Hydraulic Fracturing EPA Public Informational Meeting

Fort Worth, Texas

July 8, 2010

Summary of Public Comments

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Meeting Format

US EPA (hereafter referred to as EPA) held a public informational meeting in Fort Worth, Texas, on July 8, 2010, to discuss proposed design and scope of EPA's research study on the potential relationship between hydraulic fracturing used in natural gas extraction and drinking water. The meeting began with brief presentations by EPA staff on the need for the study, proposed scope and design of the study, and public participation opportunities during study development. Over 600 individuals attended the meetings and EPA received verbal comments from 83 citizens following the EPA presentations. Both the EPA presentations and public comments are summarized in this document.

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Summary of EPA Presentations

EPA made brief presentations on the need for a study, the proposed study design, and the stakeholder process used for the planning stages of the study.

Introductory Remarks

Dr. Alfredo "Al" Armendariz, Regional Administrator, EPA Region 6

- EPA Region 6 serves Texas, Louisiana, Arkansas, Oklahoma, New Mexico, and 66 Indian Nations.
- Natural gas is a key element of the nation's energy future. We are here to talk about one way to access natural gas: hydraulic fracturing (HF).
- There is widespread use of HF in natural gas development, including in the Barnett Shale in the Fort Worth area. The development of HF technologies was pioneered in this area.
- Many have expressed concern over the safety of HF and its potential impact on drinking water supplies. To address these concerns, EPA will conduct a study investigating the potential impacts of HF on public health and the environment, particularly on drinking water.
- The study will be transparent and peer-reviewed, and will emphasize stakeholder input. At today's meeting, EPA asks for public comment on the study's design, scope, and focus.
- While the scope of the study will primarily focus on drinking water, there are other concerns, including air emissions, global warming impacts, and local issues such as zoning, truck noise, and traffic. In EPA Region 6, EPA's Office of Air and Radiation has implemented air toxics rules. In addition, Region 6 and the Texas Commission on Environmental Quality (TCEQ) are inventorying and studying air emissions from oil and gas fields.
- EPA places a high priority on this study and hopes that the public's concerns will be addressed and answered through the process.

Why Are We Studying Hydraulic Fracturing?

Fred Hauchman, Director, Office of Science Policy, EPA Office of Research and Development

- Natural gas is an important part of our energy future, but the public has raised concerns about the impacts of HF. EPA wants to ensure that public health and the environment are protected.
- Congress directed EPA to conduct a study focused on HF's possible impacts on drinking water.
- The study will proceed as quickly as possible while respecting the scientific process and involving experts and stakeholders.
- The study will use the best available science, independent sources of information, and a transparent, peer-reviewed process. EPA will consult with other groups, including non-governmental organizations (NGOs), industry, states, and federal partners.
- The study itself will be led by EPA scientists and headed by Dr. Bob Puls. EPA's Science Advisory Board (SAB) reviewed an initial scoping study plan in April 2010. The SAB recommended that the study focus on water resources (including quality and quantity), use a case study approach, and include input from stakeholders.
- The expected study timeline is as follows:
    - October 2010: Peer review of study plan
    - Early 2011: Begin study
    - Late 2012: Initial results
- EPA expects that work will continue into the future. This is a complicated issue to study, but EPA will make every effort to complete the study as expeditiously as possible.

What Will the Study Include?

Dr. Robert Puls, Technical Lead for Study, EPA Office of Research and Development

- We need to find a balance between moving forward with natural gas exploration and extraction and protecting our natural resources.
- Here are the primary questions we hope to address with the study:
    - What HF scenarios might cause impacts on drinking water resources?
    - What approaches are effective for protecting drinking water?
- The major elements of the study are data and information (both quantitative and qualitative), chemical fate and transport (including the identification of chemicals that are used), and case studies (located in areas where issues have already arisen and/or on the site of new HF projects).
- The study could also include regional data collected by other entities, such as the Bureau of Land Management (BLM), the U.S. Geological Survey (USGS), and the Army Corps of Engineers.
- In a typical HF operation, there is a production well that is fairly deep, and there are several geologic strata between the fractures and the drinking water resources. However, there are cases where HF is shallower, and there have been cases where HF has taken

place within a geologic unit that is classified as an underground source of drinking water (USDW) by the Safe Drinking Water Act.
    - There can be 10 to 20 wells located on one well pad. Up to five million gallons of water can be required to fracture a single well.
    - Fractures in the geologic formations are created by HF, or they exist naturally in the formation. There can be interconnections between natural and induced fractures.
    - The distance between drinking water sources and HF provides one level of protection. Additional protection is provided by the casing and cementing of the well itself.
    - When wells are fractured, water, fracturing chemicals, and a proppant (such as sand) are injected under high pressure. This creates and props open fractures. When the pressure is released, the fluid returns to the surface.
- Types of data and information needed include:
    - Pre- and post-drilling site characteristics and water quality.
    - Chemical data, including information on HF fluids.
    - Water use data, such as sources and amounts.
    - Well construction and well integrity information.
    - Information on operation and management practices, especially with respect to produced water.
- Sources of data and information include:
    - Existing sources, such as published reports and materials submitted by stakeholders. EPA is already in the process of collecting this information. EPA is interested in collecting any qualitative or quantitative data that participants might have.
    - New sources. The study itself will generate more data, as will other ongoing studies. Data from these other investigations will be incorporated into the study as much as possible.
- Fate and transport includes characterizing fracturing fluids and their degradation products, determining HF's potential to mobilize chemicals from geologic formations, and identifying and refining methods for chemical analysis.
- Case studies provide opportunities for focused field investigations. The SAB recommended the case study approach, and participants at tonight's meeting can help by suggesting possible case study locations.
- Case studies will also allow EPA to evaluate HF in different parts of the country, in terms of geologic factors, water resource management practices, and water quality/quantity variations.
- Potential sites for case studies include areas where HF is planned, is in progress, or has occurred in the past.
- EPA will identify and prioritize case study locations based on stakeholder input, the vulnerability of water resources (including the proximity of other wells or exposure pathways), the extent of HF activity in an area, geologic conditions, and geographic variations.
- Next steps in developing the study plan include:
    - Collecting stakeholder input throughout the summer of 2010.
    - A transparent peer review process by experts in appropriate fields during the fall of 2010.

  - Collecting public comment on the study plan during the fall of 2010.

How Can Stakeholders Be Involved?

Ann Codrington, Acting Director, Drinking Water Protection Division, EPA Office of Ground Water and Drinking Water

- EPA held four sector-specific webinars and is currently conducting public meetings. Later, EPA will hold technical workshops to collect input from experts in the field.
- The study design is extremely important: a good study design is the foundation for a scientifically sound study.
- There are several ways to provide comments to EPA on the study design:
  - Speaking at public meetings
  - Submitting written comments at public meetings
  - Submitting written comments by e-mail or postal mail
- Key questions EPA would like input on include:
  - What should be our highest priorities?
  - What are the gaps in current knowledge?
  - Are there data and information we should know about?
  - Where do you recommend we conduct our case studies?

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Summary of Public Comments

EPA requested comment on the proposed scope of the study plan and criteria to be used for case study locations. Public verbal comments were somewhat broader than the hydraulic fracturing study, however. Individuals described regional impacts to public health, the environment, and economics; and provided recommendations on regulation, and identification of chemicals in addition to subjects or methods of study. Public comments have been grouped by common theme: impacts specific to EPA Region 6, recommendations for the hydraulic fracturing study, regulation, and general comments.

Hydraulic Fracturing in EPA Region 6

Economic and environmental impacts were the recurring subjects of public concerns specific to EPA Region 6 (Louisiana, Arkansas, Oklahoma, Texas, and New Mexico). Some commenters noted that the natural gas industry brings economic benefits to homeowners and communities through the creation of jobs and increased revenues for cities to support public structures and services. Other commenters questioned the trade-off of economic stability for risks to drinking water. Groundwater degradation from increased concentrations of salinity, sediment, methane, heavy metals, and organic compounds was alleged by several commenters to be a result of hydraulic fracturing and natural gas production activities. Surface water degradation from air emissions and flowback spills were also concerns of the public.

EPA's Hydraulic Fracturing Study

Transparency was one of the most common concerns discussed and several commenters mentioned their appreciation for EPA's effort to make this study transparent. A number of commenters emphasized that the motivation for this study needs to be protecting public health. They also warned against letting industry, economic, or political pressures influence any aspect of the study. Many commenters want full disclosure of chemicals used in the hydraulic fracturing process, so that contamination could be scientifically linked back to its source. However, there is conflict over releasing this information because industry considers it to be proprietary information.

Two other common concerns include defining the scope of the study and focusing the study on health risks to the public. Several commenters emphasized the need to distinguish between various hydraulic fracturing activities (e.g. well construction versus subsurface activities) since they could involve different levels of risk. Other commenters suggested that the study should: consider the entire life cycle of wells; use a risk-based, scientific approach; and allow for a high

level of stakeholder involvement. There were also many suggestions for researching published literature, potential case study locations, and state regulatory agencies that could be used in the study. Several comments considered the trade-offs between case studies versus scientific experiments/technical analysis. Additionally, the public expressed concern for considering impacts on air quality, water quality, water quantity, and human health.

Regulation of Hydraulic Fracturing

Commenters had a broad spectrum of opinions on the regulation of hydraulic fracturing. Some asserted that state regulations are currently in place and industry in their area is committed to protecting water quality and public health; therefore, federal regulations would add more burden than protection. Other commenters argued that state regulations do not always provide sufficient protection and EPA needs to step in immediately with federal regulations. A few commenters expressed a sense of urgency in establishing these regulations, recommending that EPA institute moratoriums on HF activity, at least until the new study is complete. Some commenters also expressed a lack of trust in state agencies and industry. They fear that politics and profits allow industry to break the rules without paying the consequences and that the risk posed by the unpredictability of fracture behavior is often discounted. For example, some commenters highlighted their disappointment that HF was Congressionally exempted from the Clean Water Act, the Safe Drinking Water Act, the Clean Air Act, and Comprehensive Emergency Response, Compensation, and Liability Act (Superfund). Lastly, the concern that industry should be required to fully disclose chemical information was mentioned frequently.

General Comments

Most of these remarks focused on commenter's opinions about the key priorities associated with hydraulic fracturing. Many commenters noted that HF has allowed the U.S. to expand production into natural gas reserves that were previously financially infeasible, thereby reducing our dependence on foreign fuel supplies and other potentially more environmentally harmful domestic fuel sources. They also cited the economic benefits to local regions and the country as a whole. Other commenters, however, expressed concern that public health and/or ensuring sustainable water supplies (e.g., sustainable industrial water cycling) should be the main priority. Many of these commenters cited examples of contaminated water and human illness, claiming HF activity as the cause. Some commenters claimed there is no evidence that HF activities actually pose health risks while others claimed there is significant evidence, disputing the possibility that HF be carried out in a safe, reliable manner. Several commenters expressed their desire for transparency (e.g., disclosure of chemical information) and their current lack of trust in state agencies and industry.

Detailed Public Comments

Public comments have been grouped by common theme: impacts specific to EPA Region 6, recommendations for the hydraulic fracturing study, regulation, and general comments.

Hydraulic Fracturing in Region 6

Comments from the public describing hydraulic fracturing in EPA Region 6 are as follows:

- A gas well was drilled 500 feet from a home in Dish, Texas, and sediment began appearing in the water immediately after the drilling. It got so bad that the family purchased a water filtration system from Home Depot. Then they continued drinking the water for a year. After that, the condition of the sediment in the water got so bad that it clogged the water system. A number of tests were performed on this water. EPA and the Railroad Commission of Texas (RRC) have been involved – several chemicals were identified in the water, and while not all tests showed the same chemicals at the same levels, arsenic, barium, lead, chromium, strontium, acetone, and methylbutene were all identified. Industry will say that these are naturally-occurring. The RRC will issue a report that this water is safe to drink. It is not EPA's job to determine the impact on industry; it is EPA's job to determine the impact on the public. The Agency should not let politics cloud its judgment, like what happens in Texas.

- The Halliburton Loophole needs to be closed. There are a number of wells that have been fracked in Flower Mound, Texas, and others are planned. The contours of the land flow directly into a lake, and there has already been a spill of flowback water. Air emissions tests show carbon disulfides. The chemical waste products from spills or fugitive emissions might enter Lake Grapevine or other surface water sources.

- No one is debating that natural gas is a clean and important source of fuel. The debate is about the process of HF, that is safe and that it does not deplete water sources. The impact on drinking water can be considered alarming. In Texas alone, 3,460 gas well permits have been approved this year, and only 35 have been rejected; that is 12 billion gallons of water. This water is not reused in the water cycle, but placed in Underground Injection Control (UIC) wells. New water resources will need to be found to meet the needs of the state population's continued growth. Residents will bear the price and experience costly water shortages until other sources can be found. The economy suffers during water shortages, and it becomes less desirable to live in the state.

- The water of a citizen from Arkansas first turned grey and dirty, then developed a questionable odor. Finally, the water stopped coming out of the pump. The state agencies were unresponsive and did not help. The same story is told across all areas in the United States with shale gas. Industry covers up their lies and does everything in their power to avoid having such cases on file.

- The City of Cleburne, Texas has experienced prosperity from the Barnett Shale, including jobs with good benefits, rising property values, higher sales taxes, and royalties for many of its citizens. The city has received $20 million in royalties, which have allowed it to fund the construction of a new civic center, road improvements, a new museum, a fire

station, and a police station. The city has not experienced a single instance of contamination in 200 wells, nor has it had any air quality issues.

- With respect to the water quantity issue, HF is responsible for only 3 percent of ground water use in the Barnett Shale area. Natural gas is good for the United States. There are 150 years of proven reserves for this country.

- One local resident had a gas well installed and noticed that her plants started dying. The more she watered them, the faster they died. Her horses developed chronic colic, and her husband's blood pressure skyrocketed. There was sodium in the water, and sodium and high blood pressure is a deadly mix. After testing the water, Texas A&M University scientists instructed the family not to drink it.

- The benefits of HF are undeniable to the nation, especially to Fort Worth and Texas. $8.2 billion and 8 percent of the local economy have come from the Barnett Shale. Energy demand is growing. The U.S. is able to produce natural gas based on new technology. This could result in more than 100 years of natural gas. The natural gas industry employed 550,000 workers in 2008 and created 2.4 million jobs in support roles. If HF were halted for 3 years, there would be a significant loss to GDP and employment.

- The RRC is the chief regulatory authority of energy in Texas, and oversaw the production of 8 trillion cubic feet of natural gas in 2009. There is a common misconception that there are many contaminated water sources due to HF. This is not true in Texas. HF has been used safely in the state for 60 years in tens of thousands of wells. There has not been one documented case of contamination from HF. HF plays a key role in the development of unconventional resources. The volume of gas in the Barnett Shale is substantial, but due to the low permeability of the formation, conventional recovery methods are impossible. In this and other unconventional shale areas, HF is a critical element in extracting this domestic resource.

- A resident and a political candidate has spent 24 years in the engineering field. Among the engineers he worked with, he found that 90 percent would do a good job and follow the correct code, but there is always 10 percent that do not. The gas industry has the same problem: 90 percent do a proper cementing job. The remaining 10 percent of 3,000 amounts to 300 wells that are at risk on any given day.

- Parker County's population is 120,000, and there are 1,745 producing gas wells in the county's 900 square miles. This is an asset to the state. However, with the good comes the bad and the perception of the bad. The appropriate state agencies have not been responsive to citizens. Otherwise, the conversation would be about what good has already been done.

- A Texas landowner's experience with the oil and gas industry has been positive in every respect, and there are thousands others who will say the same thing. Thousands have benefitted from the Barnett Shale. This family has a water well approximately 150 yards from a gas well, and there has never been contamination incidents. The water has been clean and drinkable for the 25 years that this family has owned and lived on the land. Public education is needed – there is a lot of passion and fear driving the public comments.

- It is a matter of national defense to be energy self-sufficient, but the difference between a thriving nation and a poor nation is its water, soil, and air. There is a family who has lived in East Texas on the same land since 1850; their water is now contaminated due to a neighbor's leaking gas pump. The gas leaked into his well, their well, and the other neighbors' wells. Once water is contaminated, it not only affects people living on the land right now, but it affects every generation. EPA needs to be on the job.

- A resident of Crescent, Texas, about 12 miles southwest of Fort Worth, is concerned about whether it is safe to have the gas drilling so close to the land farming. There are concerns about the runoff which runs into Mustang Creek and into Benbrook Lake, which is the municipal water supply for Fort Worth.

- The Permian Basin is oil-rich, but there are thousands of frack jobs for natural gas, as well. The oil and gas industry fuels the economy in Texas and New Mexico. It is clear that citizens have concerns, and there needs to be a forum to voice these concerns.

- Approximately 2,000 small, independent petroleum producers in Oklahoma have demonstrated that HF is a safe, proven technology that has been used over one million times over the past 60 years. It enables them to provide clean energy that makes modern life possible. It also provides a variety of other economic benefits to the area such as jobs and increased revenues.

- HF has been assumed to be safe from the get go, despite a lack of scientifically-credible testing. Dallas-Fort Worth has become more reliant on ground water due to population growth and the exhaustion of new reservoir sites. There is a lack of comprehensive well inspection and testing efforts and a lack of proof of well integrity, which is a potential threat.

- A Fort Worth weekly published an article three years ago about a man who ran a nursery; he signed a gas lease and ended up with two wells on his property. Very shortly after the wells were drilled, he turned on the tap and a foul-smelling foam came out. He was forced to drill a new water well, but it was filled with salt. He could no longer water his plants, and his nursery business was ruined. The drilling company will not take any responsibility. He called the RRC but they would not test the water because they did not know what to test for. The gas company said the contamination must have been a coincidence.

- Southwest Fort Worth borders the fork of the Trinity River. On the other side is Benbrook, TX. Benbrook has several wells, and the city council cannot say exactly how many wells have been drilled, even though they are the ones who approve the drilling. Councils that only care about money are deciding what happens to the health of everyone in Fort Worth.

- A water operator, licensed in Texas, has a water well that started losing production three years ago. The water was brackish and dark in color. A gas well had been put in half a mile away, and a water service company said the gas well ruined the water well. A second water service company came out and pulled three joints; when they got to the fourth joint they found that it was very rusty. The water problems at this well were caused by an issue with the old water well, not from the HF or the gas well.

- A Texas resident with two properties has paid to have his gas leases terminated. If HF activity continues in this area, his family is going to move someplace where there is no shale; that is how frightened they are.

- A Texas resident has a well on his property that has eight times the allowed limit of trichloroethylene (TCE).The Texas Commission on Environmental Quality (TCEQ) is going to install a charcoal filter. When the water was tested a month ago, the resident learned that TCE had been present in a nearby municipal well 4 years ago; that well is adjacent to his property. This resident was never informed of this contamination, which first occurred in 2006, the same year that a gas well was drilled across the street. Is TCE one of the fracking fluids used by the drilling company? Is TCEQ responsible for informing residents nearby of such contamination?

- In Trawick, Texas, leukemia rates are rising. Is that related to HF? Companies want to lease the land, but nobody can tell the residents that it is safe. The residents are told that it is "probably" safe.

- A Louisiana resident witnessed and videotaped twenty-three cows that died at a Chesapeake well site; the cows suffered. Drilling is killing the state of Louisiana. The state has completely handed control of its water to industry. The bayou has dried up, and creeks and streams are being dammed. Fish are dying, trees are dying, and the list goes on.

- The low permeability of the Barnett Shale is what keeps water sources safe. Companies have to fracture that to get to the gas and the protection disappears.

- Before the issue of HF was raised, in many cases, populations encroached on existing production areas. The prohibition of the development of natural resources is a condemnation of property rights; local residents are not aware of the law of dominant estate.

- In 2009, Texas independent producers provided 1.3 million jobs and spent millions of dollars to protect the environment and reduce the nation's dependence on foreign oil. There is an enormous amount of energy in shale, and HF and horizontal drilling are both practices that are needed to extract it. With these new technologies, there will be plentiful energy to heat and cool America's homes.

- Industry has repeated the same mantra: "There has not been one single documented case of contamination." But there are dozens and dozens of cases documented everywhere drilling occurs. A well was drilled 300 feet outside a resident's back door. Prior to the drilling, his water was crystal clear; testing was done before and after the drilling. Now the well is contaminated. Residents who live in the grasslands have a well with 11 parts

per billion of benzene. Cabot Energy in Pennsylvania needed to shut down three wells and provide water to 14 affected families. A family in Dish, Texas found drilling mud, arsenic, and chromium in their drinking water. A drilling map indicates that the lateral well went right underneath their home. Another family found surfactants in their water. Perhaps the contamination is from somewhere else in the drilling process, and not specifically HF, but the fact is that industry cannot control the frack, and water sources are being contaminated.

- Because water is not reused, 50,400 gallons of water in Fort Worth will evaporate every day. The city justifies this as recycling, but the chemicals will return as rain on the citizens. The evaporation processes use heat from compressors, not the clean fuel that is advertised. The emissions contain benzene, lead, mercury, radium 226 and 228, and other chemicals; nearby residents breathe these chemicals. Industry calls this produced water, or salt water, but they do not mention the cancer-causing chemicals. The produced water also contains fracking chemicals. The HF process is repeated throughout the life of the well, and chemicals are continually let into the air. The City of Fort Worth claims it will test its own air quality. However, they are not testing for lead, mercury, radium 226, and they do not know which drilling chemicals to look for.

- A few days ago, a local daily newspaper described a woman in the area who noticed an odor in her drinking water. Subsequently, she washed her hair, and it turned orange.

EPA's Hydraulic Fracturing Study

Comments from the public regarding the scope and content of EPA's study are as follows:

- Why is the study limited to drinking water, and what criteria were used to decide this?

- EPA should distinguish between horizontal wells (single and multiple) and vertical wells. The Agency should require states to submit raw data to conclude there is no proof of pollution, and also include information on the data sources, the dates samples were taken, the chain of custody, and other factors. If economic benefits are included in the submitted data, EPA should consider the impacts on communities, such as the setbacks to private water wells.

- Halliburton strongly supports plans to use a transparent, peer-reviewed process, as well as EPA's intentions to involve stakeholders and apply risk-based scientific principles. EPA should clearly distinguish between research to determine the risk from well construction matters and research to determine the risk from subsurface activities. Subsurface operations are distinct from surface activities. It is a known scientific tenet that HF fluids pose little or no threat to USDWs. EPA's own 2004 study and a New York state study, among others, show that there are no confirmed instances of contamination.

- In 1984, a water conditioning business encountered similar problems to what is happening with the HF contamination, and it was associated with anaerobic bacteria. The University of Massachusetts, Amherst has a Web site about these bacteria: http://www.geobacter.org. These bacteria produce magnetite crystals, and their presence

is tied to over-pumping the aquifer. Symptoms associated with magnetite exposure include taste/odor changes to the water, visual evidence of iron levels, severe staining, changes in hair color, the appearance of oil on the water, the accumulation of greasy materials, a salty taste with no rise in total dissolved solids (TDS), a bitter or astringent taste, rough stains, and filters covered with greasy material.

- State agencies have lost the confidence of the citizens on these issues. People from all over the country are chiming in on natural gas drilling. There is a failure of water resources in every place where this industry operates. People have good water for decades, then one factor changes and they have a slew of problems. This cannot just be a coincidence, and it cannot be blamed on anything else. EPA's study should prove that. It should not just look at the fracking process, but at the entire drilling process from beginning to end.

- EPA's study should be limited to ground water contaminated by HF.

- EPA was issued a mandate on the scope of the study; EPA should follow that mandate.

- RRC has technical staff interacting with EPA staff regarding data availability, and is happy to participate in this unbiased scientific effort and interact with scientific experts.

- Schlumberger reported that Russian scientists proved a link between HF and earthquakes. What happens when well casings are subjected to earthquakes? Another article, titled "Sniffing for Gas," claimed that gas from fractures 8,000 feet deep reached the surface due to natural fractures. If there are already fractures that allow gas to move up to the surface, is it possible that water could also move up to the surface?

- EPA's top priority should be to find out what industry's proprietary formula is. When workers are paid minimum wage, they will take shortcuts and accidents will happen. The chemicals in use need to be identified. If industry will publish what they are using, that may make the people hauling the chemicals more aware; with more accountability and responsibility workers will not cut corners.

- Based on mechanical properties, there is no way that a stimulating treatment could contaminate a fresh water drinking source. The main focus of the study needs to be on contamination from surface spills (e.g., implementing spill protection plans and response mechanisms for spills on the job) and ways to test the older wells for potential contamination. There is evidence of contamination from older corroded surface casings, where fluid is percolating through the annulus into the surface casings and surface water. EPA should come up with an accurate means of identifying the culprit well once a contaminated ground water source has been identified. Rather than shutting down the entire operation, only the faulty well should be shut down.

- In Fort Worth, most residents use water from reservoirs, but it is only a matter of time until those are contaminated. The long-term study must include the analysis of local reservoirs and the underlying aquifers, as well as the analysis of evaporation ponds. The produced water is not just salt water; it pollutes the water and contaminates the air through evaporation. A safe way must be found to dispose of the water.

- EPA's study should consider coalbed methane activities and their effects on surface water sources. The study should evaluate well construction standards with respect to multiple wells and multiple fracks per site. There should be a double-blind study; communities should not know that they are being studied.

- When EPA looks at wells, they should look at the cumulative impacts of HF throughout the lifecycle of the process, the makeup of the fluids, site storage, the migration of fluids, seasonal ground water differences, the timelines of fate and transport, and the worst-case scenarios of well casing failures.

- EPA's study needs to be totally unbiased and scientifically conducted. For case study suggestions, EPA should scan the newspapers in this area; there are a lot of people and material for case studies.

- The goals of the study need to be fairly straightforward and should involve all stakeholders, including the public. The full disclosure of chemicals should be mandatory. The possible migration patterns through geologic formations should be modeled and studied. There should be ongoing monitoring of ground water and surface water throughout the life of the wells.

- Residents in Flower Mound, Texas are searching for answers with regards to HF, and would welcome EPA conducting a case study in their town. Companies are drilling in urban areas, 500 to 1,000 feet away from homes, churches, and schools. There have not been comprehensive tests of air, water, and soil measuring the impacts on residents. The Flower Mound community remains a fertile area, with new HF sites being prepared. These sites meet or exceed the criteria that EPA has identified for case studies.

- Will EPA act as an individual agency or with others who stand to gain profit? Will there be federal regulations? What is the impact on water reservoirs and on water that residents use as a drinking source? Will companies pay for wastewater disposal? In that case, why is there a charge for wastewater on utility bills? What about the pollution from all of the wastewater? And the vehicle pollution – transportation trucks, dump trucks – are they regulated? Will geologists be involved from the beginning to test the safety of the sites? Will there be regulations for abandoned wells? What about percentages of allowable toxins – will there be tradeoffs?

- There are four areas to look at in this study. The highest priority must be health. What is the relationship between disease and oil production? These issues are very rarely addressed. Health needs to be equally important to economics.

- EPA's study should devise standards for ongoing testing through the life of wells. HF may lead to the reduction of available water supplies. Residents already have mandatory water rationing for landscaping, but industry seems to have carte blanche to purchase water. How do people stack up – who gets water first? What can EPA's study do to prioritize who gets water first? There is very little attention to environmental impacts from state and local governments. There can be no balance when it comes to public health. Somebody has to be the gatekeeper; somebody has to be the unequal partner with the most power to set the rules, and it should be the government. EPA should bear that

direction in mind and provide a study that gives the framework for regulations that protect public health and welfare.

- EPA should examine the two major issues of water quality and water quantity. What are the best available recycling technologies? If the effluent no longer comes back after being used in fracking, that additional resource will not be available for the future. Potable water is very valuable in Texas, and the state often relies on the reuse of effluent for industry and irrigation. As for quality, there are three components: surface water is contaminated by runoff from drill pad sites, construction operations and laying pipe, and the application of drilling mud to land open to runoff. Near-surface ground water is contaminated during the drilling process when the well is not yet sealed appropriately. There is the potential contamination of deep water aquifers by the fracking process, if HF causes the destabilization of the natural filtering process.

- EPA should develop an identification scheme for fracking water, or a chemical tag for each well, so that the wells polluting water can be identified. Right now, there is no way to prove the source of contamination. EPA can change that; the science exists.

- This should be an even-handed, fact-based, scientific study within the mandate of Congress. Emotion should be taken out of the issue. The potential for the benefits of the natural gas industry on the economy this is too great to get lost in emotion. This needs to be a fact-based study.

- EPA should look at changes in the patterns of chronic diseases and chronic health issues. There are higher incidences of breast cancer and childhood leukemia cases. The highest priorities should be urban areas that are just starting drilling activities, as well as surface water sources.

- What are the priorities of the study? One needs to be transparency and independence of the study design. EPA should demonstrate how the study is transparent, and how it will be independent. What are the gaps in knowledge? The public needs to see an accounting of all chemicals used.

- An EPA staff member should go through the *Fort Worth Star-Telegram* to get news stories from residents about what they are experiencing. These are the real scenarios.

- EPA should expand the study to include air quality effects.

- This study needs to be based on fact, not emotion.

- It is important for EPA to follow up on the effects of mass drilling, such as in West Texas and New Mexico and in the East Coast states with the flammable water – in some places, there are thousands of wells all within close proximity of one another. EPA should also find out about the effects of a single well in close proximity to houses and neighborhoods. Single wells are being put down in neighborhoods, close to playgrounds and water supply tanks.

- Estimates in 2007 by the Texas Water Development Board (TWDB) reported that 12.5 percent of ground water withdrawals were used for oil and gas. Last year, the reported

withdrawals used by the oil and gas industry were 27 percent. During the 2006 drought, homeowners reported "low water" or "no water" problems near HF sites. The aquifer was under stress. People appealed to the government for help, but there is no mechanism to protect human health over the interest of drilling. There has to be some way to prioritize water over natural gas drilling. There is data available. Consumer confidence reports (CCRs) are available annually from all public water systems. Various systems are reporting salinity and radium. EPA should take this into account but also look at the broad impact to aquifers. EPA should consider the cumulative impact of drilling.

- EPA's study should commence when the drill bit touches the ground: it punches through water and the water is exposed to anything that is in the hole, and some of the water sources are depleted. Past data could be collected through a survey. EPA could put notices in local papers, and residents could meet at a central location to fill out the surveys, which would be conducted by EPA to make sure there is no intimidation by industry. Most agencies are under the influence of industry. EPA should come to Arkansas to do the case studies; Arkansas is the number one place in the country to drill for natural gas, because the state has no rules and regulations.

- Jobs created should not be a factor of EPA's study; the study should focus on the health of the general public. What are the standards of what EPA says is safe drinking water? Are the current standards too low?

- The study should address the potential impact on air quality.

- The University of Texas at Arlington campus has a drill site with 22 gas wells. The site is adjacent to a child development center that serves 119 children per day, ranging in age from 6 weeks to 5 years. A naturally-occurring small creek runs through the site. EPA should consider this as a case study site. They are currently finishing fracking the last eight wells. This would be a good site for a case study because of the potential chemicals, or the potential runoff into the creek.

- The study should involve qualified people and not be based on political or philosophical assertions.

- The preliminary results of the study need to be available as soon as possible, because drilling has already impacted some water supplies and may impact others. Water usage supply experts say the Dallas region has a water shortage coming, and the Barnett Shale represents 12 percent of this shortfall in an area that serves over 826,000 people. The study must include the impact of all chemicals that natural gas adds to the water. The Trinity River system provides water for communities all the way to the Gulf of Mexico, making even the smallest accidents a threat. Air emissions fall onto lake surfaces, so it is reasonable to include surface water in the study. We highly recommend that EPA should use the Barnett Shale as a case study.

- EPA should focus on the Congressional intent of the mandate: HF and drinking water. It is imperative that state oil and gas regulatory agencies be involved in the process; they have had effective regulatory programs in place for years. The study should have a transparent process. Protecting drinking water is equally important to all parties. A fair and scientifically-based assessment will reflect the same outcomes as previous studies.

- The study is the crucial first step to get policy in place. The list of chemicals used in HF should be identified in the study. Before the study can begin, EPA must know the makeup of the fracking fluids being used so that it can adequately trace them. Industry has argued that this is proprietary information; on materials safety data sheets (MSDS), the chemicals are listed as proprietary. Because of this, in case of any accident, emergency personnel would not be able to assess the situation. Industry must agree to disclose the names of these chemicals. Strong regulations should be informed by but not delayed by this study. The needs to be controlled now, not after the study. Missteps today cannot create catastrophes for future generations.

- EPA should consider the local land farms for a case study. Are there cancer-causing chemicals running off into the lake? This could be a potential hazard if it is not addressed right away.

- EPA's study should be tied to the motivations to violate regulations and standards. There is a need for log inspections, below-ground sensors, fully-trained and motivated inspectors, and severe penalties for violations.

- Limiting the study to case studies will not demonstrate how widespread the problem is or is not.

- The settlements of the lawsuits and complaints all include gag orders. That is another mystery. When EPA conducts case studies, the Agency should consider areas without many settlements so that there will not be as many gag orders preventing them from learning the truth.

- The average royalty owner holding private mineral ownership makes less than $500 per month from their holdings. They live on the land, drink the water, and raise their crops and families on the land; they are stewards of the land and they are the last ones who want to see the land contaminated. If this study is to be conducted on their behalf, it must be scientific and technical. Ask the industry experts, including the state agencies, two questions: Has there been documented evidence that HF has contaminated drinking water? How likely is it to occur in the future? There are farms and ranches in urban areas, as well as a lot of development. People are unaware of drinking water contamination.

- The study's priorities should include a broad, life cycle investigation of the HF process from before the drill bit is inserted into the ground until after it is removed. I appreciate the Agency's sense of urgency and thoroughness. Right now, even before the study takes place, there are enough data available to regulate this process. This case study approach is good because there is an immediate need for on-the-ground field research. There are different implications in different parts of the country.

- EPA should be reminded that states do regulate HF, and the protection of potential sources of drinking water is the uncompromised focus of state governments. The study should tap into the resources and data collected by the states over the past fifty years. States look forward to cooperating with EPA for this study.

- The American Petroleum Institute (API) represents 400 companies in all sectors of the oil and gas industry that have extensive experience with techniques for extracting gas from

shale. This is clean-burning and domestic gas. API's top priority is producing energy in a safe way with the least possible environmental impact. Members work in cooperation with the government to improve operational integrity and regulatory processes. There is substantial public concern about HF, and members support EPA's ongoing scientific review. Members plan to remain engaged in the process, and are confident that this comprehensive review will prove what 60 years of experience has proved, which is that HF poses no significant risk to human health. API has provided guidance specific to this topic; guidance documents provide a straightforward written framework that could be useful to EPA's study. The guidance documents can be downloaded free of charge at http://api.org.

- The study's priorities should include the identification of the chemicals used.

- Innovative solutions for treating fracking water do exist. Companies such as Produced Water Absorbents (PW Absorbents) have had results along the lines of 96 percent reduction in volatile organics in the fracking water. PW Absorbents' parent company, ABS, has worked with EPA on other cleanup efforts.

- Gaps in our knowledge include the contents of the HF fluids. What goes in does not come out – this is by design. Everything to go in nice and thick and gel-like, but it then needs to thin so that it can get out easily. That process is done by adding in all these chemicals. It is an elegant process, but if someone has a contaminated well, you cannot prove that it is from the fracking if you don't know what the chemicals are. There is no way to prove contamination; there is no documentation of contamination.

- The study should be fair and scientifically based. A number of studies have already been conducted on HF, including a previous EPA study. EPA should consider past work when conducting this study. It is technically near impossible for frack water to flow up a mile and a half of properly-laid casing. EPA should investigate which aspects of the process are not being addressed. EPA should also continue to work with state regulatory agencies.

- Without good quality water to drink and good quality air to breathe, nothing else really matters. Politics should not be a consideration, and industry profits must not be a consideration. What happens in Texas or Colorado does not necessarily stay in Texas or Colorado. Water flows to the Atlantic Ocean or the Gulf of Mexico, and contaminants flow with it. Industry has used diesel, methanol, TCE, and radioactive walnut shells to aid in HF. EPA should test for the release of radon gas. There must be honest reporting of all these results. There have been several occurrences in Texas that would make good case studies – in particular, in Boyd, Texas, there was some good drinking water that burned nicely.

- Multiple studies waste time and money and do not foster confidence in the government.

Regulating Hydraulic Fracturing

Comments from the public regarding regulation of hydraulic fracturing activities are as follows:

- Federal regulations are required; they should be developed and put on the fast track. EPA should not wait for the complete study to publish findings regarding water, but instead prepare and propose regulations governing drilling from the beginning to the end, until a well has no activity of any kind. In 1969, the U.S. government proved that the people of the United States were capable of putting a man on the moon. Surely, 40 years later, private enterprise – with strong, smart, government regulations and strict oversight – can drill wells and safely recover natural gas. EPA needs to be strong, smart, swift, and proactive.

- It is all about water. In a lifetime, one person uses about 2.3 million gallons. In 2009, gas operations in Texas, Pennsylvania, and West Virginia used 532 billion gallons in one year. That water is gone forever. Based on these figures, that is enough water for 230,000 people for a lifetime. This is comparable to the water supply of Lovett, Texas or Orlando, Florida for seventy years. Water cannot be created, and there is no substitute at any price. The government should consider recycling provisions in HF regulations.

- Current state regulations have been effective thus far, and HF is not a new thing. The government needs to support the citizens who rely on the oil and gas industry.

- The CEO of Chesapeake has said that the industry needs to demystify its processes; that is commendable. Industry should work with the states. If state agencies take care of their responsibilities, the federal government will not need to step into local lives and economies.

- A commenter expressed concerns that the state agencies in Louisiana are corrupt and not serving the public's interest.

- RRC bases its determinations on science and fact. Its framework is comprehensive, and has very specific regulations. The agency oversees all well construction, and there are dozens of inspectors working in the field. Regulations do not allow for the pollution of surface water or ground water. The organization takes its responsibility very seriously, and has rules and regulations for recycling. With over 50 years of HF experience in Texas, and tens of thousands of wells, RRC has not identified a single threat to drinking water.

- EPA should demand a full disclosure of the chemicals used in the HF process, as well as the recycling of used water and a moratorium on HF.

- A citizen whose family has been in the oil and gas business for generations was surprised to hear that HF would be considered in an urban area. Who voted for this? What city council or mayor considered this? Did they know what was involved? Did they understand about the wastewater? How could the state of Texas and EPA not understand? Industry is present and the state and local governments are not protecting the public. Federal intervention is necessary. Once EPA completes the study, the Agency will face great pressure from industry to not regulate HF.

- The Arkansas state agencies seem to be working for industry, not the people of Arkansas. They are not trusted by the people; citizens feel that the state would already have the data if they wanted it.

- The problem is the RRC, who is not a friend of the people. The agency is supposed to control the oil and gas business, but it has lied to the people. EPA is also the problem; the Agency knew about the problems before drilling started. HF cannot be allowed in highly dense urban settings where children play and where schools are.

- EPA needs to be involved in the regulation of HF, because Texas does not have laws – the state only has the "good ol' boy" system.

- Industry has exemptions to Rule 37 of the Texas Administrative Code [which sets requirements for well spacing]. Now they want to be exempted from water usage regulations. State agencies are lacking in a lot of areas, but they do good things also. EPA needs to ensure the long-term safety of underground aquifers. The aquifers are all different. Some recharge quickly and some recharge slowly. There are a lot of things EPA could have a big impact on. In addition, full disclosure of the chemicals used must be a public item. If industry has any integrity left, they will disclose what is in the chemicals now and not wait until they have to be told to do so by a regulatory agency.

- Abandoned wells pose problems for years. Explosions and accidents are increasingly commonplace and pose more and more of a threat to human life. If a private citizen is dumping trash, a fine is issued. If our cars do not pass a test, owners must pay to fix the problem. The double standard must be fixed.

- Industry should be subjected to the Clean Water Act and the Clean Air Act.

- Industry should disclose the chemicals used in the fracking process when applying for a permit. The ability to keep them secret is wrong. On a tour of a Chesapeake well site, attendees were told that the HF chemicals had a formula similar to dish soap.

- The currently-available information warrants immediate federal regulation of HF. EPA needs to guide HF to ensure drinking water is safe. HF may also pose dangers to migratory birds and other wildlife. HF falls under the Migratory Bird Treaty Act.

- Massive amounts of toxics are spread on farmland and dumped in creeks. There is no Texas legislation, so there is no way that federal regulations can interfere. If HF is safe, why does Halliburton need indemnification from any regulation? In the Texas Supreme Court case *Garza vs. Coastal,* industry emphasized how imprecise HF is; it is not a precise science. A fracture might go twice as far as predicted – oops! Tom Price of Chesapeake Energy said that HF is a "surgical operation." Schlumberger says that clearly the industry has much to learn about HF, and that models fail completely to predict fracture behavior. An improperly designed fracture can enter the water zone. People with contaminated water are spending thousands and tens of thousands of dollars for private testing. They do not trust state regulators.

- Oil and gas regulation has traditionally been the role of the state. Congress should maintain the status quo and leave this regulation to the states.

- HF is stringently regulated by three agencies in Louisiana. The development of wells is subject to continual oversight from regulators. Companies are committed to the protection of drinking water. Wells have proper casing and cementing and HF takes place thousands of feet below the water table. Drilling companies meet monthly to discuss best practices and work with community leaders; they take their responsibilities seriously.

- The RRC has the authority to regulate HF. EPA should work with industry to find the solution to the instances of water contamination; whether they are caused by HF or well construction, they are a problem.

- There should be a moratorium on HF from now until the comprehensive study is completed. Experiments involving monitoring wells downstream of drilling activities are needed, and specific well dyes such as mild radioactives or nanoparticles should be used. Monitoring wells should be required in each distinct geologic formation, such as the Barnett Shale and the Marcellus Shale, and industry should be taxed to pay for this testing (like the Reagan administration's "user fees"). As the well blowout in the Gulf of Mexico demonstrated, industry does not know what is under the ground.

- Regulation should remain with the state agencies, but they must work to preserve and protect water resources. There is no "us vs. them" – everyone needs to be on the same side and work with the facts. Most operators use abundant surface water, not ground water. Operators should be encouraged to adopt an adaptive energy-water collaborative approach.

- Additional layers of regulation will not result in additional protection.

- State regulators have long overseen HF, and federal regulations should not block resource development.

- HF was exempted from the Clean Water Act, the Safe Drinking Water Act, the Clean Air Act, and Superfund – that is not acceptable.

- This is a political matter. If it had been addressed by state agencies and dealt with, this would have been taken care of a long time ago and EPA would not have to be involved. The public cannot trust the agencies to which they pay their hard-earned tax dollars.

- There should be full disclosure of all chemicals used. Each well should list all the chemicals used in order of the amount, just like the U.S. Food and Drug Administration (FDA) requires in the food supply. The companies do not have to list how much of each chemical is used, just list them from highest to lowest. EPA should also test the flowback water. It is obscene that industry is using 3 to 5 million gallons of water per well when most citizens are restricted from watering their lawns between 10 AM and 6 PM. Industry also uses a recycling process, but it should be tested to make sure it is safe. The chemicals are not a proprietary formula – Coca-Cola has a proprietary formula, but people have the option of whether or not they want to purchase it. People are not given the same option for their health and safety when it comes to HF.

- Oil and gas should only be produced in ways that are safe. EPA, RRC, and the Interstate Oil and Gas Compact Commission (IOGCC) all found HF to be nonthreatening. When

EPA developed the UIC program, EPA came to Texas and learned from the RRC how to implement a UIC program. After ensuring there is sufficient environment protection, the RRC should promote clean natural gas development.

- The RRC has not identified any dangers from HF because of its industry bias. The organization says that HF takes place below the fresh water zone, but if it is really safe, then why do the wells get contaminated? A third-grade science glass could connect the dots. The source of the contamination does not matter, because the water still gets polluted. Industry has not proven that HF does not cause contamination. Just like BP, they only want jobs and profit. Does it take a Gulf oil spill or a Love Canal to restore our priorities? The Fort Worth City Council is industry-friendly. State agencies are concealing adverse results, while the safety of citizens should be the highest priority. EPA should exercise its authority as it did with the cement kilns.

- An article published this morning titled, "Ground Water at Risk," quotes industry apologists who state there is no proof of any danger to health and safety – they have it backwards. The 1958 Delaney Clause [an amendment to the Food, Drugs, and Cosmetic Act of 1938] says you cannot put carcinogens in food. Carcinogens also cannot be put in water. I endorse the comments in this article completely and repudiate the role of Vice President Cheney in undermining safe drinking water in this country. I ask EPA to please look at the Delaney Clause and call for a moratorium. Safety first, profit later.

Hydraulic Fracturing – General Comments

General comments from the public regarding hydraulic fracturing are as follows:

- The idea that gas drilling can be done in a way that assures the safety of the environment, wildlife, and health simply cannot be supported by the already well-documented facts. HF fluids contain carcinogens and other lethal compounds, and tens of thousands of gallons of these fluids remain underground somewhere. These fluids can migrate and mingle with ground water. Injection wells can also fail and they have failed. Since 2004, there have been 1,000 contaminations that have been linked to fracking, mostly in remote areas; in urban areas, obviously the margin for error is smaller. According to a recent article in *Scientific American,* frack water from the Marcellus Shale contains very high levels of radium. To say gas drilling does not harm water is like denying evidence of global warming.

- Hydraulic pressure is the source of small earthquakes. The fracturing mud is toxic, and it is known to contain natural radioactive elements that are enriched to enhance proprietary HF systems. The chemicals are mixed in water, and they are industrial strength but they are described as being as benign as "a pinch of salt." However, too much salt will kill. The government does not test for the same chemicals that are found by private testing. HF will kill the population through water contamination: it takes ten years to kill a human liver this way. There are cracks at the edges of the shale and other layers of the earth, so toxic mud can flow into horizontal springs and water wells. Because of cracks at the edges of boreholes, chemicals seep into aquifers before the casing is completed. The fire department has said that gas can pool in the water because it is heavier than air.

- Natural gas is clean, abundant, American, and available right now. It can be an important complement to renewable energy sources like wind and solar. Texas Tech University is studying new ways to manage recovery from these new gas sources. Texas Tech has incorporated environmental courses into its engineering programs. Over the last 25 years, alumni working in the field have not expressed any concerns about the environment based on their experiences. Texas Tech is conducting research into new HF technologies, but it has been used for decades, and it has become more and more efficient. Natural gas generates jobs, revenue, low fuel prices, and it has a big economic impact and an impact on energy security.

- HF operations have had major spills. What happens when this contamination goes into the ground and washes into rivers and streams? Most of Fort Worth is dependent on surface water. The public needs assurances that water resources are being checked at the point source locations running into their watershed.

- HF has been used safely since the 1940s. The protection of freshwater aquifers is one of RRC's highest priorities.

- HF is a 60 year-old practice that has been used to stimulate over one million wells in the United States.

- In April 2008, a gas field worker in Colorado went to a hospital's emergency room with chemicals on his clothes. After 10 minutes of exposure to the man, an emergency room nurse became ill. Her liver, heart, and lungs shut down within a week. Doctors had great difficulty pulling her through. The drilling company would not disclose what the chemicals were. Different people are affected differently, even when exposed to very small amounts of the chemicals. Recent documentaries have shown evidence of illnesses apparently related to these chemicals. Dr. Theo Colburn identified 300 chemicals, most of which are toxic. Testing for these chemicals is expensive, it is not covered by insurance, and it is impossible when the chemicals are not identified. Industry claims there is no proof of contamination, which is likely true because the claims cannot be defended in court. Industry settles and places a gag order on the people involved. The chemicals must be further studied, identified, and lists made available to doctors.

- Different groups have linked shale gas to water contamination, and the reports are increasing. Natural gas represents a transition away from coal, but it must be examined to make sure water is protected. As the SAB knows, the study is the crucial first step to put protection in place. HF involves injecting chemicals underground, and EPA oversight is necessary. EPA's own analysis in 2004 found that many chemicals are hazardous, but somehow did not pose a risk when mixed with water. This defies common sense and geology. Underground aquifers flow in ways we do not understand.

- Concerned citizens who are concerned and/or unhappy with their state agencies' roles in regulating hydraulic fracturing and/or their responses to instances of water contamination should call their state legislators.

- Royalty owners have rights, but even more important is the basic human right to clean drinking water. The Endocrine Disruption Exchange has identified 94 HF chemicals known to be used in fracking in Texas: 74 percent have between 4-14 health effects, and

34 percent of the total are known endocrine disruptors. More information comes in daily. In 2009, companies like Chesapeake increased their HF operations but this did not result in a significant increase in production. Water is taken out of natural processes forever.

- Gas companies came to Fort Worth and offered residents a lot of money, but they disrespected the communities. They tried to get people to sign contracts without letting people read them. When residents have tried to find out information, they have had to learn it on their own. There is so much secrecy. Why won't companies talk about what is going on in these wells? There is a rise in cancer. The number one priority should be safety and security in the community. One of the gaps is that the public does not know what is going on. The companies are trying to separate communities and turn them on one another; one will receive more money than the other. EPA should not let the state become involved.

- Natural gas provides a way to transition away from coal, but it must be examined and regulated so that the nation's water sources are protected.

- Citizens want to know what they could have done within their communities that could have prevented drilling from happening in their neighborhoods.

- At the core of the First Amendment is the right of the citizen to be heard. Industry is using 245 chemicals and 175 products in HF. Homeowners who are in close proximity of the gas wells have a right to know what is in there. There is much irreversible damage to human health – has Chesapeake forgotten about the Clean Air Act, the Safe Drinking Water Act, and the [Emergency Planning and Community] Right-to-Know Act? One citizen has 16 wells very close to her property line, and would like to install 16 wells in the backyards of Chesapeake's CEO and of Texas Governor Perry. If it is safe for the public, it is safe for them. It does not take a rocket scientist to figure out that mixing chemicals will cause an explosion. BP did not have an emergency plan in place in case of disaster. Two months later, they have not been able to stop the leak.

- A company that has been involved in recycling fracking water for the past 6 years empathizes with both sides of the debate. Balance is necessary; natural gas can help our economy recover and make the United States energy independent. HF is generally safe; this company works with these chemicals in their operations every day and does not see them as a big health risk. The bigger concern is the sustainability of the water. When most of the water is lost to the formation, it is gone for good. One goal should be sustainable industrial water cycling. Knowledge and best practices from Texas are being exported to Pennsylvania and Arkansas.

- Like everything else in life, there is a right way and a wrong way to do this. BP has shown the wrong way. Companies talk about having experience with HF for 60 years, when, in fact, this type of HF has only been used for 15 years. Industry needs to speak to people in an honest manner. Governor Perry has been the lapdog of industry, and RRC has been the lapdog of the Governor. It is time to raise the curtain on what is in the fracking fluids, and to regulate what goes in and what comes out. It is all about economics, but industry can do it the right way; it is possible.

- Without HF, there would be no access to the reserves in the shale. Reliable HF is required to take energy from dirtier to cleaner, toward hydrogen. Natural gas has more hydrogen, so it burns cleaner and is more cost effective. There are standards for pipes and cementing to protect ground water. Each well must be cemented to the surface, along the entire casing string. The recycling process adds 40 percent to the cost, but Devon Energy believes that it is the right thing to do.

- The types of contamination that have been reported are caused not by HF, but by the failure of improperly cased or maintained wellbores. There is no way that a fracture can move into water-bearing strata – it is not physically possible. It is more likely that contamination is occurring through older wellbores or wellbores that have not been properly cased. HF is one of the most important technologies that exists, along with 3D seismic surveying and directional drilling. It has become highly developed and efficient.

- When a clean drinking water well goes bad, and the only variable that has changed is the presence of a gas well, it is clear who is to blame. It is shocking that the natural gas drilling industry is allowed to compromise our health. Texas has the most drilling and the least regulation. It is a juggernaut of destruction. How can it be that industry is given carte blanche to use so much water? Citizens are told to conserve water – one of the most precious resources – yet the Barnett Shale drilling uses more than 1 billion gallons of water. Clean water is turned into poison with chemicals. It is a toxic cocktail wreaking havoc above and below ground. Water is removed from the active hydrologic cycle.

- 1.7 million mineral rights owners, many of whom are well into their sixties and use royalty incomes to supplement their retirement, depend on natural gas production and drilling. Technology now allows companies to remove oil and gas that were not previously economically viable. At one time, the nation wanted to reduce dependence on foreign oil. There has never been a single case of ground water contamination by HF, as evidenced by previous studies. Without HF, thousands of jobs will be lost, tax revenues that support schools and state governments will decrease, the incomes of royalty owners will be reduced, and the United States' dependence on foreign oil will increase.

- HF occurs thousands of feet below fresh water zones. The Barnett Shale is 8,000 feet below the water table – that's more than a mile of solid rock, and deeper than the combined heights of the five tallest buildings in North America. In the past 25 years, Congress, federal agencies, and the states have examined HF extensively and not one case of contamination has been proven. In 1995, the EPA Administrator stated that HF is closely regulated by the states and that EPA is not legally required to regulate HF. There has been no evidence of HF resulting in drinking water contamination. Two EPA officials recently testified before Congress and agreed.

- Everyone has an equal stake in HF, and all should be invited to the table, including industry, royalty owners, and citizens. Citizens should not be seen as less important; the public cannot organize like industry can, and they do not have the same resources available, but everyone has to drink the water.

- Natural gas provides abundant clean energy and enormous benefits. The single largest challenge is public concern over health, safety, and lifestyle. Industry will not engender public confidence.

- Citizens are amazed at the amount of time and study they are supposed to do to keep their family safe; this is the government's job. Google Maps shows what used to be prairie land, just west of Denton, Texas. Wells are coming like locusts and overtaking the land.

- It seems so easy for industry to ignore individuals and their testimonies of health problems, of the degradation of property and the destruction of the value of land. People are getting sick or dying. Livestock are dying. The regulatory agencies are corrupt and they have failed the public.

- This issue means a lot to a lot of people on different sides. The economic impact of unconventional natural gas is significant; there is an impact on long-term energy policy. The potential for local economies is significant. There are bad things, but there are also good things.

- EPA's priority should be to get caught up and get in front of this issue. A few people have testified that nobody has proved contamination; this is something that EPA might help change.

- Corporate special interests are profiting at the expense of public health. Fresh water is a natural resource, and HF poses a double jeopardy, because industry is financially motivated to inject produced water underground. Pipelines should be built to transport water to the sites instead of using trucks. Operation permits do not require operators to report releases of benzene and other chemicals. These wells are under the radar, and there are no vapor recovery systems; air pollution has not been minimized.