Testimony for the US House Committee on Science, Space, and Technology:
Review of Hydraulic Fracturing Technology
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Introduction

The regulation of oil and gas exploration and production activities, including hydraulic fracturing and horizontal drilling falls within the jurisdiction of the states. The Texas Railroad Commission (RRC) has been regulating the mining of hydrocarbons for 100 years. The Commission no longer over sees the rail industry.

Texas is the largest producer of oil and natural gas in the country. From the drill bit to the burner tip, the oversight of the oil and natural gas industries that operate in Texas, including the responsibility to prevent and to abate surface and ground water pollution related to oil and gas development in state lands and waters, falls under the jurisdiction of the Railroad Commission of Texas. With over one million wells drilled, the RRC is responsible for more oil and gas wells than any other entity in the nation. Currently, 45% of all the rigs running in the United States of America are in Texas. Market forces and the introduction of new technologies developed in Texas, like hydraulic fracturing and horizontal drilling, made shale gas production profitable in the 1990s. Since then, Texas' natural gas production has increased more than 50 percent. Never in this period has hydraulic fracturing been a contributor to groundwater contamination.

The Railroad Commission of Texas and Hydraulic Fracturing

The RRC's regulatory framework for well construction and water protection, which extends well beyond just hydraulic fracturing, protects surface water and groundwater in a very effective manner. Like other aspects of our comprehensive regulatory framework that covers virtually all oil and gas activities, our regulatory practices addressing hydraulic fracturing are the culmination of over 50 years of experience. The recent expansion in hydraulic fracturing activity in the Barnett Shale produced more than 13,000 gas wells. Even with such a dramatic increase in activity, not once has Texas experienced a case of groundwater contamination caused by hydraulic fracturing. I do not know of a single reported case of contamination nationwide.

The Texas regulatory framework emphasizes well construction with multiple layers of protection for groundwater. Our inspectors conduct thousands of inspections and tests annually to ensure regulatory compliance.

Protection of water resources that can be used for human consumption should be of the utmost importance to every community, and it certainly is to the RRC. The location and depth of the underground strata from which that water is taken is very important when

discussing hydraulic fracturing. While those depths vary regionally, in Texas the strata from which water to be used for human consumption is generally thousands of feet, perhaps miles, above the targeted formations during the hydraulic fracturing process. For example, the water table can extend to a depth of 1000 feet in some areas of the Barnett Shale. The horizontal lateral pipes are located more than one and a half miles below the surface.

Additionally, the volumes of fluids other than water that are being injected must also be kept in mind. Water typically makes up more than 99% of the liquids in fracturing fluid; e.g., the percentage of non-H_2O compounds may be approximately 0.05% in a job utilizing 5 million gallons of water.

Cooperation among governmental agencies is a necessity to successfully ensure environmental mitigation. Before permitting a well for hydraulic fracturing, we must receive certification from our sister agency, the Texas Commission on Environmental Quality (TCEQ), that identifies where the location and depths of groundwater must be protected by cement and steel casing. TCEQ geologists and hydrologists evaluate the well logs from previous wells in the area around any proposed well to determine the required depth of surface casing to ensure the protection of fresh water formations. An operator must obtain this certification from the TCEQ and must present it to the RRC before we will even consider issuing a drilling permit. In every new well, the RRC requires that heavy steel surface casing extend beyond the deepest fresh water formation. Surface casing must be pressure tested for leakage before restarting drilling activity as an additional safeguard.

Whether it is fracturing fluid, oil or natural gas, to affect the usable quality of water, those substances would have to migrate upward through thousands of feet of rock. That is physically impossible. For produced water that is recovered at the surface from the well to contaminate fresh water formations, a leak in the heavy steel surface casing and a breach of the other protections would have to occur. There is no evidence or history of that ever occurring in Texas.

Interstate Coordination

Since the regulations of these activities fall under the states' jurisdiction, it is essential for oil and gas producing states to work cooperatively and to share information. The RRC actively participates in the Interstate Oil and Gas Compact Commission (IOGCC), the national Groundwater Protection Council (GWPC), and STRONGER (State Review of Oil and Natural Gas Environmental Regulations). The RRC is proud to state that our Chief Geologist was the chair of the STRONGER workgroup that developed their guidelines for hydraulic fracturing. Our staff may be some of the most talented available today.

Participation with the GWPC and the IOGCC led to the initiation of a national registry to voluntarily disclose the chemicals used during hydraulic fracturing. Our heavy involvement with the GWPC and the IOGCC led to the development of the website—

FracFocus. This coordinated effort worked closely with producers and service companies to develop a format allowing the submission of well and chemical data. Many of the active shale gas producers have stated their intent to provide this information, and numerous regional and national oil and gas associations have endorsed the project.

STRONGER was initially directed to review state drilling fluids and produced water management. This purview was expanded in 2010 to address hydraulic fracturing regulations in response to public concerns. As stated above, the RRC was heavily involved in that process. Since then, STRONGER has conducted reviews in multiple states. These reviews provide significant benefits to the states demonstrating the effectiveness of regulatory programs by bringing in experts from across the nation to identify possible regulatory improvements. Some of these experts are RRC employees. STRONGER reviews demonstrate in a clear and public process that state programs are sound and effective. Our program is sound and effective.

Risk Management and Drinking Water

The best avenue to risk management is concentrated and prudently developed experience. The history of hydraulic fracturing goes back decades. It was first commercially employed in 1948. As many of you know, the Safe Drinking Water Act (SDWA) was enacted in 1974 to protect public water. Hydraulic fracturing had been commercially utilized for 25 years at that time, and the SDWA never considered it as an issue. For the next 22 years the SDWA was debated and amended only twice, and both times hydraulic fracturing was never discussed. In 1997, a court case, *Legal Environmental Assistance Foundation (LEAF) vs. Environmental Protection Agency (EPA)*, brought the process of hydraulic fracturing into question without considering any legislative history or environmental impacts.

In 2002, for the first time ever, the EPA released a draft study on hydraulic fracturing concluding the process does not pose a risk to drinking water. To lay the alarm to rest, the US House passed the bipartisan 2005 Energy Bill clarifying that Congress never intended for hydraulic fracturing to be regulated under the SDWA. Only recently has there been a growing impetus to further regulate the fracturing process even though over 50 years of history record no harm to drinking water from the process. And, for over those 50 years, the RRC has cautiously, expeditiously and thoroughly monitored the process and collected data while upholding our goals to protect public health and safety and to prevent the waste of our mineral assets.

Through our many years of experience with the hydraulic fracturing process, we have developed a reliable regulatory framework based on sound science, technical expertise and common sense. The RRC regulations address pad site surface operations, water use and wastewater disposal/storage, casing requirements and injection procedures. Any state experiencing the economic blessings of shale developments concerned with acquiring appropriate regulatory schemes should look to Texas.

A very important aspect of being a regulator is managing complaints and properly conducting inspections by competent geologists, engineers and other scientists to ensure regulatory policies are upheld and enforced. At the RRC, handling complaints is one of the most critical functions of our Field Operations section. Frequently, responsible industry participants will notify us of bad operators in an attempt to avoid the industry-wide problems and publicity caused by irresponsible oil and gas operators.

Once a complaint is received and a docket is assigned, an initial inspection is made with or without the complainant. This inspection is immediate in the case of imminent danger due to pollution or a threat to public health. Both parties, the complainant and the respondent, are entitled to our inspection report to ensure transparency and due process.

Once the field personnel are deployed to investigate a contamination, they utilize a variety of procedures to confirm if contamination exists, what the source is, and how to eliminate the source and to initiate clean up if necessary. To make this determination, field staff collects water samples from the well and other water wells in the area for testing and comparison analysis. They also collect samples of produced water from oil or gas wells within a quarter-mile of the subject water well. Bacteriological samples are forwarded to the local health department, and the surrounding area approximately a quarter-mile from where the subject water well is inspected. This area inspection includes an investigation into disposal or injection wells, oil and gas storage and treatment facilities, both current and abandoned pits, flow-lines, evidence of past leaks or spills, any creeks and streams, and any other situation that may shed light on a possible contamination. If a water contamination is verified, the case is sent to the Site Remediation division for clean up efforts. If enforcement action is necessary, our Office of General Counsel pursues the necessary filings.

A recent case of interest where the RRC applied these sound principles and due process is the situation in which the EPA alleged that natural gas from a well operated by Range Resources, a Texas-based company, migrated into water wells in North Texas. Our Commission field staff fully vetted the area and sent those investigative reports to our administrative hearings' examiners to either confirm a contamination had occurred and if so then to determine the source. After weeks of technical and legal investigations and the presentation of arguments in keeping with the Administrative Procedures Act, my fellow commissioners and I ruled there was no evidence of natural gas contamination attributed to Range Resources. We are confident in our ruling, and we stand behind the RRC process. This case exemplifies the RRC's success in properly regulating the Texas energy industry, which regulation includes making decisions based on sound science and accepted and approved testing methods, while ensuring that mineral interest owners can enjoy the monetary benefit of their property ownership and that the state benefits accordingly.

EPA's Draft Plan

The EPA's original charge was not to study the "full life cycle" of an oil and gas well, inclusive of all oil and gas exploration and production activity such as site selection and development, production, storage and transportation, all of which are unrelated to hydraulic fracturing. EPA's own Science Advisory Board rightfully concluded that the scope of the study should be restricted, at least initially, to researching sources and pathways of the potential impacts of hydraulic fracturing on water resources. The RRC submitted comments on the draft plan a month and a half ago. We concur with the EPA's Science Advisory Board and believe that the scope of the draft plan remains broader than that which Congress may have intended. This raises concerns of scope creep.

Our two main concerns about the EPA's study are that it proposes to delve into areas beyond the reach of federal law and that it also proposes to study areas beyond the practice of hydraulic fracturing. Specifically, the EPA now includes a study of how water withdrawals might impact water availability and water quality. Water availability and water withdrawal have historically been the issues of state law, and we believe is beyond the reach of federal law and regulation. In addition, the EPA proposes to study the potential impacts of spills, containment, treatment, and disposal of wastewaters resulting from hydraulic fracturing. There is no need for the EPA to enter into these issues since there already exist controls on oil and gas activities in federal law, which include the SDWA, Clean Water Act (CWA), Clean Air Act (CAA), and Resource Conservation and Recovery Act (RCRA). Furthermore, there are a myriad of state laws and regulations actively being enforced by the states that care just as deeply for our state and national resources. Another federal study is just a waste of taxpayer money.

The EPA has performed similar studies in the past. In the 1980s, the EPA performed an exhaustive study of oil and gas activities and wastes with respect to the Resource Conservation and Recovery Act (RCRA). There is no need for new information on the comprehensive process of oil and gas exploration and production. For this reason and in an effort to save time and money, we recommended the scope of study return to that directed by Congress—focus on practices directly associated with hydraulic fracturing and drinking water resources. With that said, I have offered the RRC and its staff as a resource to both the EPA and the Science Advisory Board in this endeavor to conduct an evaluation of the chemicals used in the fracturing process. Furthermore, I would eagerly join the discussion on the development of other alternatives, the evaluation of well construction and maintenance, evaluation of fracture development, and development of best management practices. As stated above, we have been doing this in Texas for over 60 years, the technology to advance these practices and make shale development possible was pioneered in Texas, and we have the most experience with the largest shale play in the nation.

Finally, when operators complete the required RRC forms, they list the amount and kind of material used during hydraulic fracturing. Additionally, service companies are required by the Office of the Safety and Health Administration (OSHA) to post on site Material Safety Data Sheets of all chemicals used on a drilling location for on-site employees and emergency first responders.

Economic Generator

Hydraulic fracturing has made the impossible possible. It allows access to oil and natural gas trapped in areas that were unobtainable in the past. This process is responsible for 30% of the nation's domestically recoverable oil and natural gas. Seven billion barrels of oil and 600 trillion cubic feet of natural gas have been recovered by hydraulic fracturing. Some say that up to 90% of wells operating today are because of hydraulic fracturing and 60-80% of new wells will need hydraulic fracturing to continue to production.

In 2007, $226 billion was invested in domestic exploration and production. This is an economic generator that supports local businesses and creates American jobs. Royalties paid totaled $30 billion in 2007. Without delving too far into how this business drives up local, state and federal tax revenue, it is exciting to note that 33 school districts in Texas are funded mostly by oil and gas dollars alone.

If some of the new EPA regulations considered today are implemented, more than half our oil and natural gas wells could be eliminated. America's production of domestic energy resources would diminish by 183,000 barrels of oil per day and 245 billion cubic feet of natural gas annually. The federal government would lose $4 billion in revenue, and the states would lose $785 million in taxes, not counting the additional jobs lost.

The American Petroleum Institute engaged IHS Global Insight to study potential impacts of policy changes for hydraulic fracturing. They reported that all states will feel a decline in economic activity, but some states are more affected than others. The most affected will be Texas. By 2015, Texas could lose up to 364,000 jobs. These are jobs that paid an estimated $30,000 per job in taxes and royalties to Texas in 2009 and provide the average oil and gas worker with a salary of about $107,000 per year. For comparison, consider that the rest of the private sector workforce in Texas earns an average of $44,000 per year. The report concludes that Texas could experience a loss of nearly $37 billion in gross state product. The country will suffer when a domestic homegrown energy source is diminished.

Texas is not the only state affected. The analysis concludes that in addition to Texas, Oklahoma, Kentucky and West Virginia will suffer the largest natural gas production decline. Wyoming joins the aforementioned group in terms of employment and real output declines in the excess of 7%. Nevada, Colorado, Montana, Arizona, and Florida are all mentioned. And, if development does not continue in New York and Pennsylvania, then they will see a loss also.

Summary

In closing, I understand there is a broad concern in the public related to hydraulic fracturing. I am not here to belittle or to disregard that concern. Rather, I am here to provide confidence to the public that these activities can be, and in Texas are, safe, secure and sufficiently regulated. Furthermore, the production increase due to these operations

is a blessing to our nation, and we should be proud of the technological innovations discovered and perfected in America, more specifically, in Texas.

There is a French delegation back in Texas meeting with RRC staff learning how to establish appropriate regulatory protocols for all activities related to natural gas production via the process of hydraulic fracturing and horizontal drilling. These foreign officials are already convinced of the benefits. These are not the only foreign officials to visit. In the past year, we have had numerous foreign consulates and ambassadors knocking on our door wanting to learn from our successes in Texas and apply our process to their respective countries. Technology is working the way it was intended- improving our quality of life.

The numbers do not lie. In Texas alone, we could lose over 364,000 jobs and almost $37 billion if this practice is outlawed. The numbers for the entire country are even greater. The truth is that America and Texas benefit substantially due to the practice of hydraulic fracturing and horizontal drilling. Any stories of environmental damage or contamination of drinking water from hydraulic fracturing are fairy tales.

From 2007 to up until last year, net imports of natural gas have decreased by about 1.2 trillion cubic feet. My goal as Chairman of the Railroad Commission is energy security for our country; a diminished reliance on imported energy of any kind, be it natural gas or oil. Declining imports that are a direct result of increased domestic supply that result from putting technology to work is the news the American people want to hear. They are sick and tired of fractured fairy tales and they deserve to hear the truth. Thank you for the opportunity to speak it today.