small percentage of the water used for enhanced recovery is fresh water or slightly saline water produced from outside sources as needed to replace the volume of oil removed.[283] Saline or brackish water is drawn from underground reservoirs that are below the base of usable quality water.[284] The RRC requires a permit for wells associated with oil and gas activities that draw such water from formations below the base of usable quality water.[285]

Recently, the Texas Supreme Court held that landowners have an ownership interest in the water beneath their property that cannot be taken for public use without adequate compensation under the Texas Constitution.[286] The Texas courts have long held that landowners have ownership in oil and gas beneath their property, and the court found no reason to treat groundwater differently.[287] Accordingly, under Texas law, landowners are regarded as having absolute title in severalty to the groundwater in place beneath their land.[288] The only qualification of that rule of ownership is that it must be considered in connection with the law of capture.[289] Thus, a landowner has a right to exclude others from groundwater beneath his or her property, but one that cannot be used to prevent ordinary drainage.[290] Moreover, landowners have a constitutionally compensable interest in groundwater.[291] On remand, the lower court must determine whether an agency's denial of a landowner's application for a drilling permit constitutes a taking under the facts of this case.[292]

C. Surface Casing Program Transferred From TCEQ to RRC

On September 1, 2011, Article 2 of House Bill 2694 was passed which transferred from the TCEQ to the RRC duties relating to the protection of groundwater resources from oil and gas associated activities.[293] Specifically, the law transfers duties pertaining to the responsibility of preparing groundwater protection advisory/recommendation letters.[294] After the transfer, the RRC will be responsible for providing surface casing and/or groundwater protection recommendations for the following activities: (1) exploration, development, or production of oil and gas resources—new drilling, other drilling activities including, but not limited to, enhanced recovery injection wells, injection wells for brine mining, injection wells for underground storage of hydrocarbons, seismic exploration and cathodic protection wells, well integrity tests, plugging of abandoned wells, core holes, and microseismic boreholes; (2) subsurface disposal and injection of oil and gas waste—saltwater disposal wells; and (3) anthropogenic carbon dioxide injection wells and geologic storage facilities under the RRC's jurisdiction.[295]

D. The Oil Field Cleanup Fund and RRC Voluntary Cleanup Program

In 1991 the Texas Legislature created the Oilfield Cleanup Fund ("OFCF") within the Railroad Commission to deal with the burgeoning abandoned well problem.[296] Funding for the program comes from regulatory fees, permit fees and bond fees paid by the Oil and Gas industry.[297] An abandoned site becomes a candidate for state cleanup when the responsible party fails or refuses to take action, or is unknown, deceased or bankrupt.[298] Cleanup prioritization is based on public health, safety, and the protection of the environment.[299]

The Voluntary Cleanup Program ("RRC-VCP") provides an incentive to remediate Oil & Gas related pollution by participants as long as they did not cause or contribute to the contamination.[300] Applicants to the program receive a release of liability to the state in exchange for a successful cleanup.[301] When cleanup is completed, the RRC will issue a Certificate of Completion which embodies the release of liability to the state for a participant (and subsequent owners) who did not cause or contribute to the contamination and acquire the certificate by fraud, misrepresentation, or knowing failure to disclose material information.[302] However, some practitioners have argued that the RRC-VCP is not as attractive as the equivalent program under the TCEQ.[303] With regard to the TCEQ program, current owners oftentimes have exposure for cleanup even if they did not cause the contamination and will enter the TCEQ VCP in order to avoid enforcement and to obtain a certificate of completion which permits them to more easily sale the property.[304] However, with respect to the RRC-VCP, non-operating surface interest owners generally do not have liability for oil field contamination, and are therefore less likely to volunteer to clean it up.[305] In addition, the statutory authority for TCEQ program also permits cost-recovery claims against the responsible parties.[306] However, the authority for the RRC-VCP does not have an equivalent provision. Accordingly, a person who is not otherwise liable for cleanup has less an incentive to volunteer to clean it when there is no hope of collecting their costs against the responsible party.[307]

IV. LOCAL

A. Ordinances

The RRC does not have jurisdiction over, and exercises no regulatory authority with respect to, private or public roads or road use.[308] Permits issued by the RRC for oil and gas exploration, production, and waste disposal do not limit any independent authority of a municipality, county or other state agencies with respect to road use.[309] The RRC also no statutory authority over noise or nuisance related issues.[310] Noise and nuisance related issues would be governed by local ordinances.[311] In addition, The RRC does not have regulatory authority over odors or air contaminants.[312] However, for a well within the city limits, the city may enact ordinances regarding odors or other nuisances.[313]

Due to the increase in oil and gas activity, several cities in the Barnett Shale area have passed natural gas well ordinances to regulate issues such as distance requirements, sound level, water usage and permitting processes.[314] Setback distances (the minimum length between a dwelling and a gas well that is required by a city) and limits on noise levels that may be generated in both daytime and nighttime operations are the most common municipal regulation.[315] However, these requirements may vary from city to city.[316] For example, the Southlake ordinance provides that a well must be at least 1,000 feet from any habitable structure, or from the property line of any occupied public or private school or hospital whereas the City of Fort Worth ordinance only requires that the well be 600 feet away from such structures.[317]

B. Moratoriums

Several cities in the Barnett Shale are have also requested moratoriums on drilling permits in their area in to provide them with time to consider whether to adopt regulations. For instance, on January 18, 2011 Southlake City Council passed a resolution to place a 180 day moratorium on oil and gas permits to determine whether to amend its current regulations.[318] On June 10, 2008, the City of Flower Mound adopted a six month moratorium for new permits for certain pipelines and centralized collection facilities.[319] Chapter 212 of the Local Government Code governs moratoriums in Texas.

C. Limitations

The Texas Constitution requires that adequate compensation be paid when private property is taken for public use.[320] However, all property is held subject to the valid exercise of the police power.[321] A municipality is not required to make compensation for losses occasioned by the proper and reasonable exercise of its police power.[322] Municipalities in Texas have, under the police power, authority to regulate the drilling for and production of oil and gas within their corporate limits, when acting for the protection of their citizens and the property within their limits, looking to the preservation of good government, peace, and order therein.[323] However, if a municipality goes too far in the regulation of oil and gas activities, the municipality may be held to have taken property, thus requiring it to pay just compensation to the owner.[324] The question of whether a police power regulation is proper or whether it constitutes a compensable taking is a question of law.[325]

Although there is no bright line for distinguishing between an exercise of the police power which does constitute a taking and one which does not, there are two related requirements taken into consideration when assessing validity of an exercise of police power.[326] First, the regulation must be adopted to accomplish a legitimate goal; it must be "substantially related" to the health, safety, or general welfare of the people.[327] Second, the regulation must be reasonable; it cannot be arbitrary.[328] In other words, it must "substantially" advance the legitimate goals of the city.[329]

Although the Texas ordinances have not been challenged, there is case law from other jurisdictions in this regard. For instance, on August 12, 2011, a West Virginia court overturned a city's ordinance banning the hydraulic fracturing of Marcellus Shale.[330] The city, characterizing the hydraulic fracturing process as a nuisance, argued that it had the authority to enact and enforce the ordinance pursuant to the rights given to the city by the "Home Rule" provisions of the West Virginia Constitution.[331] However, the court ruled that the state's interest in oil and gas development and production as set forth in the West Virginia Code provides for the exclusive control of this area of law to be within the hands of the state environmental agency.[332] Moreover, the court held that the agency's regulations do not provide any exception or latitude to permit the city to impose a complete ban on fracking or to regulate oil and gas development and production.[333] Because the city's ordinance encroaches upon the state's all encompassing authority regarding the production and development of oil and gas resources, the court held that the ordinance was preempted by state law.[334]

However, on February 21, 2012, a New York court upheld a town's zoning amendment

that bans hydraulic fracturing within its jurisdiction.[335] The zoning amendment was enacted in response to a petition from town residents concerned about the impact hydraulic fracturing on ground and surface water supplies.[336] An energy company that had obtained gas leases covering more than one-third of the town's total area prior to the amendment argued that the state's Oil, Gas and Solution Mining Law preempted the zoning amendment.[337] However, the court held that that the law lacks a clear expression of legislative intent to preempt local zoning control over land use concerning oil and gas production.[338] The court, therefore, granted the town's motion for summary judgment validating the amendment.[339]

In addition, on February 24, 2012, another New York court upheld a town's enactment of a zoning law that bans oil and gas drilling, including hydraulic fracturing, within the geographical borders of the township.[340] In that case, the holder of two gas leases argued that Section 23-0303 of New York's Environmental Conservation Law preempted the zoning law.[341] That section states that "this article shall supersede all local laws or ordinances relating to the regulation of oil, gas and solution mining industries."[342] However, the court ruled that neither the plain reading of the statute nor its legislative history leads to the conclusion that this phrase was intended to abrogate the constitutional and statutory authority vested in municipalities to enact legislation affecting land use.[343] Rather, the court held that the natural and most obvious sense of the word "regulation" is that the legislature intended to insure state-wide standards with regard to the method and manner to be used in oil, gas, and solution drilling or mining.[344] According to the court, the state determines the "how" of such procedures, but the municipalities maintain control over the "where" of such exploration.[345] Accordingly, the court held that a local municipality may enact a land use regulation that permits or prohibits oil and gas drilling within the confines of its geographical jurisdiction.[346]

V. GOVERNMENT STUDIES

A. Federal

1. Environmental Protection Agency

In 2010, the U.S. House of Representatives Appropriation Conference Committee directed EPA to conduct research to examine the relationship between hydraulic fracturing and drinking water resources. In February 2011, EPA released its Draft Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources.[347] The scope of the study includes the full lifespan of water in hydraulic fracturing, from acquisition of the water, through the mixing of chemicals and actual fracturing, to the post-fracturing stage, including the management of flowback and produced water and its ultimate treatment and disposal.[348] The EPA has identified the following fundamental questions for each stage of the hydraulic fracturing lifecycle.

- *Water acquisition*: How might large volume water withdrawals from ground and surface water impact drinking water resources?
- *Chemical mixing*: What are the possible impacts of releases of hydraulic fracturing fluids on drinking water resources?

- *Well injection*: What are the possible impacts of the injection and fracturing process on drinking water resources?
- *Flowback and produced water*: What are the possible impacts of releases of flowback and produced water on drinking water resources?
- *Wastewater treatment and waste disposal*: What are the possible impacts of inadequate treatment of hydraulic fracturing wastewaters on drinking water resources?[349]

The study will involve retrospective case studies which will focus on investigating reported instances of drinking water resource contamination or other impacts in areas where hydraulic fracturing has already occurred as well as prospective case studies which will involve sites where hydraulic fracturing will occur after the research is initiated.[350]

EPA asked the EPA Science Advisory Board ("SAB") to provide a peer review of the draft study plan, and for the SAB to provide suggestions and comments.[351] The SAB is an independent, external federal advisory committee. The SAB met in April 2010 to provide advice on the proposed approach to be used to frame the hydraulic fracturing study design and on the areas that will be addressed by research relevant to hydraulic fracturing. Their ideas were provided to EPA in a June 2010 Report to the Administrator.

EPA considered SAB's comments, as well as stakeholder comments, in the development of the Final Study Plan.[352] On November 3, 2011, EPA announced the Release of the Final Draft of Hydraulic Fracturing Study Plan.[353] Initial research results are expected by the end of 2012 with a goal for a report in 2014.

EPA has selected seven case studies located in various formations locations across the country that the Agency believes will provide the most useful information about the potential impacts of hydraulic fracturing on drinking water resources under a variety of circumstances. Two prospective case studies, where EPA will monitor key aspects of the hydraulic fracturing process at future hydraulic fracturing sites, are located in: (1) Haynesville Shale - DeSoto Parish, LA, and (2) Marcellus Shale - Washington County, PA. Five retrospective case studies, which will investigate reported drinking water contamination due to hydraulic fracturing operations at existing sites, are located in: (1) Bakken Shale—Killdeer and Dunn Counties, ND, (2) Barnett Shale—Wise and Denton Counties, TX, (3) Marcellus Shale—Bradford and Susquehanna Counties, PA, (4) Marcellus Shale—Washington County, PA, and (5) Raton Basin—Los Animas County, CO. Recently, Texas Railroad Commissioner David Porter expressed his concerns about the scope, methodology, and science of the EPA's study.[354]

In addition, on August 11, 2011 EPA sent letters to nine oil and gas companies requesting their voluntary participation in the study.[355] EPA is requesting data on well construction, design, and well operation practices for 350 oil and gas wells that were hydraulically fractured from 2009-2010. EPA made this request as part of its national study to examine the potential impacts of hydraulic fracturing on drinking water resources. All nine oil and gas companies said that they planned to assist EPA.[356] The companies that received the letter included: Clayton Williams

Energy, ConocoPhillips, EQT Production, Hogback Exploration, Laramie Energy II, MDS Energy, Noble Energy, Sand Ridge Operating and Williams Production.

On September 9, 2010, EPA issued voluntary information requests to nine hydraulic fracturing service providers.[357] The data requested included: (1) the chemical composition of fluids used in the hydraulic fracturing process, (2) data on the impacts of the chemicals on human health and the environment, (2) standard operating procedures used at hydraulic fracturing sites, and (3) the locations of sites where fracturing has been conducted.

According to EPA, in response to EPA's September 2010 request, it received a list of approximately 25,000 oil and gas production wells that were hydraulically fractured between 2009 and 2010 and the names of the oil and gas operator for each well.[358] To identify the wells for the request, EPA first sorted the list of operators by those with the most wells to those with the fewest wells. EPA defined operators to be "large" if their combined number of wells accounted for the top 50% of wells on the list, "medium" if their combined wells accounted for the next 25% of wells on the list, or "small" if their wells were among the last 25% of wells on the list, and removed all operators with 10 wells or less. Then, using a map from the U.S. Energy Information Administration showing all shale gas plays, EPA classified four different areas of the nation: East, South, Rocky Mountain (including California) and Other. To choose the nine companies that received the request, EPA randomly selected one "large" operator from each from the geographic areas, for a total of four "large" operators, and then randomly, and without geographic consideration, selected two "medium" and three "small" operators. Once the nine companies were identified, we used a computer algorithm that balanced geographic diversity and random selection within an operator's list to select wells until we had a total of 350 wells.

2. Department of Energy

On May 5, 2011, U.S. Energy Secretary Steven Chu charged the Secretary of Energy Advisory Board ("SEAB") Natural Gas Subcommittee to make recommendations to improve the safety and environmental performance of natural gas hydraulic fracturing from shale formations.[359] President Obama directed Secretary Chu to form the Subcommittee as part of the President's "Blueprint for a Secure Energy Future."[360]

On August 11, 2011, the Subcommittee produced its first ninety day report.[361] The report includes numerous findings and recommendations including the need to: (1) improve public information about shale gas operations; (2) improve communication among state and federal regulators; (3) improve air quality; (4) protect water quality; (5) disclose fracturing fluid composition; (6) reduce use of diesel fuel; (7) manage short-term and cumulative impacts on communities, land use, wildlife, and ecologies; (8) organize for best practices; (9) increase research and development.[362] The report also identified four major areas of concern: (a) possible pollution of drinking water from methane and chemicals used in fracturing fluids; (b) air pollution; (c) community disruption during shale gas production; and (d) cumulative adverse impacts that intensive shale production can have on communities and ecosystems.

On November 18, 2011, the Subcommittee produced its second ninety day report.[363] In this report the Subcommittee focuses largely on implementation of the twenty recommendations presented in its first ninety day report.[364]

3. Department of Interior

The Interior Department's Bureau of Land Management ("BLM") is readying its own draft rules requiring drillers to disclose fracking chemicals used in operations on public lands, which include provisions for disclosing wastewater composition and management practices.[365] The draft, which is modeled on Colorado's disclosure plan, includes a broad mandate requiring drillers to disclose "the complete chemical makeup of all materials used in the actual stimulation fluid without regard to original source additive."[366] But it also includes language outlining the bar companies would have to meet to avoid public disclosure of materials considered confidential business information. In this regard "operators must "specifically identify information claimed to be exempted from public disclosure by a Federal statute or regulation," "identify the law or regulation that protects the information, and explain in detail why the specific information is exempted from public disclosure," and verify that the information is not publicly available through any other means, such as state mandates.[367]

4. Department of Health and Human Services

In January 2010, the National Institute for Occupational Safety and Health ("NIOSH") which is part of the Centers for Disease Control and Prevention within the Department of Health and Human Service stated that there is a lack of existing information regarding the variety and magnitude of chemical exposure risks to oil and gas extraction workers.[368] To determine if risks are present, NIOSH seeks to develop partnerships with the oil and gas extraction industry to identify, characterize and (if needed) control workplace chemical exposures.[369] The goals of this NIOSH field effort include: 1) identifying processes and activities where chemical exposures could occur; 2) characterizing potential exposures to vapors, gases, particulates and fumes (e.g., solvents, diesel particulate, crystalline silica, acids, metals, aldehydes, and possibly other chemicals identified during the study); 3) depending on results of the field effort, recommending safe work practices and/or proposing and evaluating exposure controls (to include engineering controls, substitution, and personal protective equipment).[370]

In addition, on November 7, 2011, the Agency for Toxic Substances and Disease Registry ("ATSDR"), investigated the water quality of seven residential wells surrounding a Chesapeake natural gas well site in Leroy Township, Bradford County, Pa., at the request of the EPA following a well blowout.[371] ATSDR found that several wells had elevated levels of salts and other chemicals.[372] While it is unclear how the wells were contaminated, the available data suggest to ATSDR that one well was impacted by natural gas activities.[373] In addition, the ATSDR was involved in analysis of groundwater samples from incidents involving oil and gas operations in Pavillion, Wyoming.[374]

5. Securities and Exchange Commission

As a result of recent scrutiny of the environmental ramifications of using hydraulic fracturing operations to drill shale formations, the SEC staff has asked registrants to describe steps they have taken to minimize the potential environmental impacts of these operations.[375] These steps include: (1) ensuring that drilling, casing, and cementing adhere to known best practices; (2) monitoring the rate and pressure of the fracturing treatment for abrupt changes; (3) evaluating the environmental impact of additives to the hydraulic fracturing fluid; (4) minimizing the use of water or disposing of it in a way that reduces the impact on nearby surface water.[376] The SEC staff has also asked registrants to provide the SEC with reports detailing the chemicals used in hydraulic fracturing fluids, including the volume/concentration and total amounts used in the fluid formulation.[377]

6. Delaware River Basin Commission

The Delaware River is the longest un-dammed river in the United States east of the Mississippi, extending 330 miles from the confluence of its East and West branches at Hancock, N.Y. to the mouth of the Delaware Bay where it meets the Atlantic Ocean.[378] Over 15 million people (approximately five percent of the nation's population) rely on the waters of the Delaware River Basin for drinking, agricultural, and industrial use.[379] The Delaware River Basin Commission ("DRBC") is a federal-interstate compact government agency that was formed by concurrent legislation enacted in 1961 by the United States and the four basin states (Pennsylvania, New York, New Jersey, and Delaware).[380] Its five members include the basin state governors and the Division Engineer, North Atlantic Division, U.S. Army Corps of Engineers, who serves as the federal representative.[381] The commission has legal authority over both water quality and water quantity-related issues throughout the basin.[382]

In connection with natural gas drilling, the commission has identified three major areas of concern: (1) gas drilling projects in the Marcellus Shale or other formations may have a substantial effect on the water resources of the basin by reducing the flow in streams and/or aquifers used to supply the significant amounts of fresh water needed in the natural gas mining process; (2) on-site drilling operations may potentially add, discharge or cause the release of pollutants into the ground water or surface water; and (3) the recovered "frac water" must be treated and disposed of properly.[383] The commissioners at their May 5, 2010 meeting unanimously directed staff to develop draft regulations in the shales for notice and comment rulemaking and postponed the DRBC's consideration of well pad dockets until regulations are adopted.[384] The special meeting scheduled for Nov. 21, 2011 to consider adoption of draft natural gas development regulations was postponed to allow additional time for review by the five DRBC members.[385] There are still some unresolved issues that the commissioners are working through and no new date has yet been announced for a vote on the draft regulations.[386]

7. Susquehanna River Basin Commission

The Susquehanna River is the nation's sixteenth largest river and is the largest river lying entirely in the United States that flows into the Atlantic Ocean.[387] The Susquehanna and its

hundreds of tributaries drain 27,510 square miles, an area nearly the size of South Carolina, spread over parts of the states of New York, Pennsylvania, and Maryland.[388] In 1970, Congress of the United States, and the legislatures of New York State, Pennsylvania and Maryland adopted the Susquehanna River Basin Compact which provided a mechanism to guide the conservation, development, and administration of the water resources of the vast river basin.[389] The Compact established the Susquehanna River Basin Commission ("SRBC") as the agency to coordinate the water resources efforts of the three states and the federal government.[390] Recently, the SRBC proposed issued proposed natural gas drilling rules with will regulate all withdrawals of surface water and groundwater and consumptive water uses within the basin for natural gas development in certain tight shale formations.[391]

8. Department of Transportation

On August 25, 2011, the Department of Transportation, Pipeline and Hazardous Materials Safety Administration ("PHMSA") issued an advanced notice of proposed rulemaking ("ANPR") related to its safety program for natural gas transmission pipelines.[392] The ANPR asks for comment on various questions concerning whether pipeline integrity management ("IM") requirements and other regulatory requirements relating to system integrity should be enhanced.[393] Written comments were due by December 2, 2011, though parties requested additional time to submit comments.[394] The PHMSA administers a series of statutes known as the Pipeline Safety Laws, which are minimum safety standards for transportation of gas by pipeline.[395] PHMSA notes that IM requirements have increased the level of safety concerning the transportation of gas in high consequence areas ("HCAs").[396]

The ANPR seeks public comment on 14 specific topics within two broad categories: (1) should IM requirements be revised and strengthened to bring more pipeline mileage under IM requirements and to better assure safety of pipeline segments in HCAs; and (2) should non-IM requirements be strengthened or expanded to address other issues associated with pipeline system integrity? Each broad category includes specific topics such as: modifying the definition of an HCA, modifying repair criteria, revising the requirements for collecting, validating and integrating pipeline data, valve spacing and the need for remotely or automatically controlled valves, corrosion control, and more.[397]

9. Department of Commerce

The National Oceanic and Atmospheric Administration ("NOAA"), the federal agency that focuses on the condition of the oceans and the atmosphere, completed a study that measured air emissions, starting just outside Denver, Colorado, that may help explain smog problems across parts of the Western US.[398] The federal scientists concluded that emissions from oil and gas drilling in the area help explain the region's smog problem.[399] They also found that airborne emissions from these drilling sites had been underestimated.[400]

10. Department of State

The Department of State ("DOS") launched the Global Shale Gas Initiative ("GSGI") in April 2010 in order to help countries seeking to utilize their unconventional natural gas resources to identify and develop them safely and economically.[401] According to the GSGI, future climate policies could increase demand for shale gas since it is a lower-carbon "bridge fuel" to reduce CO2 emissions.[402] Although the U.S. shale gas experience cannot be precisely duplicated, its application through GSGI can be instrumental in helping governments understand the complexities of shale gas development.[403] Governments often have limited capability to assess their own country's shale resource potential or are unclear about how to develop shale gas in a safe and environmentally sustainable manner through establishing the right regulatory policy and fiscal structures.[404] The ultimate goals of GSGI are to achieve greater energy security, meet environmental objectives and further U.S. economic and commercial interests.[405]

11. Department of Agriculture

Wayne National Forest recently announced that the USDA Forest Service has withdrawn over 3000 acres of public lands from a federal oil and gas lease sale scheduled for December 7, 2012.[406] According to the news release, the Forest will assemble a team of natural resource specialists to do further analysis and to review the best scientific information available with regard to the surface effects of deep horizontal drilling and lateral hydraulic fracturing.[407] The Review of New Information ("RONI") will assist the Forest in making a decision whether the 2006 Forest Plan needs to be amended or revised.[408] The review will disclose the effects on the surface that's associated with this new technology.[409]

B. Texas

1. TCEQ Barnett Shale Air Studies

Since 2002, gas production activity in the Barnett Shale area has experienced significant growth and the TCEQ has been improving emissions data from oil and gas production and is conducting in-depth measurements to fully evaluate potential health effects.[410] The TCEQ is using state-of-the-art technology to address emissions from Barnett Shale activities and overall oil and gas operations.[411] In particular, the TCEQ has used infrared gas-imaging camera to study emissions from individual tanks or tank batteries associated with upstream oil and gas production in various counties with the Barnett Shale.[412] Information and results from such studies as well as of other activities are detailed on the TCEQ's website.[413]

2. RRC Appoints Eagle Ford Task Force

The Eagle Ford Shale is rapidly becoming one of Texas' largest domestic crude oil and natural gas discoveries in more than 40 years.[414] Roughly 50 miles wide and 400 miles long, the Eagle Ford spreads across Texas from the Mexican border covering 24 Texas counties.[415] The RRC recently announced that it has appointed the Eagle Ford Task Force .[416] Its main purpose is to serve as a forum for dialogue, so that task force members can bring issues and concerns from their constituents to the table and work toward solutions.[417] Over the next year, the task force will discuss the following: (1) water usage as it relates to hydraulic fracturing; (2) the impact of oil and gas production on community infrastructure; (3) the need for public education regarding oil and gas production; and (4) promoting economic development stemming from oil and gas production.[418]

On October 12, 2011, the RRC announced that the task force adopted the following advisements with respect to pipelines: (1) the placement of pipelines should avoid steep hillsides and watercourses where feasible; (2) pipeline routes should take advantage of road corridors to minimize surface disturbance; (3) when clearing is necessary, the width disturbed should be kept to a minimum and topsoil material should be stockpiled to the side because retaining topsoil for replacement during reclamation can significantly accelerate successful revegetation; (4) proximity to buildings or other facilities occupied or used by the public should be considered. Particular consideration should be given to homes; (5) unnecessary damage to trees and other vegetation should be avoided; (6) after installation of a new line, all rights-of-way should be restored to conditions compatible with existing land use.[419]

With respect to road, the task force stated the following: (1) the task force supports trucking companies partnering with the Texas Department of Public Safety to develop a program that would alert companies when their drivers receive moving violations or drivers license suspensions; (2) the task force supports the creation of road use agreements or trucking plans between operators and local authorities. These agreements could include parameters such as: (a) operators must avoid peak traffic hours, school bus hours and community events; (b) operators must establish overnight quiet periods; and (c) operators must ensure adequate off-road parking and delivery areas at all sites to avoid lane/road blockage.[420]

On January 26, 2012, the RRC announced that the task force came to the conclusion that, based on the information presented, the Carrizo Wilcox Aquifer in South Texas appears to contain enough water resources to support oil and gas drilling activities, including hydraulic fracturing, in the Eagle Ford Shale while meeting all other projected uses.[421] The data presented to the group indicated that drilling and completions in the Eagle Ford Shale account for approximately six percent of the water demand in South Texas, while irrigation accounts for 64 percent and municipal uses account for 17 percent.[422] In addition, the industry as a whole has reduced the amount of water it uses to hydraulically fracture wells.[423] Currently, industry is reporting an average use of approximately 11 acre-feet of water used to complete each well, down from the approximately 15 acre-feet previously used.[424] Industry experts informed the task force that approximately 2,600 to 2,800 new wells are expected to be completed annually in the Eagle Ford

Shale at peak demand, which translates into about 30,000 acre-feet of water per year during the heaviest point of development of the Eagle Ford Shale.[425] In 2008, the Carrizo Wilcox Aquifer contained 540,000 acre-feet of available water.[426] The task force will continue to meet monthly to examine issues pertinent to the region.[427]

VI. UNIVERSITY & INDUSTRY STUDIES

A. Is the Greenhouse Gas Footprint of Shale Gas More Than Coal?

1. Cornell University I

In April 2011, researchers at Cornell University published a study that challenged the assumption that shale gas has a low greenhouse gas footprint.[428] Although the study acknowledged that less carbon dioxide is emitted from burning natural gas than burning coal per unit of energy generated, it nonetheless concluded that the greenhouse gas footprint of shale gas is significantly larger than that from conventional gas, due to methane emissions with flow-back fluids and from drill out of wells during well completion.[429] According to the study, the large GHG footprint of shale gas undercuts the logic of its use as a bridging fuel over coming decades, if the goal is to reduce global warming.[430]

Interestingly, on January 3, 2012, a different group of researchers at Cornell University published a study that was critical of the first study referenced above.[431] They start by stating that it is not in dispute that natural gas is widely considered to be an environmentally cleaner fuel than coal because it does not produce detrimental by-products such as sulfur, mercury, ash and particulates and because it provides twice the energy per unit of weight with half the carbon footprint during combustion.[432] However, in the recent publication referenced above, the first Cornell researchers report that their life-cycle evaluation of shale gas drilling suggests that shale gas has a larger GHG footprint than coal and that this larger footprint "undercuts the logic of its use as a bridging fuel over the coming decades".[433]

2. Cornell University II

The second group of researchers argue that their analysis is "seriously flawed" in that they significantly overestimate the fugitive emissions associated with unconventional gas extraction, undervalue the contribution of "green technologies" to reducing those emissions to a level approaching that of conventional gas, base their comparison between gas and coal on heat rather than electricity generation (almost the sole use of coal), and assume a time interval over which to compute the relative climate impact of gas compared to coal that does not capture the contrast between the long residence time of CO2 and the short residence time of methane in the atmosphere.[434] The researchers conclude that using more reasonable leakage rates and bases of comparison, shale gas has a GHG footprint that is half and perhaps a third that of coal.[435]

3. Carnegie Mellon University

On August 5, 2011, researchers at Carnegie Mellon University released a study that estimates the life cycle greenhouse gas emissions from the production of Marcellus shale natural gas and compares its emissions with national average US natural gas emissions produced in the year 2008, prior to any significant Marcellus shale development.[436] The study concluded that Marcellus shale natural gas greehhouse gas emissions are comparable to those of imported liquefied natural gas.[437] Further, the study found that natural gas from the Marcellus shale has generally lower life cycle greenhouse gas emissions than coal for production of electricity in the absence of any effective carbon capture and storage processes, by 20–50% depending upon plant efficiencies and natural gas emissions variability.[438] The study received financial support from the Sierra Club.[439]

4. The National Energy Technology Laboratory

On October 24, 2011, the National Energy Technology Laboratory ("NETL"), a division of the Department of Energy, issued a report which rebutted the findings of the first Cornell study.[440] In the report, the NETL found that the natural gas-fired baseload power production has life cycle greenhouse gas emissions 42 to 53 percent lower than those for coal-fired baseload electricity, after accounting for a wide range of variability and compared across different assumptions of climate impact timing.[441] According to the report, the lower emissions for natural gas are primarily due to differences in the current fleets' average efficiency – 53 percent or natural gas versus 35 percent for coal, and a higher carbon content per unit of energy for coal than natural gas.[442] Even using unconventional natural gas, from tight sands, shale and coal beds, and compared with a 20-year global warming potential (GWP), natural gas-fired electricity has 39 percent lower greenhouse gas emissions than coal per delivered megawatt-hour (MWh) using current technology.[443]

5. Worldwatch Institute

In August 2011, a new study from the Worldwatch Institute and the Deutsche Bank Climate Change Advisors concluded that over its full cycle of production, distribution, and use, natural gas emits just over half as many greenhouse gas emissions as coal does for equivalent energy output.[444] The analysis clarifies the role of methane releases in the calculation of comparative emissions between the two fossil fuels and explores how the growing share of natural gas production from shale formations could change that fuel's footprint.[445]

6. University of Maryland

In December 2011, a group of researchers at the University of Maryland compared the greenhouse gas footprints of both conventional and unconventional natural gas with coal in a transparent and consistent way, focusing primarily on the electricity generation sector.[446] The researchers concluded that for electricity generation the greenhouse gas impacts of shale gas are only marginally higher than those of conventional gas, and both remain substantially lower than

those of coal under standard assumptions.[447] In particular, they stated that even with high existing uncertainties in fugitive emissions from the hydraulic fracturing process, the greenhouse footprint of shale gas and other unconventional gas resources is about 11% higher than that of conventional gas for electricity generation, and still 56% that of coal.[448] Moreover, if the spread in future fleet efficiencies between gas and coal increases over the coming decades, this differential from coal will continue to increase.[449]

B. Does Hydraulic Fracturing Cause Contamination of Groundwater?

1. Duke University

On April 14, 2011, Duke University researchers published a report which concluded that in aquifers overlying the Marcellus and Utica shale formations of northeastern Pennsylvania and upstate New York, there was systematic evidence for methane contamination of drinking water associated with shale gas extraction.[450] The report states that although methane concentrations were detected in generally 85% of the drinking water wells across the region, regardless of gas industry operations, concentrations were substantially higher closer to natural-gas wells. Specifically, methane concentrations were 17-times higher on average in shallow wells from active drilling and extraction areas than in wells from non-active areas. They then analyzed the origin of the methane and concluded that much of the gas found near the active sites was consistent with deeper thermogenic methane gas from sources such as the Marcellus and Utica shales at the active sites as opposed to shallower biogenic gas. However, despite its conclusion with regard to methane, the report states that they found no evidence of contamination of drinking-water samples with deep saline brines or fracturing fluids.

2. Cabot Oil and Gas

On December 5, 2011, Cabot Oil & Gas Corporation along with GSI Environmental, Inc. released a study which indicates that methane in Pennsylvania water wells is unrelated to Marcellus shale fracturing.[451] The study states that results from more than 1,700 water wells sampled and tested prior to proposed drilling in Susquehanna County, Pa., show methane to be ubiquitous in shallow groundwater, with a clear correlation of methane concentrations with surface topography.[452] Specifically, water wells located in lowland valley areas exhibit significantly higher dissolved methane levels than water wells in upland areas, with no relation to proximity of existing gas wells.[453] According to the study, the correlation of methane concentrations with elevation indicates that, on a regional level, elevated methane concentrations in groundwater are a function of geologic features, rather than shale gas development.[454]

Furthermore, based upon a "multiple-lines-of-evidence" approach, the study indicates that the methane found is either thermogenic, originating from deposits overlying the Marcellus shale, or biogenic, originating from alluvial or glacial drift deposits.[455] In either case, the study claims that the assertion by the Duke study that hydraulic fracturing of the Marcellus shale is contributing thermogenic methane to local water wells is unsubstantiated.[456] Rather, they conclude that the

thermogenic methane encountered in the water wells is related to the shallow Upper and-or Middle Devonian gases.[457]

3. The University of Texas

On November 9, 2011, the University of Texas at Austin's Energy Institute announced that preliminary findings from a study on the use of hydraulic fracturing in shale gas development suggest no direct link to reports of groundwater contamination.[458] The researchers stated that from what they have seen so far, many of the problems appear to be related to other aspects of drilling operations, such as poor casing or cement jobs, rather than to hydraulic fracturing, per se.[459]

On February 16, 2012, the Energy Institute issued its final report which found that many problems ascribed to hydraulic fracturing are related to processes common to all oil and gas drilling operations, such as casing failures or poor cement jobs.[460] University researchers also concluded that many reports of contamination can be traced to above-ground spills or other mishandling of wastewater produced from shale gas drilling, rather than from hydraulic fracturing per se.[461]

Other findings from the Energy Institute study include: (1) natural gas found in water wells within some shale gas areas (e.g., Marcellus) can be traced to natural sources and probably was present before the onset of shale gas operations; (2) although some states have been proactive in overseeing shale gas development, most regulations were written before the widespread use of hydraulic fracturing; (3) media coverage of hydraulic fracturing is decidedly negative, and few news reports mention scientific research related to the practice; (4) overall, surface spills of fracturing fluids pose greater risks to groundwater sources than from hydraulic fracturing itself; and (5) the lack of baseline studies in areas of shale gas development makes it difficult to evaluate the long-term, cumulative effects and risks associated with hydraulic fracturing.[462]

The University of Texas also provided an overview of two other Energy Institute initiatives related to the use of hydraulic fracturing in shale gas development.[463] The first project, which will commence in April, is a detailed case study focusing on claims of groundwater contamination in North Texas' Barnett Shale.[464] The research will entail an examination of various aspects of shale gas development, including site preparation, drilling, production, and handling and disposal of flow-back water.[465] Researchers also will identify and document activities unrelated to shale gas development that have resulted in water contamination.[466] It will also assess the quantity of fresh groundwater used in shale gas development and evaluate ways to reduce the amount.[467] A second project, currently under development, would include a field and laboratory investigation of whether hydrological connectivity exists between water in the units above and below the shale unit being fractured as a result of the fracturing process.[468] As envisioned, the project calls for university researchers to conduct field sampling of hydraulic fracturing fluid, flow-back water, produced water, and water from aquifers and other geologic units within the Barnett Shale.[469]

Researchers will also supplement the study with an examination of reports relating to atmospheric emissions and seismic activity attributed to hydraulic fracturing, which have emerged as significant issues of concern in recent months.[470] The Environmental Defense Fund assisted in developing the scope of work and methodology for the study.[471]

4. Pennsylvania State University

In October 2011, Penn State University released a entitled "The Impact of Marcellus Gas Drilling on Rural Drinking Water Supplies" which was conducted by researchers from the university and was funded by the Center for Rural Pennsylvania.[472] The research looked to provide an unbiased and large-scale study of water quality in private water wells in rural Pennsylvania before and after the drilling of nearby Marcellus Shale gas wells.[473] It also looked to document both the enforcement of existing regulations and the use of voluntary measures by homeowners to protect water supplies.[474] For the study, the researchers evaluated water sampled from 233 water wells in proximity to Marcellus gas wells in rural regions of Pennsylvania in 2010 and 2011.[475] Among these were treatment sites (water wells sampled before and after gas well drilling nearby) and control sites (water wells sampled though no well drilling occurred nearby).[476]

According to the study results, approximately 40 percent of the water wells failed at least one Safe Drinking Water Act water quality standard, most frequently for coliform bacteria, turbidity and manganese, before gas well drilling occurred.[477] The study's pre-drilling results for dissolved methane also provided new information that documented its occurrence in about 20 percent of water wells, although levels were generally far below any advisory levels.[478] In this study, statistical analyses of post-drilling versus pre-drilling water chemistry did not suggest major influences from gas well drilling or hydrofracturing on nearby water wells, when considering changes in potential pollutants that are most prominent in drilling waste fluids.[479] When comparing dissolved methane concentrations in the 48 water wells that were sampled both before and after drilling, the research found no statistically significant increases in methane levels after drilling and no significant correlation to distance from drilling.[480]

C. What are the Benefits or Harms of Exploration from Shale Formations?

1. MIT University

In June 2010, MIT University released an interdisciplinary study titled "The Future of Natural Gas" which discussed the role of natural gas in a carbon-constrained economy.[481] The study stated that the environmental impacts of shale development are challenging but manageable.[482] Shale development requires large-scale fracturing of the shale formation to induce economic production rates.[483] There has been concern that these fractures can also penetrate shallow freshwater zones and contaminate them with fracturing fluid, but there is no evidence that this is occurring.[484] There is, however, evidence of natural gas migration into freshwater zones in some areas, most likely as a result of substandard well completion practices by a few operators.[485] There are additional environmental challenges in the area of water management, particularly the effective disposal of fracture fluids.[486] Concerns with this issue are particularly acute in regions

that have not previously experienced large-scale oil and natural gas development, especially those overlying the massive Marcellus shale, and do not have a well-developed subsurface water disposal infrastructure.[487] According to the study, it is essential that both large and small companies follow industry best practices; that water supply and disposal are coordinated on a regional basis and that improved methods are developed for recycling of returned fracture fluids.[488]

2. Rice University

In July 2011, researchers at the James A. Baker III Institute for Public Policy at Rice University released a study that discussed the effect of shale gas on the United States national security.[489] The study examined some of the geopolitical consequences of rising supplies of natural gas from shale and the implications for U.S. security and foreign policy. The study found that full development of commercial shale gas resources in the United States will have multiple beneficial effects for U.S. energy security and national interests. The full and timely development of U.S. shale gas resources will limit the need for expensive imports of LNG, reducing the energy-related swelling of the U.S. trade deficit and thereby helping to strengthen the U.S. economy. Shale gas will also lower the cost to average Americans of reducing greenhouse gases as the country switches to cleaner fuels.

Moreover, the study found that as greater shale gas production creates greater competition among suppliers in global markets, U.S. and international prices for natural gas are kept from rising substantially. Increased competition among world natural gas suppliers due to shale gas developments also reduces the threat that a Gas-OPEC can be formed, and it will trim the petro-power of energy producing countries such as Russia, Iran, and Venezuela to assert themselves using an "energy" weapon or "energy diplomacy" to counter U.S. interests abroad.

The study concluded that it will be essential for the United States to promote a stable investment climate with regulatory certainty. In particular, the United States will need adopt policies that ensure shale gas exploitation can proceed steadily and predictably with sound environmental oversight. The United States should focus squarely on setting the policies needed to ensure that shale gas can play a significant role in the U.S. and global energy mix, thereby contributing to greater diversification of global energy supplies and to the long-term national interests of the United States.

3. Colorado School of Public Health

On March 19, 2012, the Colorado School of Public Health released preliminary results from a study that raises concerns about the potential public health impact of air emissions from unconventional gas drilling operations.[490] Researchers at the Colorado School of Public Health examined three years of air monitoring data in Garfield County, Colorado and concluded that residents living near natural gas wells may face increased exposure to benzene, a known human carcinogen, and other toxic chemicals, such as ethyl benzene, toluene, and xylene.[491] The researchers found higher lifetime cancer risks for people living closer to the wells.[492] They also

concluded that these nearby residents have a higher risk of experiencing neurological and respiratory health effects, such as headaches, throat and eye irritation, impaired lung capacity, dizziness, fatigue, numbness in the limbs, and tremors.[493]

On March 21, 2012, the Colorado Oil & Gas Association issued a press release in response to the Colorado School of Public Health report saying it is based on faulty assumptions, including over stating how long it takes to drill a well and outdated data that fails to reflect significant regulatory changes resulting in reduced emissions.[494] The association states that Colorado State University is crafting an emissions study for Garfield County, in collaboration with EPA and others, that will "provide the reliable, relevant data that must precede health impact studies related to oil and gas drilling."[495]

VII. LITIGATION TRENDS

A. Recent Texas Lawsuits

Although civil lawsuits against oil and gas operators for alleged pollution are not new in Texas, there has been a significant increase in recent litigation that relates to hydraulic fracturing operations. For instance, the following lawsuits have recently been filed:

1. *Scoma v. Chesapeake Energy Corp., et al*.

On June 1, 2010, Jim and Linda Scoma filed suit against Chesapeake Energy Corporation in the 413th Judicial District Court in Johnson, County, Texas. Chesapeake subsequently removed the matter to the Northern District of Texas. On August 11, 2010, Plaintiff's filed their amended complaint in the Northern District of Texas.[496] According to the amended complaint, the Scomas' house is near a Chesapeake oil and gas well in Johnson County which is within the Barnett Shale. The Scomas' claim that Chesapeake's activities (including hydraulic fracturing) contaminated their water well which has now turned an orange/yellow color, tastes bad, and gives off a foul odor. Testing results performed on the well water in 2008 and again in 2009 show an increased concentration of harmful petroleum constituents, such as benzene, toluene, ethylbenzene, xylene, barium, and iron. The plaintiffs asserted causes of action for nuisance, trespass and negligence and seek exemplary damages as well as a permanent injunction "precluding future drilling and fracking activities near Plaintiffs' land." The plaintiffs also claim that the continuing tort doctrine tolls their statute of limitations.

On May 10, 2011, Chesapeake filed a motion for summary judgment in this matter.[497] In the motion, Chesapeake argued that: (1) it was not a proper party to the lawsuit as it is not the lessee under the Lease, does not own any minerals, and does not conduct any drilling or completion operations and activities near Plaintiffs' Property; (2) each of Plaintiffs' claims are barred by limitations and the alleged conduct of Chesapeake is not subject to the continuing tort doctrine; (3) Plaintiffs' nuisance claim fails as a matter of law, because Plaintiffs have admittedly suffered no damages; (4) Plaintiffs' trespass claim fails as a matter of law, as Chesapeake has never

intentionally or voluntarily entered the Property and Plaintiffs have admittedly suffered no damages; and (5) Plaintiffs' negligence claim fails as a matter of law, because Plaintiffs admittedly have suffered no damages, Chesapeake owes no duty to Plaintiffs, and Chesapeake is not making use of the surface of Plaintiffs' Property. In response, Plaintiffs filed an "Emergency Motion to Stay for 58 Days Plaintiffs' Response to Defendant Chesapeake Energy Corporation's Motion for Summary Judgment" which was granted by the Court.[498] The parties subsequently settled or otherwise resolved their claims and a Final Judgment was entered on December 9, 2011 which dismissed this matter..[499]

2. *Sizelove v. Williams Production, et al.*

On November 3, 2010, John Mitchell Sizelove and Jaymen Sizelove filed suit against Williams Production Company, LLC, Mockingbird Pipeline, L.P., XTO Energy, Inc., Gulftex Operating, Inc., Trio Consulting & Management, LLC and Exexco, Inc. in the 431rd Judicial District Court in Denton County, Texas.[500] The Plaintiffs allege that defendants' compressor and gas drilling operations caused Plaintiffs to suffer headaches and respiratory problems. Defendants allegedly installed a drill water collection site and gas compressor station 250 feet from the home, a gas pipeline just 400 feet from the home, and eight gas drills within a three-quarter mile radius. The complaint contends that the defendants cut down trees on the property and allowed workers to use the land as a toilet. These operations allegedly lowered the property value with constant noise and toxic formaldehyde, sulfur dioxide, benzene, toluene, and xylene emissions. Plaintiffs allege claims for nuisance and trespass, and seek property damages, damages for mental anguish, and exemplary damages. The case is currently set for trial on November 26, 2012.

3. *Heinkel-Wolfe v. Williams Production, et al.*

On November 3, 2012, Margaret Heinkel-Wolfe, Individually and as Next Friend for Paige Caroline Wolfe, a minor filed suit filed suit against Williams Production Company, LLC, Mockingbird Pipeline, L.P., XTO Energy, Inc., Gulftex Operating, Inc., Trio Consulting & Management, LLC and Exexco, Inc. in the 362nd Judicial District Court in Denton County, Texas.[501] Similarly to the *Sizelove* matter, the Plaintiffs allege injuries due to the installation of a drill water collection site and gas compressor station just 990 feet from their home, and a gas pipeline just 700 feet away and eight gas drills within a three-quarter mile radius. Plaintiffs allege these operations have lowered their property value with constant racket and toxic formaldehyde, sulfur dioxide, benzene, toluene, and xylene emissions. Plaintiffs claim to suffer from headaches, respiratory ailments, and troubled breathing as a result of the defendants' drilling and compressing operations, which are polluting the air and water surrounding the plaintiffs' home. In their amended complaint, plaintiffs dropped their negligence claims and allegations of water contamination, but retained causes of action for nuisance and trespass. The matter is currently set for trial on September 17, 2012.

4. *Brock v. Jack Grace Production*

On September 15, 2011, Charles and Sharee Brock filed suit against Jack Grace Production in Montague County.[502] The plaintiffs' house is allegedly near oil and gas operations of the defendant. According to the petition, after watching the 2010 Gasland documentary, the plaintiff lit his tap water on fire which he attributes to defendants' operations. Plaintiffs' water allegedly contained various pollutants as well as dissolved methane. Plaintiffs asserted claims for nuisance, trespass, and negligence and seek various damages including exemplary damages. The plaintiffs also claim that the continuing tort doctrine tolls their statute of limitations. Following initial rounds of discovery, Plaintiffs sought to non-suit the matter which was granted on June 15, 2011.[503]

5. *Mitchell v. Encana Oil & Gas (USA), Inc., et al*.

On December 15, 2010 Grace Mitchell filed suit against Encana Oil & Gas and Chesapeake in the Northern District of Texas.[504] According to the Complaint, Ms. Mitchell's house is near to the defendants' oil and gas wells located in Johnson County, Texas which is within the Barnett Shale. Ms. Mitchell claims that soon after the Defendants commenced their drilling and hydraulic fracturing operations her groundwater, which was her primary source of water, became contaminated. Plaintiff claims that she can no longer use the water from her own well for consumption, bathing, or washing clothes because in May 2010, the well water started to feel slick to the touch and gave off an oily, gasoline-like odor. Testing results performed on the groundwater well confirmed it was contaminated with various chemicals, including various hydrocarbons, similar to diesel fuel. Ms. Mitchell has asserted claims for nuisance, trespass, fraud/fraudulent concealment and strict liability for ultra-hazardous and abnormally dangerous activities. Ms. Mitchell also seeks various damages including exemplary damages and damages for future medical monitoring.

On March 15, 2011, Chesapeake filed a motion to dismiss.[505] In its motion, Chesapeake argued that: (1) Plaintiff's nuisance, trespass, and negligence claims fail Federal Rule of Civil Procedure 8's "Plausibility" Test; (2) Plaintiff failed to plead her fraud and fraudulent concealment claim with specificity under Federal Rule of Civil Procedure 8 and 9(b); and (3) Texas law does not recognize abnormally dangerous activities doctrine as a basis for strict liability. On March 16, 2011, Encana Oil & Gas also filed a motion to dismiss which raised several of the same arguments.[506] The parties subsequently settled or otherwise resolved their claims and the court entered a Final Judgment dismissing this matter on December 27, 2011.[507]

6. *Harris v. Devon Energy Production Company, L.P*.

On December 15, 2010, Doug and Diana Harris filed suit against Devon Energy Production Company, L.P. in the Northern District of Texas.[508] According to the Complaint, the Harris' house is near to the defendants' oil and gas wells located in Denton County, Texas which is within the Barnett Shale. According to the plaintiffs, soon after defendant commenced drilling and hydraulic fracturing operations, plaintiffs' groundwater became contaminated. Plaintiffs also

claim that they can no longer use the water from their well for consumption, bathing, or washing clothes. In April 2008, their groundwater became polluted with a gray sediment. Plaintiffs claim that testing results performed on the groundwater well showed water contamination with high levels of metals: aluminum, arsenic, barium, beryllium, calcium, chromium, cobalt, copper, iron, lead, lithium, magnesium, manganese, nickel, potassium, sodium, strontium, titanium, vanadium, and zinc, some of which upon information and belief, are contained in a commercial compound called "bentonite" used in drilling mud. The plaintiffs have similarly asserted claims for nuisance, trespass, fraud/fraudulent concealment and strict liability for ultra-hazardous and abnormally dangerous activities. Plaintiffs also seek various damages including exemplary damages and damages for future medical monitoring.

On December 22, 2010, because the Plaintiffs reside in Denton County which is located in the Eastern District of Texas, the court *sua sponte* transferred the matter to the Eastern District of Texas, Sherman Division.[509] On January 6, 2011, Devon filed a partial motion to dismiss on the basis that: (1) Plaintiffs' one-paragraph fraud/fraudulent concealment claim amounts to nothing more than conclusory allegations without any supporting facts which have not been plead with sufficient particularity under Federal Rules of Civil Procedure 8 and 9(b); (2) Texas law does not recognize abnormally dangerous activities doctrine as a basis for strict liability.[510] In response, Plaintiffs withdrew their strict liability claim and filed a motion seeking leave to file a new complaint--one that added in certain "improved edits ... to satisfy the elements of their fraud claim."[511] The Court eventually granted Plaintiffs' motion for leave to file their amended complaint and, thus, denied Devon's motion to dismiss as moot. On April 8, 2011, Plaintiffs filed their First Amended Complaint containing their alleged "cause of action" for fraud. [512] On April 18, 2011, Devon filed its second partial motion to dismiss Plaintiff's fraud claim for failure to state a claim upon which relief can be granted.[513] In addition, on May 26, 2011, Devon filed a motion for summary judgment against Plaintiff's remaining claims on the basis that Plaintiffs' claim that their water well was contaminated as a result of Devon's drilling, fracking and storage activities is not scientifically possible.[514]

On December 6, 2011, the Plaintiffs filed a Motion to Dismiss without prejudice.[515] According to the Plaintiffs, even though testing showed toxic contamination in Plaintiffs' well water when this lawsuit was filed in December 2010, recent testing showed that the contamination is no longer at a toxic level for human consumption.[516] Devon objected to the request on because it permitted the Plaintiff to avoid a dispositive ruling on the merits of Devons' motion for summary judgment as well as prevented Devon from recovering its taxable court cost.[517] Nonetheless, the court entered a Final Judgment dismissing this matter without prejudice on January 25, 2012.[518] On February 2, 2012, Devon filed a notice of appeal to the Fifth Circuit.[519]

7. *Town of Dish v. Atmos Energy Corp., et al.*

On February 28, 2011, The Town of Dish filed suit against Atmos Energy Corp., Crosstex North Texas Gathering LP, Enbridge Gathering LP, Energy Transfer Fuel LP, Texas Midstream Gas Services LLC and Enterprise Texas Pipeline LLC in the 362nd District Court in Denton, County, Texas.[520] Two other suits were also filed by Dish property owners — one by town

Commissioner William Sciscoe and his wife, Denise, and another by the owners of nearby properties.[521] In the petition, the plaintiff claim that excessive emissions, noise and light from the defendants' compressor station facilities amount to a public nuisance. They also accuse the companies of trespassing for allowing emissions to pollute the town's air.

8. *Parr v. Aruba Petroleum, Inc., et al.*

On March 8, 2011, Lisa Parr filed suit against Aruba Petroleum, Inc., Ash Grove Resources, LLC, Encana Oil & Gas (USA), Inc., Halliburton Company, Republic Energy, Inc., Ryder Scott Company, L.P., Ryder Scott Oil Company, Tejas Production Services, Inc. and Tejas Western Corp. in County Court at Law No. 5 in Dallas County, Texas.[522] The plaintiff claims defendants natural gas exploration and development activities occurred close to her home that is located in Decatur, Texas which is within the Barnett Shale. Plaintiff claims that defendants have caused releases, spills, emissions, and discharges which have exposed Plaintiffs and their property to hazardous gases, chemical and industrial wastes. Plaintiffs have asserted causes of action for assault, intentional infliction of emotional distress, negligence, gross negligence, negligence per se, nuisance, trespass, and strict liability for abnormally dangerous activity. Plaintiff also seeks various damages including exemplary damages and damages for future medical monitoring.

9. *Lipsky v. Range Production Co., et al.*

On June 20, 2011, Steven and Shyla Lipsky filed suit against Durant, Carter, Coleman, LLC, Silverado on the Brazos Development Company #1 Ltd., Jerry V. Durrant, James T. Coleman, Estate of Preston Carter, Range Production Company, and Range Resources Corporation in Parker County, Texas.[523] The Lipskys' property is the subject of the EPA vs. Range enforcement matter referenced above. In this matter, the Lipskys assert private causes of action against the various developers for breach of contract, violation of the Texas Deceptive Trade Practices Act and tortuous interference with contract, as well for negligence, gross negligence, malice, and nuisance. The plaintiffs seek 4.5 million dollars in actual damages and 2 million dollars in mental anguish.

On August 18, 2011, Range filed a plea to the jurisdiction or, in the alternative, motion for summary judgment on the basis that Plaintiff's nuisance and trespass claims were an impermissible collateral attack on the Texas Railroad Commission's Final Order which found that Range's operations "have not caused or contributed, and are not causing or contributing to contamination of any domestic water wells." The trial court agreed and granted Range's motion on January 27, 2012. However, Range still maintains its counterclaims against the Plaintiffs in this matter.

B. Typical Claims

As referenced above, the typical causes of action asserted by the plaintiffs are nuisance, trespass and negligence. Some of the plaintiffs have also asserted claims for breach of contract, fraud/fraudulent concealment and strict liability for ultra-hazardous and abnormally dangerous

activities. The plaintiffs seek various damages including exemplary damages and damages for future medical monitoring as well as injunctive relief. The following section describes each of these causes of action under Texas law.

1. Nuisance

A nuisance is a condition that substantially interferes with the use and enjoyment of land by causing unreasonable discomfort or annoyance to persons of ordinary sensibilities attempting to use or enjoy it.[524] A condition that causes aesthetic changes to the view, scenery, landscape, or beauty of an area is not a nuisance.[525]A nuisance may arise by causing: (a) physical harm to property, such as by the encroachment of a damaging substance or by the property's destruction; (b) physical harm to a person on his property from an assault on his senses or by other personal injury; and (c) emotional harm to a person from the deprivation of the enjoyment of his property through fear, apprehension, or loss of peace of mind.[526]

For an actionable nuisance, a defendant must generally engage in one of three kinds of activity: (1) intentional invasion of another's interests; (2) negligent invasion of another's interests; or (3) other culpable conduct that is abnormal and out of place in its surroundings.[527] Accordingly, proof of negligence is not essential to imposition of liability for the creation and maintenance of a nuisance.[528] This makes this cause of action very attractive for plaintiffs as nuisance can have the same practical effect as strict liability.[529] Several Texas courts have held that "one may create a private nuisance by using property in a way that causes reasonable fear in those who own, lease, or occupy property nearby."[530] Generally, proof of due care is not a defense because nuisance looks only to effect, not the culpable conduct of the defendant.[531]

The appropriate measure of damages depends on whether the nuisance causing the injury is permanent or temporary.[532] The differences between permanent and temporary injury is discussed in greater detail below. Nuisance claims also permit injunctive relief and recovery for punitive damages.[533] Nuisance claims also permit recovery of damages for sickness, annoyance, discomfort or other substantial bodily harm caused by a nuisance that impairs the comfortable enjoyment of real property.[534]

2. Trespass

Trespass is defined as the intentional physical interference with the exclusive possession of property.[535] To establish a trespass requires proving some actual physical invasion of the right of possession.[536] "Physical invasion" means that a party enters another's property without a legal right of possession.[537] Trespass can also result from a party causing or allowing an object to cross onto another's land.[538] Since possession is the protected right, a trespass can occur whether or not actual damage occurs to the invaded property.[539] This cause of action can afford injunctive relief, as well as recovery for actual and punitive damages.[540]

Several types of oil and gas operations can result in the unauthorized invasion of the property of another without any entry onto the surface of that land.[541] These types of invasions

are often referred to as "subsurface trespass."[542] The issue of whether such invasions caused by hydraulic fracturing operations constitute a trespass was recently addressed by the Texas Supreme Court in *Coastal Oil & Gas Corp. v. Garza Energy Trust*.[543] Although declining to rule on the broad issue of whether such intrusions constitute a trespass in general, the court held that the rule of capture precludes trespass claims that assert drainage of the natural gas as the only injury.[544]

The Texas Supreme Court has recently spoken on waste water injection wells as well.[545] In *FPL Farming Ltd. v. Environmental Processing Systems, L.C.*, a landowner that owned tracts of land near nonhazardous wastewater injection well sued the operator for trespass.[546] The court of appeals (relying on the Garza opinion) held that a party was shielded from civil tort liability merely because it received a permit to operate a deep subsurface wastewater injection well.[547] The court reasoned that "[w]hen a state agency authorized deep subsurface injections, no trespass occurs when fluids that were injected at deep levels are then alleged to have later migrated at those deep levels into the deep subsurface of nearby tracts."[548] The Texas Supreme Court disagreed and held that as a general rule, a permit granted by an agency does not act to immunize the permit holder from civil tort liability for actions arising out of the use of the permit.[549] The Supreme Court also distinguished a wastewater injection from hydraulic fracturing as one deals with the extraction of minerals and therefore the rule of capture applies which negates the element of injury to a trespass claim.[550]

3. Negligence and Negligence Per Se

As in any other negligence case, the plaintiff must show that the defendant owed the plaintiff a duty, the defendant breached that duty, that the plaintiff was injured, and that the plaintiff's injury was proximately caused by the defendant's breach.[551] Although the plaintiff need not prove negligence under a nuisance theory, negligence is typically included in the laundry list of theories of recovery.[552] In this context, the plaintiff generally claims that the defendant owed a duty to conduct operations so as not to pollute the plaintiff's property.[553]

However, the standard of care used in determining the presence of negligence in these cases can be a moving target.[554] Although plaintiffs may argue that the appropriate standard of care should be to conduct operations in a nonpolluting manner, it is clear that some pollution, technically speaking, is unavoidable in activities associated with the exploration, production, transportation, and refining of oil and gas.[555] Spills will occur, lines and tanks will leak, and equipment malfunctions will happen because human action is involved.[556] One additional difficulty associated with identifying the appropriate standard of care is determining at what point in time a defendant's duty should be measured.[557] In other words, should a defendant's past conduct be analyzed according to the standards of the past or present?[558]

If establishing a standard of care proves to be difficult in an ordinary negligence case, the theory of negligence per se might be a viable option.[559] Negligence per se is a concept in which a legislatively imposed standard of conduct is adopted by the civil courts as defining the conduct of a reasonable and prudent person.[560] In such a case, the jury is not asked to decide whether the defendant acted as a reasonable, prudent person would have acted under the same or similar

circumstances.[561] The statute itself states what a reasonable, prudent person would have done.[562] If an excuse is not raised, the only inquiry for the jury is whether the defendant violated the statute or regulation and, if so, whether the violation was a proximate cause of the accident.[563] In Texas, Statewide Rule 8 could potentially serve as the basis for a negligence per se claim related to oilfield contamination.[564]

4. Miscellaneous Other Claims and Issues

Breach of contract claims usually relates to breach of a mineral lease agreement between the mineral interest owner and the operator or breach of a surface use agreement between the operator and the surface estate owner. Such agreements might contain clauses that require the operator to restore the property to pre-drilling condition following operations.[565] Contamination might be a breach of such agreements as well as a breach of an implied covenant to manage and administer the lease as a reasonable prudent operator.[566]

With regard to strict liability, the Texas Supreme Court has held that it is not a basis for recovery in water pollution cases.[567] Texas also does not recognize a cause of action of strict liability for "ultrahazardous" or "abnormally dangerous" activities.[568] Texas case law also supports that medical monitoring is not a recognized cause of action in Texas.[569] Intentional infliction of emotional distress is a "gap-filler" tort, created to permit recovery in "those rare instances in which a defendant intentionally inflicts severe emotional distress in a manner so unusual that the victim has no other recognized theory of redress."[570] "Where the gravamen of a plaintiff's complaint is really another tort, intentional infliction of emotional distress should not be available."[571] Accordingly, this theory should rarely apply to the claims asserted above.

Fraud by nondisclosure, or fraudulent concealment, is a subcategory of common-law fraud.[572] Fraud based on nondisclosure requires a threshold showing of grounds giving rise to a duty to speak on the part of the silent party, such as the existence of a confidential or fiduciary relationship.[573] In federal court, to plead fraud with particularity a plaintiff must include the time, place and contents of the false representations, as well as the identity of the person making the misrepresentation and what that person obtained thereby.[574]

C. Key Defenses

There are several key defenses available in response to claims of alleged contamination caused by hydraulic fracturing activities. For the most part, these are the same defenses that have historically been utilized in environmental pollution cases in Texas which are described below.

1. Surface Estate Owner and Neighboring Property Owner

The duties owed by an oil and gas operator to the surface estate owner are much narrower than those owed to a neighboring property owner. When the mineral and surface estates are severed, the mineral estate is the dominant estate.[575] The execution of a mineral lease typically not only severs the minerals from the surface but also creates dominant and servient estates.[576] The

entity that owns the minerals enjoys the dominant estate.[577] Ownership of the dominant estate carries with it the right to enter and extract the minerals and "all other such incidents thereto as are necessary to be used for getting and enjoying" the minerals.[578] Incident to the right to extract is the right to explore.[579] If in pursuing these rights, the servient estate is susceptible to use in only one manner, then the owner of the dominant estate may pursue that use irrespective of whether it results in damage to the surface.[580] In other words, if particular damage to the surface estate cannot reasonably be avoided in legitimately pursuing the rights of the dominant estate, the owner of the dominant estate is not liable for the damage.[581]

Thus, the mere fact of damage to the surface does not evince unreasonable conduct.[582] Instead, it is incumbent upon the surface owner to establish that the dominant estate owner failed to use reasonable care in pursuing its rights or that the rights could have been pursued through reasonable alternate means sufficient to achieve the goal desired but without the damage.[583] Accordingly, the servient estate owner must prove that its opponent failed to act reasonably given the correlative rights and liabilities involved.[584] However, these same standards are not applicable to neighboring property owners who also claim that their property has been impacted by an oil and gas operator. Accordingly, the status of the plaintiff could widely determine the duties owed to them.

2. Temporary and Permanent Injury

Temporary versus permanent injury is always one of the more significant issues in oilfield pollution cases.[585] In addition to actually trying to determine the nature of the injury complained of, there are strategic considerations associated with choosing whether the injury is temporary, permanent, or both.[586] The difference between temporary and permanent injury is significant, primarily as it relates to the appropriate measure of damages as well as the affirmative defense of the statute of limitations.[587]

a. Measure of Damages

Permanent damage results from activity that is of such a character and that exists under such circumstances "that it will be presumed to continue indefinitely."[588] Permanent injuries are those that are "constant and continuous, not intermittent or recurrent."[589] The proper measure of damages for permanent injury to the land is the diminution in the value of the land.[590] Temporary injuries are intermittent, sporadic, or recurrent injuries to land that are contingent upon some irregular force, such as rain.[591] When an injury to land is temporary and can be remediated at reasonable expense, the proper measure of damages is the cost of restoration to its condition immediately preceding the injury.[592] However, when the cost of restoration exceeds the diminution in fair market value, the diminution in fair market value is the cap on the measure of damages.[593]

b. Statute of Limitations

The statute of limitations for trespass, nuisance, and negligence for damages to land are governed by the two-year statute of limitations and are required to be brought within two years from the date of accrual.[594] An action for permanent damages to land accrues, for limitations purposes, upon the date of discovery of the first actionable injury, not on the date the damages to the land are fully ascertainable.[595] Thus, an action to recover damages for permanent injury accrues when injury first occurs or is discovered. On the other hand, a temporary injury claim accrues anew upon each injury.[596] Accrual of limitations is a question of law for the court.[597] The continuing tort doctrine which is an exception to the statute of limitations does not apply to claims where the damages arise from permanent injury to the land.[598]

c. Application

Texas courts have generally considered contamination from oil and gas operations to be permanent injuries to the land. For instance, in *Mieth v. Ranchquest, Inc*., the Houston Court of Appeals held that the damage to property caused by discharge of drilling fluids, diesel fuel, oil, and saltwater during operations at oil and gas wells was permanent.[599] In *Hues v. Warren Petroleum Co*., the same court determined that landowners sued an oil and gas company for permanent damages to their property based upon gas leaks and the disposal of brine which began several years earlier.[600] In *Walton v. Phillips Petroleum Co*., the El Paso Court of Appeals held that a landowner's complaint that oil company's salt-water pits caused migration of pollutants into his groundwater alleged permanent injuries where water was presently contaminated and had been for several years and there was never a time where contamination was non-existent or significantly diminished due to changing conditions.[601] Finally, in *Mitchell Energy Corp. v. Bartlett*, the Fort Worth Court of Appeals determined that the injuries to the landowners' property were permanent based upon claims of groundwater contamination from the defendant's historic oil and gas operations.[602]

3. Standing

Only the person whose primary legal right has been breached has standing to seek redress for an injury.[603] In other words, a person has standing to sue only when he or she is personally aggrieved by an alleged wrong.[604] "Without a breach of a legal right belonging to a plaintiff, that plaintiff has no standing to litigate."[605] A plaintiff must have a cause of action for injury to the property in order to have standing.[606] The cause of action for an injury to property belongs to the person owning the property at the time of the injury.[607] Without an express assignment, the cause of action does not pass to a subsequent purchaser of the property, so he or she cannot recover for an injury committed before his or her purchase.[608]

In *Senn v. Texaco, Inc*., the Eastland Court of Appeals regarded the distinction between temporary and permanent injuries as meaningless with respect to the issue of standing.[609] The court found that "any injury to the land that the defendants might have caused, whether temporary

or permanent, occurred prior to the Senns' purchase of the land," and the Senns, therefore, did not own any causes of action for either type of injury that may have been caused by the defendants.[610] Adopting the reasoning of the Eastland Court of Appeals decision in *Senn*, the Tyler Court of Appeals held that, when the undisputed evidence "showed a continuing condition that already existed on the date of purchase" and no new injuries occurred after purchase of the property or an assignment of a cause of action for the prior injury, "the [plaintiff] had not been aggrieved and therefore had no standing."[611]

In *West v. Brenntag Southwest, Inc*., the court ruled that it had to determine whether there was evidence of a new and distinct injury that occurred after the plaintiff acquired the property.[612] The plaintiff argued that the contamination's gradual leaking into the soil continued while he owned the property and that this fact was sufficient to show a new injury to support standing.[613] The court disagreed, holding that the fact that the injury existed throughout the plaintiff's ownership did not create a new injury to the land.[614] The court found that the injury was continuous and lingering and, without an assignment, would not support standing to bring suit for negligence or nuisance.[615]

4. Causation

With respect to water pollution claims, plaintiffs will be required to show that contaminants from defendants' hydraulic fracturing activities migrated into plaintiffs' water wells and caused their injuries.[616] Causation cannot be established by mere guess or conjecture; it must be established by evidence of probative value.[617] In *Mitchell Energy Corp. v. Bartlett*, the plaintiff relied on testimony from a geochemist that specialized in "isotopic geochemistry" to establish that the contaminants in the plaintiff's water wells came from the defendants' oil and gas operations.[618] However, the court held that the geochemist's testimony provided no evidence of causation in light of fact that expert did not gather any evidence from other gas wells in area and did not rule out other possibilities of the alleged contamination.[619]In *FPL Farming, Ltd. v. Environmental Processing Systems*, the Beaumont Court of Appeals held that there was no evidence that the plaintiff suffered any injury caused by the defendant's injections of waste into a wastewater injection well on its property as there was no evidence that the wastewater had migrated to the surface of the property or that the injection well was a danger to the drinking water.[620]

In addition, plaintiffs might not be able to prove causation if contaminants are not present in concentrations above certain levels. In *Taco Cabana Inc. v. Exxon Corporation*, the purchaser of commercial property sued the former lessee of the prior owner for trespass, negligence per se, and other claims, alleging that lessee failed to remediate property it previously subleased as gasoline station.[621] The San Antonio Court of Appeals held that the plaintiff failed to establish causation as the evidence did not establish that the soil contained contaminants that exceeded state levels which would have triggered a duty to take corrective action.[622] The court reasoned that to the extent that any common law duties regarding removal of contamination existed, such duties have been displaced by the Texas Water Code, because the legislature has delegated to the State of Texas the task of determining appropriate cleanup standards.[623] Both the Texas Administrative

Code as well that RRC's Field Guide provides guidance on maximum contaminant levels in drinking water resulting from for oil and gas spills.[624] Accordingly, this same argument could be made in the context of a claim of water pollution allegedly caused by hydraulic fracturing operations.

VIII. CLOSING

Due to the size of the potential natural gas reserves available, shale gas development utilizing hydraulic fracturing provides this nation with a realistic opportunity to finally reduce its dependence on foreign oil. However, to meet this nation's future demands, the scale of exploration and production will have to drastically increase over the coming years. Such activities will undoubtedly impact the environment. Due to pressure from both environmental groups as well as the industry, current and future regulation on the federal, state and local level will continue to play a key role in this area. However, it is important that all interested parties work together to solve the environmental concerns so that the benefits of shale gas development can be fully realized for generations to come.

This paper was prepared in April 2012 as a general discussion of the issues presented and is not to serve as, or to be relied upon as, legal advice. This paper would not have been completed without the assistance of Jean Flores and John Slavich, shareholders at Guida, Slavich & Flores, P.C. The views expressed in the paper are mine, and not of my law firm or its clients.

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[7] *Id*.
[8] *Id*.
[9] *Id*.
[10] *Id*.
[11] *Id*. at 32; *see also* 42 U.S.C. §300f *et seq.* (1974); U.S. ENVT'L PROT. AGENCY, *Summary of the Safe Drinking Water Act*, http://www.epa.gov/lawsregs/laws/sdwa.html (accessed September 22, 2011).
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[13] *Id*.
[14] *Id*.
[15] *Id*.
[16] *Id*.
[17] *Id*. (*citing Legal Environmental Assistance Foundation, Inc. v. United States Environmental Protection Agency*,

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[19] *Id*.
[20] U.S. ENVT'L PROT. AGENCY, *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs, Final Report* (2004) http://water.epa.gov/type/groundwater/uic/class2/hydraulicfracturing/wells_coalbedmethanestudy.cfm (accessed September 22, 2011).
[21] In particular EPA stated that "Based on the information collected and reviewed, EPA has determined that the injection of hydraulic fracturing fluids into CBM wells poses little or no threat to USDWs." *See Executive Summary at ES-16*, http://www.epa.gov/ogwdw/uic/pdfs/cbmstudy_attach_uic_exec_summ.pdf (accessed September 22, 2011).
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[34] *Id*. (*citing* 33 U.S.C. § 402(1)(2)).
[35] *Id*. (*citing* 33 U.S.C. § 1362(24)).
[36] *Id*. (*citing* U.S. ENVT'L PROT. AGENCY, *Regulation of Oil and Gas Construction Activities*, http://cfpub.epa.gov/npdes/stormwater/oilgas.cfm) (emphasis in original).
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[39] *Id*.
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[42] *Id*.
[43] *Id*.
[44] *Id*.
[45] *Id*.
[46] *Id.*

[47] *Id.*
[48] U.S. ENVT'L PROT. AGENCY, *Effluent Guidelines (Clean Water Act section 304(m))*
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[49] U.S. ENVT'L PROT. AGENCY, *Shale Gas Extraction*, http://water.epa.gov/scitech/wastetech/guide/shale.cfm
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[51] *Id.*
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[53] *Id.*
[54] *Id.*
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[56] *Id.*
[57] *Id.* at 35; *see also* 42 U.S.C. §7401 *et seq.* (1970); U.S. Envt'l Prot. Agency, *Summary of the Clean Air Act*, http://www.epa.gov/lawsregs/laws/caa.html (accessed September 22, 2011).
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[59] *Id.*
[60] *See Fact-Based Regulation for Environmental Protection in Shale Gas Development*, The University of Texas Energy Institute, page 65.
[61] *Id.* (*citing* Governor's Marcellus Shale Advisory Commission, supra note 125, at § 7.3.2.).
[62] *Id.* (*citing* 42 U.S.C. § 7408-9).
[63] *Id.* (*citing* 42 U.S.C. § 7412).
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[65] *Id.*
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[95] http://www.epa.gov/oppt/chemtest/pubs/SO.Earthjustice.Response.11.2.pdf
[96] *Id.*
[97] *Id.*
[98] http://www.epa.gov/oppt/chemtest/pubs/EPA-Letter-to-Earthjustice-on-TSCA-Petition.pdf
[99] *Id*.
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[101] *Id*.
[102] *Id.*
[103] *Id.*
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[105] *Id*. at 37; *see also* 42 U.S.C. §6901 *et seq*. (1976); U.S. Envt'l Prot. Agency, *Summary of the Resource Conservation and Recovery Act*, http://www.epa.gov/lawsregs/laws/rcra.html. (accessed September 22, 2011).
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[107] *See Fact-Based Regulation forEnvironmental Protection in Shale Gas Development*, The University of Texas Energy Institute, page 19 (February 12, 2012) (*citing* 53 Fed. Reg. 25,4460-01, 25,447 (July 6, 1988) (exempting these wastes from Subtitle C of RCRA)).
[108] *Id*.
[109] *Id.* (*citing* 53 Fed. Reg. 25,446 (1988).
[110] *Id*.
[111] *Id*. (*citing* State Review of Oil and Natural Gas Environmental Regulations, http://www.strongerinc.org.
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[113] *Id*. (stating that for a list of oil and gas exploration and production wastes that are not exempt from Subtitle C of RCRA, see U.S. Envtl. Protection Agency, Exemption of Oil and Gas Exploration and Production Wastes from Federal Hazardous Waste Regulations 11 (2002), available at http://epa.gov/osw/nonhaz/industrial/special/oil/oil-gas.pdf.).
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[131] *Id*.
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[133] *Id.*
[134] *Id*.
[135] *See* 16 U.S.C. § 701 *et seq*.
[136] *U.S. v. Range Production Co., et al*., 2011 WL 2469731 at *2 (N.D. Tex. June 20, 2011).
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[138] *Id.*
[139] *Id.*
[140] *U.S. v. Range Production Co., et al.*, 2011 WL 2469731 at *3 (N.D. Tex. June 20, 2011) (*citing* 42 U.S.C. § 300i).
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[588] *Schneider Nat'l Carriers, Inc.*, 147 S.W.3d at 272; *Bayouth v. Lion Oil Co*., 671 S.W.2d 867, 868 (Tex.1984).
[589] *Id.*
[590] *Kraft v. Langford*, 565 S.W.2d 223, 227 (Tex.1978).
[591] *Bayouth*, 671 S.W.2d at 868.
[592] *Kraft*, 565 S.W.2d at 227.
[593] *North Ridge Corp. v. Walraven*, 957 S.W.2d 116, 119 (Tex. App.—Eastland 1997, pet. denied) (*citing Atlas Chem. Indus., Inc. v. Anderson*, 514 S.W.2d 309 (Tex. Civ. App.—Texarkana 1974), *aff'd*, 524 S.W.2d 681 (Tex.1975)).
[594] *See* TEX. CIV. PRAC. & REM. CODE ANN. § 16.003(a); *Mitchell Energy Corporation v. Bartlett*, 958 S.W.2d 430, 435 (Tex. App.—Fort Worth 1997, pet. denied).
[595] *Corley v. Exxon Pipeline Co*., 821 S.W.2d 435, 437 (Tex. App.—Houston [14th Dist.] 1991, writ denied).
[596] *Id*.
[597] *Id*. at 274–75
[598] *Mitchell Energy Corp.*, 958 S.W.2d at 443.
[599] *Mieth v. Ranchquest, Inc*.,177 S.W.3d 296, 299 (Tex. App.—Houston [14th Dist.] 2005, no pet.).
[600] *Hues v. Warren Petroleum Co*., 814 S.W.2d 526, 529 (Tex. App.—Houston [14th Dist.] 1991, writ denied).
[601] *Walton v. Phillips Petroleum Co.*, 65 S.W.3d 262, 274 (Tex. App.—El Paso 2001, pet. denied), *abrogated on other grounds by In re Estate of Swanson*, 130 S.W.3d 144 (Tex. App.—El Paso 2003, no pet.).
[602] *Mitchell Energy Corp*., 958 S.W.2d at 436.
[603] *Nobles v. Marcus*, 533 S.W.2d 923, 927 (Tex. 1976).
[604] *Nootsie, Ltd. v. Williamson County Appraisal Dist*., 925 S.W.2d 659, 661 (Tex. 1996).
[605] *Denman*, 123 S.W.3d at 732; *Brunson v. Woolsey*, 63 S.W.3d 583, 587 (Tex. App.— Fort Worth 2001, no pet.).
[606] *Denman*, 123 S.W.3d at 732; *see Nobles*, 533 S.W.2d at 927.
[607] *Lay v. Aetna Ins. Co*., 599 S.W.2d 684, 686 (Tex. Civ. App.—Austin 1980, writ ref'd n.r.e.).
[608] *Id*.
[609] *Senn v. Texaco, Inc*., 55 S.W.3d 222, 226 (Tex. App.—Eastland 2001, pet. denied).
[610] *Id*.
[611] *Exxon Corp. v. Pluff*, 94 S.W.3d 22, 28 (Tex. App.—Tyler 2002, pet. denied).
[612] *West v. Brenntag Southwest, Inc*., 168 S.W.3d 327, 332-33 (Tex. App.—Texarkana 2005, pet. denied).
[613] *Id*. at 335.
[614] *Id*. at 335-36.
[615] *Id.*
[616] *Mitchell Energy Corp.*, 958 S.W.2d at 446 (*citing Morgan v. Compugraphic Corp*., 675 S.W.2d 729, 731 (Tex.1984)).
[617] *Id*. (*citing McClure v. Allied Stores of Texas, Inc*., 608 S.W.2d 901, 903 (Tex.1980)).
[618] *Id*.

[619] *Id.*
[620] *FPL Farming Ltd.*, 305 S.W.3d at 741.
621. *Taco Cabana Inc. v. Exxon Corporation*, 5 S.W.3d 773, 779-780 (Tex. App.—San Antonio 1999, pet. denied).
[622] *Id*. at 780.
[623] *Id.*
[624] 30 TEX. ADMIN. CODE. 290, Subchapter R; *see also RRC: Field Guide for the Assessment and Cleanup of Soil and Groundwater Contaminated with Condensate From a Spill Incident* http://www.rrc.state.tx.us/environmental/spills/spillcleanup.php (accessed September 27, 2011).