

Hydraulic Fracturing EPA Public Informational Meeting

Binghamton, New York

September 13, 2010 – Afternoon Session

Summary of Public Comments

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Meeting Format

US EPA (hereafter referred to as EPA) held four public informational meetings in Binghamton, New York, on September 13 and 15, 2010, to discuss proposed design and scope of a research study on the potential relationship between hydraulic fracturing used in natural gas extraction and drinking water. The following meeting summary details the public verbal comments given during the first of the four meetings held on September 13, 2010, from 12:00 to 4:00 p.m.

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 590 individuals attended the meeting and EPA received verbal comments from 109 citizens following the EPA presentations. Both the EPA presentations and public comments are summarized in this document.

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

Judith Enck, Regional Administrator, EPA Region 2

- EPA Region 2 serves New York, New Jersey, US Virgin Islands, Puerto Rico, and the tribal nations located therein.
- Natural gas is a key element of the nation's energy future. However, the public has expressed serious questions on the safety of hydraulic fracturing (HF) and EPA takes these questions seriously.
- 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 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. EPA wants to hear the public's experiences and ideas.
- EPA places a high priority on this study and hopes that the public's concerns will be addressed and answered through this study.
- It is EPA's understanding that the New York Department of Environmental Conservation (NYDEC) will not review or take action on the 60 permit applications they have received until the after the release of the final Supplemental Generic Environmental Impact Statement (SGEIS). NYDEC has received approximately 14,000 public comments on the draft SGEIS.

Why Are We Studying Hydraulic Fracturing?

Jeanne Briskin, Office of Science Policy, EPA Office of Research and Development

- Natural gas is an important part of our energy future, and it is a resource we value for a variety of reasons, but the public has raised concerns about the impacts of HF. EPA takes these concerns seriously and 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. EPA insists on conducting a credible, transparent, scientific study, which takes time.
- 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.
- EPA is also in the process of putting together a robust panel of experts with a wide range of experience. The panel will provide a critical review of the study plan.
- 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. If the study identifies issues that require urgent attention, EPA will act quickly to take the necessary steps.

What Will the Study Include?

Dr. Robert Puls, Director of Research, EPA Ground Water and Ecosystems Restoration Division

- EPA is very impressed with the depth of knowledge of New York's citizens on this topic. The comments and suggestions received at these public meetings will be very helpful to EPA.
- 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. 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.
 - In the West, wastewater is often disposed of through underground injection wells. However, there are fewer of those wells in the East, which adds an additional challenge.
- 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 in 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

- The most important part of this meeting is the public comment. Additional comments will be accepted until September 28, 2010.
- 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 comments described regional impacts to public health, the environment, and economics and provided recommendations on regulations and subjects or methods of study. Public comments have been grouped by common theme: impacts specific to EPA Region 2 and the Marcellus Shale area, recommendations for the HF study, regulation of HF, and other comments.

Hydraulic Fracturing in Region 2 and the Marcellus Shale Area

Most region-specific comments focused on two main points. First, many commenters stressed the poor economic health of the region and the benefits that HF could bring to the economy. However, some disagreed, arguing that HF could jeopardize the region's small farms, vineyards, tourism, and rural landscape. The second chief concern of commenters was the large number of residents relying on private wells or surface sources for drinking water who may be vulnerable to HF impacts. Many people in the region also live above sole-source aquifers. Commenters expressed concern that even small problems could quickly affect large numbers of people with no readily available alternatives for water. Many commenters also argued that the Northeast is one of the few regions of the country and the world with abundant supplies of clean, fresh water and that this resource should not be compromised under any circumstance, either through contamination or by large-volume consumption for HF. Finally, many commenters referenced the NYDEC's draft SGEIS, either asking EPA to consider its findings or asking EPA to call for its withdrawal.

EPA's Hydraulic Fracturing Study

Scope

Comments on the scope of the study generally fell into two categories: those that asked EPA to keep the scope as narrow and focused as possible, and those that asked EPA to conduct as comprehensive and cumulative a study as possible. Many of these latter commenters favored including emissions to air and health effects from aerosols in the final study design and asked EPA to look beyond the moment of fracturing to include all impacts including impacts to surface waters and transportation. Some commenters opposed to a broad scope did approve of broadening the scope to include economic impacts. In total, the majority of commenters favored a broad, cumulative study scope. Several commenters from all perspectives asked for a study based on science and facts and free from political, industry, and emotional influences.

Knowledge Gaps

The most common knowledge gaps commenters identified were the composition, fate, and potential toxicity of fracturing fluids and the options for treatment of fracturing fluids and produced formation fluids (wastewater). Several commenters were concerned that viable treatment options did not exist, although a few commenters suggested options for treatment. Several commenters also focused on the potential for radioactivity in produced fluids due to the presence of naturally occurring materials and requested that EPA investigate the health risks associated with this. Other knowledge gaps highlighted by commenters included the uncertainty

about the complex subsurface geology and the effects of multiple rounds of fracturing in the same well. A few commenters also asked EPA to consider filling knowledge gaps with citizen-collected knowledge and noted the possibility that absolutely irrefutable evidence of contamination may not be available in every case. Commenters also provided specific information to help fill these knowledge gaps.

Case Study Locations

The majority of commenters suggesting case study locations recommended locations in New York or Pennsylvania, although a few commenters also suggested locations in other states. The majority of commenters also suggested that EPA choose locations where damage and contamination have already occurred. Most commenters favored unannounced visits and many did not think that partnering with industry would be a good approach. Commenters instead thought that EPA should talk with landowners in affected areas to determine the most promising case studies. Many commenters also suggested looking into the records of the Pennsylvania Department of Environmental Protection and the NYDEC. Some commenters noted that there has not been a single documented, verified case of drinking water contamination due to HF. Finally, several commenters asked EPA to address how contaminants could become incorporated into the food chain through nearby agricultural activities.

Regulating Hydraulic Fracturing

Many commenters want to see HF regulated under national laws such as the Safe Drinking Water Act and the Clean Water Act. These commenters generally felt that HF currently is not subject to these regulations because of political influence, not scientific evidence. Other comments concerned NYDEC's proposed regulations. Many of the commenters who referenced New York state regulations felt they were adequate to protect drinking water and underscored that they were the strictest in the world. Many of these commenters suggested that EPA work with NYDEC if federal regulations are adopted. Several commenters cautioned that state regulatory agencies are too understaffed and underfunded to properly regulate HF, even in the presence of good state laws, especially given the scale of proposed HF activities. A few commenters called for regulations requiring HF companies to disclose the composition of fracturing fluids.

General Comments

Many commenters discussed the positive economic impacts of HF. Some commenters remarked that since the value of natural gas will only increase with time, the study should take as long as needed to ensure water safety. Many commenters also remarked on the importance of natural gas's low carbon emissions compared to coal or oil and the nation's continuing need for fossil fuels and energy independence. However, other commenters argued that natural gas is not a "green" fuel, especially when cradle-to-grave carbon emissions from the entire drilling process are taken into account. These commenters generally emphasized the nation's need to transition to renewable energy sources. Several commenters also criticized previous studies as influenced by industry or politics. Finally, many commenters from all perspectives acknowledged how emotional this debate has become for many people, and expressed a wish that good, transparent science would be the result of the study.

Detailed Public Comments

Public comments have been grouped by common theme: impacts specific to EPA Region 2, recommendations for the hydraulic fracturing study, regulation, and general comments.

Hydraulic Fracturing in Region 2 and the Marcellus Shale Area

Comments on HF in Region 2 and the Marcellus Shale area were as follows:

- An elected official is not opposed to development in the Marcellus Shale in Upstate New York. Natural gas is a tremendous resource with the potential for significant economic benefits. Reaping those benefits does not come at the expense of New York State's greatest natural resource—the abundant supply of clean water.
- Many upstate New Yorkers have questions regarding the safety of the HF process and natural gas drilling in general. It is important to separate fact from fiction and give the citizens that would be affected the opportunity to participate in the discussion.
- Communities in New York State are poor, there is high unemployment, and people are forced to move to find work. Farmers are on the verge of losing their farms. Do not turn upstate New York into a playground for the rich. HF will revitalize our communities. EPA should work with NYDEC. They have the strictest rules; they set the benchmark.
- With HF, billions of gallons of hazardous fluid that start out as clean New York State water are transformed into a toxic product. Each Marcellus well will produce around a million gallons of waste fluid that flows out of the formation along with gas, heavy metals, and radioactive materials.
- NYDEC launched a year-long evaluation of the potential impacts to water quality, water quantity, and the water supply infrastructure from HF. The results are presented in two reports that were submitted to DEC and made available on the DEC Web site. DEC's two reports identify a number of serious risks to water supply and infrastructure. First, industrialization from gas drilling would cause significant land use changes in the watershed and would create risks for the quality of our water and water infrastructure. As a consequence, gas drilling could also affect our ability to maintain filtration avoidance. Current cost analysis suggests that filtering the water from the Catskill-Delaware watersheds could cost more than \$10 billion to build, and \$100 million per year to operate. That translates to a 30% increase in the price of water and sewer service currently paid by New York City residents—a risk which is entirely avoidable.
- The northeastern United States has the last remaining reserve of clean fresh water on earth; we cannot pollute it.
- Over 50% of Cortland County is leased; land in the State Forest has already been leased.
- A commenter lives on top of a sole source aquifer. From this aquifer 80,000 people get their water, including the commenter. It will only take one mistake in a complex,

glacially formed valley and 80,000 people will be shortchanged. EPA should look at cumulative impacts, especially on private wells. The NYDEC doesn't even mention private wells in their draft SGEIS.

- This debate is of vital interest to the consumers of the New York City water supply, which provides more than one billion gallons of drinking water for approximately one-half of the state's residents, including 8.4 million residents of New York City. The Marcellus Shale underlies the entire Catskill-Delaware portion of the water supply which typically supplies over 90% of the demand.
- New York State and other states need to stop using a generic approach. These states need to have full public hearings on HF activities.
- Since drilling started in Dimock, Pennsylvania, two years ago, families cannot drink or bathe with their well water. Gas and methane are released from stacks from wells so that wells do not explode. One well exploded in January 2009.
- Up to 4 billion gallons of New York surface water would be used every year. It is impossible to avoid altering the ecosystems of those streams at that level. Water in New York State is the most precious resource there is and New York State cannot afford to contaminate it.
- EPA's first task must be to call for a withdrawal of the New York State SGEIS. The document ignores the complexity and cumulative impacts and treats the absence of knowledge as evidence of no harm. Lessons of the past show us that a state of not knowing has led to bad surprises. Look at the example of the tragedy of the Hudson River. PCBs traveled in ways that nobody thought possible, migrating through shale itself, and ended up in areas that people could not and would not have predicted. The commenter was diagnosed with bladder cancer at the age of 20—the geologic formations should not have allowed that.
- HF is comparable to a band of robbers that is being aided by the government. Compulsory integration forces landowners to participate if 60% of neighbors lease.
- Natural gas firms and NYDEC have long denied the existence of HF hazards in New York. This can only be rationalized by ignoring widely available government data or defining the absence of evidence and the evidence of no impact.
- Cortland County is a prime example of an area where geology easily allows conduits from surface to ground water. A gas well salt brine spill 30 years ago continues to contaminate groundwater today.
- Since gas drilling can kill vegetation and wildlife, it will kill farming and tourism, endanger health and safety, and damage the diversified economy of New York State.

- A commenter lives on the edge of Tioga and Broome Counties and gets all their water from a sole source aquifer. There is a sole source aquifer region here, the Clinton Street-Ballpark Valley System. All of Broome and Tioga County are sole source aquifers. The actual recharge area is beyond county boundaries.
- Water use is a major concern, as is storage and disposal of the contaminated wastewater. In the commenter's town, all drinking water comes from private wells and in the county, most of the income is from small farms, tourism, wineries, education, and community-supported agriculture. All of this would be destroyed with a major drilling accident.
- Throughout the United States, aquifers are being depleted: in the Southeast, to the Midwest, in Florida. EPA must take the greatest precaution to protect the water supply where it is plentiful in the northeast. New York State still has a temperate climate and good land, water, and farming infrastructure. New York also has a burgeoning number of small farms and associated craft industries like cheese and wine made with sustainable methods. New York can once again be the breadbasket of the Northeast. This would be destroyed by HF, which would change the whole area into an industrial zone with pollution.
- Nothing has happened in New York because high-volume HF has never happened in New York. There is a big difference in scale here.
- A commenter believes HF constitutes deep well injection due to its meager recovery rates and warrants regulation under effluent limitations in New York and other regulations associated with underground injection.
- EPA should be commended for examining the whole HF process from obtaining the water to operations and disposal. EPA should review data obtained from the NYDEC and county health departments. It documents spills, fires, and explosions due to natural gas activities, and other impacts of HF. Local ordinances for dumping of flowback water have been exceeded nineteen-fold.
- A citizen has heard thousands of heartbreaking stories in Pennsylvania and New York during their extensive travels. There are two fractured Marcellus well for every contaminated well. Cabot pipes in water from the nearest water supply. EPA must not allow a legacy policy from the previous administration to threaten a great source of drinking water to millions of people, in the name of clean energy. The whole world is watching. They must help uphold the Pennsylvania constitution which says that people have the right to clean air and water.
- There is a current de facto moratorium pending the release of the final SGEIS. EPA submitted withering comments on the draft SGEIS. It is imperative that EPA enforces its grave reservations. What has happened in Pennsylvania should make the New York State DEC withdraw its draft SGEIS and address the shortcomings.

- Look at the geology. The soil report said we currently do not have the capacity to clean flowback in the Northeast. There aren't any facilities.
- The Marcellus isn't a boogeyman; it is the key to the economic survival for New York State. EPA and NYDEC should not spend additional time on redundant studies. Rather, they should focus on enforcing existing regulations in New York State.
- HF in the Marcellus can be done safely and this EPA study will reaffirm that HF, done in accordance with New York State's regulations, does not represent a threat. NYDEC has the technical experience to get this right. Anti-drilling rhetoric has dumbed down the discussion and clouded judgment.
- If done correctly, water and high volume HF is the key to unlocking the energy in the Marcellus Shale and other formations around the world. Do not be silent and do not let this opportunity to develop the Marcellus Shale pass. EPA should not stand in the way of a technology that works in the name of technologies that do not. Alternative energy is not an alternative; energy is life.
- Spills are common during oil and gas extraction. Spills near the surface in sponge-like topsoil clean up easily, but if they pass into the subsurface they become a serious poisoning risk. Routes include old unused water wells and old, undocumented, unplugged oil and gas wells. New York and Pennsylvania have more than 200,000 old and undocumented wells. New York has more than 40,000 and Pennsylvania has more than 180,000. There are also the holes left behind from seismic testing. EPA should look at developing a risk assessment tool for these holes. New York and Pennsylvania know that the old wells are a serious threat, but finding these penetrations is also very difficult. The plugging programs in New York and Pennsylvania are small and underfunded, plus the well casings were often salvaged for steel in World War II. Old water wells are common in both states and plugging is not required. These wells are often lost in overgrowth. Seismic holes are 20 feet deep, and it is unclear if they are generally plugged. Spills are an integral part of hydraulic fracturing and many poisoning routes are available.
- Fracturing has been used in New York since the 1950s. This is not new technology. In fact, 12,000 wells that are fractured are operating right now in New York. Most certainly, if this was hazardous to our health, it would have been shut down decades ago by some government agency. Take advantage of the extensive research being done by NYDEC using tax dollars. Do not reinvent the wheel. Natural gas will provide clean energy with fewer pollutants for our country. NYDEC has all of the information they need to proceed with gas drilling.
- Farmers and landowners are conservatives and environmentalists. A landowner group is in favor of alternative energy and good regulations. They want drilling in the Marcellus shale, and want it to start as soon as regulations are approved.
- New York State should not trade its quantity and quality of water for gas. EPA's excellent comment letter on NYDEC's proposed SGEIS makes it clear that EPA has the

ability to do this study. We hope that preliminary results of the study will come out soon enough to alert the public and prevent New York State from making the same kind of mistakes Pennsylvania has made. News stories from Pennsylvania indicate spills impacting streams and groundwater. There have been reports of broken casings and unexpected gas pockets impacting wells of homeowners, and the discharge of highly saline flowback killing fish and causing scaling of intake pipes in the Pittsburgh area.

- Inadequate staffing at NYDEC offices, outdated environmental impact statements, and the lack of specific public knowledge of water issues are big issues here.
- In New York, about 75,000 wells (14,000 of which are currently producing) have already been drilled without a single case of contamination even after people were asked to look for examples. A Hollywood actor holding a glass of cloudy water proves nothing except that fear-mongering and emotion will always trump science and logic. Over 90% of gas wells drilled in New York are fracked out of necessity. This process has a stellar environmental track record that is a testament to strict state records and regulations.
- After seeing all of the problems elsewhere, Upstate New York says “no” to being the guinea pigs.
- New York’s natural gas reserves are not declining in value as they wait to be developed. They hold the promise of new jobs and economic opportunities for Upstate families. However drilling does progress, it must be done in a way that protects water resources. After all, energy is very important to our future, but clean water is absolutely critical.
- The natural gas industry started in New York. It is an established industry, regulated by DEC, and adds value to the economy.
- The carbon dioxide emissions associated with 30 years of HF is the same as for over 500 years of emissions from all current local sources combined. Tompkins County is trying to reduce its CO₂ emissions by 80% by 2050, but if HF arrives, this will be impossible. If large, cheap supplies of natural gas become available as a result of HF, it will exacerbate climate change, reduce conservation, and further delay the transition to a sustainable energy future.
- Tompkins County sits over both the Utica and Marcellus shales. Situated in the beautiful and water-rich Finger Lakes Region, the Town of Ulysses is rural. Most of its residents rely on wells. Water resources are critically compromised under NYDEC’s current proposed regulations on HF.
- This holds enormous economic potential. A recent study estimates that the next 10 years of gas development will create 280,000 jobs and \$6 billion in revenue. The social implications of HF are substantial. The State of New York is currently running an \$8.2 billion dollar deficit that is putting funding for schools, hospitals, and emergency response programs in jeopardy. Tax receipts and investments from hydraulic fracturing offer a solution.

- NYDEC does not require that chemical compositions of fracking fluids be made public, nor does it ban the most toxic ingredients. It does not require a process subject to SDWA, and it does not prohibit surface impoundments of dangerous contaminated water from hydraulic fracturing operation. It allows municipal wastewater treatment plants to treat fracking water. It neglects the drinking water of rural constituents. NYDEC is inconsistent when banning HF in watersheds of New York City and Syracuse but continuing to allow it in rural locations.
- Rural towns, even those that have the most careful zoning, cannot control where this process is taking place. It is overwhelming towns with work that was not budgeted for and for which the towns do not have staff to conduct. Don't leave the regulation of this industry to NYDEC: they are not staffed well and have hundreds of interests, and they have not taken a comprehensive view. Small towns have been left to fend for themselves.
- The relatively recent discovery of the size (500 trillion cubic feet of gas) and value (\$1 trillion) of the 400 million year old Marcellus Shale gas play has brought pressures on homeowners, landowners, and government that few could have anticipated.

EPA's Hydraulic Fracturing Study

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

- If the conclusions of the 2004 EPA study are rejected, then we are entering the situation where we have to redo every study that was done under previous administrations. It is a heavy burden for taxpayers to bear, especially considering the heavy deficit, if a study needs to be redone every time a new political party is in control of EPA.
- EPA should stay within the scope mandated by Congress—to study the relationship between HF and drinking water. The study should be based on science, facts, history, and economic impact and not on political and/or special interest agendas. In 1999 the Ground Water Protection Council found that HF poses no threat to the underground sources of drinking water. In 2003, the Interstate Oil and Gas Compact Commission found the same thing. Every state has reported no contamination due to HF. Base the findings on science, fact, and history while considering the economic impact.
- A landowner with a small lot and a private well is concerned they will see detrimental effects and no benefits. Reports from Wyoming, Pennsylvania, and, recently, the Ross 1 gas well in Maryland, New York show the need to demonstrate the comprehensive effects of HF on wells and water supplies and demonstrate the urgency for a scientific study.
- EPA should know what the NYDEC has done to study gas drilling. They analyzed 270 supposed accidents over the last 30 years and found the following: only one of 270 incidents was water well contamination and it involved flagrant violation of safe drilling laws. This well also did not have fracturing. Other incidents involved lightning strikes,

car accidents, etc. It is all bad stuff, but it is not HF. EPA needs to look at some of these kinds of issues.

- The first thing that EPA should study is the geology. Soil reports show there is a substantial danger in the bedrock and a high likelihood of an incident.
- This study must be multidisciplinary and look at the cradle to grave cumulative impact of hydraulic fracturing. HF puts hazardous chemicals and radioactives into our watersheds and people. The industry's admission of a 1 to 2 percent failure rate is unacceptable and jeopardizes communities and clean safe water.
- The EPA study must look cradle to grave. Initial drilling, venting, spills, pipelines, compressors, booster stations, and well pads all produce damage, emissions, and a waste stream of toxic materials. There are 20 tons of chemicals per million gallons of water injected in a frack well and at least 80% of injected fluid stays in the ground. This is a recipe for present and future problems. The subsurface is not stagnant; it is alive with faults and fractures. EPA should look at the interactions of natural fractures and saline and fresh aquifers. The bioaccumulation and fate and transport must also be looked at. The tons of chemicals injected do not magically disappear. The upwelling of salty mixtures with heavy metals and radioactive materials added to and released from the subsurface is capable of causing enormous damage. Do not let human lives become collateral damage.
- A full lifecycle analysis is critically important if this type of drilling is to proceed in New York as it has in other states. EPA needs to have a good sense of what the impacts are from start to finish because air, land, and water are all interconnected at the core. All of our water is interconnected; look at this on an ecosystem basis. Impacts will be cumulative on a large scale.
- Most of the problems are going to be surface problems. EPA needs to look at instances where gas is polluting the drinking water. Everybody is obsessed with fracking fluid, but gas is not something you want to make tea with. If you rule out surface problems, then you will see what is at fault.
- Do not stick to industry's narrow definition of HF but understand that when people raise a cry to Congress and say, "Study this," they aren't talking about the tiny moment of HF. They are talking about the whole process: the storage, the transport, and the ultimate fate of the chemicals used, all of which can be important, including disposal issues like burial on site and illegal dumping on back roads and into rivers. Dilution is not the solution to pollution; Onondaga Lake is a case in point. Injection wells are also not the solution. Habitat fragmentation and road construction are also of concern.
- EPA needs to answer the question of whether HF is safe. Stay on that topic. It has been going on in some form for 60 years—is there a history of contamination?

- EPA should expand the study to look from the beginning of the drilling, not just HF. Drilling itself has caused contamination from what the group has heard from local families. Start from there, and then go on to HF.
- Science must dictate the study's conclusions. EPA must do all it can to ensure that its scientists and researchers are not influenced by industry or politics as they were in 2004 so that the public can be assured that this study was carried out in the public's interest. This is the most important action a government ever does: acting in the public interest. Public health and the well-being of our environment deserve nothing less.
- EPA's highest priority should be a balance of risk versus benefit. Study the adverse impacts in relation to the benefits.
- EPA should expand the scope of the study to effects on air as well as water. Carcinogens can get into water as well as the air, or get into the water and go into the air thus creating very serious health problems. Radon is one such carcinogen. It is the second leading cause of lung cancer in the United States and associated with 15,000 to 22,000 deaths each year, according to the National Cancer Institute.
- This study is a little redundant and not necessary. EPA should be swift and conduct a technical study and not a political one. Focus narrowly on the moment of HF and its impact on ground water and nothing else. It should not be allowed to expand any further. Reaffirm our confidence in the state regulatory system, which has been adequate in the past, to handle any future incidents that occur.
- Getting this study right is crucial for ourselves and future generations. To that end, the study must be done by looking at shale gas development comprehensively. Look at household wells and springs, agriculture and food production, and look at downstream effects of withdrawals and waste disposal. The most noticeable effects and the cumulative effects will be different in different geological settings and this variance must be looked at. Cumulative effects on ground water and surface water of heavily exploited areas must also be looked at.
- EPA should widen the study to include processes that occur both before and after the actual moment of HF, and to include transport of chemicals. EPA should implement stringent controls to protect drinking water supplies and measures for the protection of watersheds. Since those chemicals are not yet mixed with water, the concentration is much higher than during hydraulic fracturing and therefore even more dangerous. There have been too many leaks and spills.
- It is important that we take the time to engage in good, sound science; science that is not tainted by political agendas. We can proceed accordingly once our questions are adequately answered.
- EPA should commit to a broad study. They want a full cradle to grave life cycle analysis, including impacts to air. Please remove the blinders and look at the real environmental

costs. The cumulative impact must be studied, not just one well at a time. EPA should look at storage and transportation spills, including failed liners of cesspools, and collect empirical data on its own and work with partners, including neighbors in affected regions.

- The owner of an organic dairy farm noted that she had to create and implement a whole farm plan that deals with all impacts and suggests the same approach should be taken with HF. Not only will it have effects on ground and surface waters, but HF will affect soil, wildlife, air, and sanitation as well as cause extensive changes to the rural landscape. The EPA study should look at different types of geology and assess hydrogeology to establish proper distances to test from contamination from wells and ensure the protection of vulnerable aquifers in Cortland County. Spills that get into surface waters and are capable of further contaminating groundwater along with casing failures are two of the most potentially important pathways. All residents, including dairy farmers, industry, and businesses, rely on both surface and ground water.
- This study should address the whole process, not just the stimulating of a well. It needs to focus on the real and not the ideal. It is theoretically possible to do it right, but the reality is that spills, leaks, and careless well casing are part of the practice.
- Air emissions from the sites should be examined. Some of these sites look like small refineries: two stacks emit toxic fumes. Families are breathing in these fumes. Some are reporting all types of health issues. As for water and soil, there have been countless spills and major violations, as well as problems with the volume of traffic.
- No matter whether for or against HF, health and water are everyone's concern. Health and safety problems are mounting as drilling sweeps the country; current drilling is only a fraction of what industry has planned. This is why EPA should conduct a cumulative impact analysis. The mandate for EPA's study is broad and its scope must therefore be as well. If this study is to truly reflect EPA's mission to protect health and the environment, it must investigate many aspects of fracturing – which is the core of a complex process – including the full lifecycle of chemicals utilized, from manufacture and transport to disposal, and the impacts of chemical spills and leaks, contamination from fracturing facilities, such as flowback ponds and storage tanks, migration of hydrocarbons through rock fractures, and the disturbance of naturally occurring radioactive materials and salts.
- EPA should consider the HF that will occur over and over at each well and ensure that the true cumulative effects are properly assessed.
- EPA should look at how often HF has actually been employed in the past and, when incidents occurred, if they occurred at drilling sites and if the damage was the result of fracturing, or just accidents like spills of diesel fuel. Were they results of HF, or of conventional drilling, or not from natural gas at all? Many deplorable accidents are from spills of fuel that are equally as likely to happen in the meat packing industry or at a cannery.

- EPA should study the entire process of natural gas extraction, from laying down pipelines to drilling, capping, trucking in and out, and compressor stations, dehydrators, and all of the things involved in the process. In terms of water contamination, there are truck accidents, leaking pipelines, flaring, explosions, and accidental discharges, but the most important are the cumulative effects of HF, which are missing from the New York State DEC SGEIS. There can be thousands of wells in one area. As for water testing: how wide a perimeter should be tested, who pays, what chemicals are tested for, and how often?
- Everyone agrees that abundant clean water and air are the basic human rights. Consumptive use of water and pollution of air is what's being talked about. The EPA study must look comprehensively and independently. EPA has a mandate to conduct a scientific investigation because of the potential risk to public health and safety. EPA should not partner with industry because it would shed doubt on the study's credibility. Look at surface water and ground water contamination from spills, leaks, casing and cementing, accidents, poor wastewater management, and how fractures intersect with naturally occurring faults, more porous layers, and abandoned wells. Pathways to underground aquifers might not show up for a very long time. Expand the scope of the study to include the entire lifecycle and cumulative long-term impacts on air, water, emissions, and evaporation from compressors and wastewater pits.
- EPA should also look at exposure pathways, runoff to streams from dumping for EPA's approved alleged purposes of dust control in summer and deicing in winters. Nobody wants to talk about radioactive waste, but we should be looking at this issue too. In 1992 it was decided not to be a problem, but it has not been looked at.
- HF has raised some of the most serious environmental concerns in the country today. This EPA study is the first of its kind and needs to be carried out with the utmost care to identify risks and impacts. The entire world is watching EPA and this study, and there are high expectations. EPA has the opportunity to provide critical scientific information on the whole gas extraction practice. It is not possible to talk about drilling without HF. Industry now claims 90% of wells are fractured. They are trying to convince EPA to keep this narrowly focused. That makes no sense; it's a wasted opportunity. They should champion a study that is as broad as possible to confirm its safety, if they really believe it is safe. Careful examination of what technology should be utilized pre-, during- and post-drilling to analyze where fractures have gone and look at the subsurface response should also be investigated to avoid contamination. Technologies such as 3D seismology and tracers should also be considered.
- Include in the study all processes that need to occur for the actual fracturing to occur. Make evaluating all risks an integral part of the study. Evaluate everything: drilling, storage, transport, pressurizing—they all have risk and can contaminate the land of our forefathers, the water for our children, and the air we breathe. The higher the pressure, the more gallons, and the more time these actions are repeated, the more risk of an accident. Evaluate each of these risks and the ways to mitigate them, and if the risk is too high, require a change in the process. Analyze the produced liquid. If it meets the criteria

of a hazardous material, then treat it as such and use the standards for hazardous materials.

- Subsurface migration is not a widespread phenomenon. EPA should resist the temptation to conduct a comprehensive examination and expand the scope of the study. The Congressional mandate is clear: does HF pose a threat vis à vis subsurface migration?
- EPA should take up the issue of air pollution. New York is not Wyoming. There are already ozone alerts, and ozone is linked to cancer, asthma, stroke, diabetes, learning disabilities, etc. Nine thousand California citizens die each year from air pollution. EPA should use the California studies to estimate how many New York State residents will die from air pollution if fracking is allowed.
- EPA should produce a scientific study on the relationship between HF and drinking water.
- For the study, EPA's priorities should be, first, is there documented evidence that HF has in fact contaminated drinking water? How likely is contamination to occur in the future?
- A conclusive cumulative impact study on every facet of HF must be realized to stem the negative effects of HF. There have been serious concerns from people in 32 states. The urgency of this conclusive review is needed in order to understand why this toxic process should not be used.
- A new, comprehensive, unbiased EPA investigation of HF is vitally important. The United States cannot and must not move forward with HF absent an independent, scientific, unbiased analysis, supported by empirical data, of the risks that HF can pose to water supplies or air quality. The results of this study will guide the federal government's policies, and perhaps policies abroad, regulating natural gas drilling.
- First and foremost, this study must be comprehensive and look at all ways that drinking water supplies and non-drinking water supplies can be impacted by natural gas drilling including, but not limited to, well blow-outs caused by fracking, spills, casing failures, flowback materials and treatment, out of zone fractures, and the unpredictable nature of fractures that occur below the surface and away from the well site.
- Given the disastrous effect of climate change on water resources, EPA must study greenhouse gases and global warming.
- HF is safe. With the proper supervision and regulations in place, this new industry can grow safely and create new investments and new jobs. EPA should conduct a focused study that does not take forever to complete.
- EPA should not study the entire natural gas development cycle. Otherwise, it will lack focus, will not be timely, and EPA will infringe on the rights of the states to regulate this industry.

- A national organization passed a resolution calling for a nationwide moratorium on issuance of permits for new high-volume HF wells until concerns about public health and water quality are adequately addressed.
- EPA must study different geologic areas and how high-volume slickwater multistage HF can be affected by the different types of bedrock. The New York City Department of Environmental Protection pointed out the large amount of natural fracturing that occurs in the Catskills in the New York City watershed.
- EPA should investigate the cumulative impacts on air quality and the ground level ozone that is created.
- A full study should cover problems with health and air.
- It is going to be very tough for EPA to do their job. EPA should include social scientists to design valid, anonymous surveys that allow everyone to be heard. EPA needs facts on every aspect of fracturing.
- The current state of affairs in Pennsylvania shows that HF can damage a state in many, many ways.
- EPA should do their best to protect children at risk.
- Each well leaves 4 million gallons of water underneath the earth. That is 32 million gallons per pad, an incredible amount of water, multiplied by hundreds of thousands of wells. We need a cumulative impact study on the migration of all this. Tracers can be put into the water so that we can relate any contamination to its source. Also, microseismic testing can be used to see how fractures have propagated.
- EPA needs to clarify the purpose of this study. Was this study undertaken because of actual instances of contamination? If so, in what states and towns did these events take place? The state regulators and the landowners need this information immediately. Does EPA feel states are capable of regulating this industry? EPA should look at how states have demonstrated their ability to regulate the natural gas industry. If EPA requires companies to disclose the chemicals that they use, upon receipt of information, what will EPA do with this information? Numbers are tossed around, but compiling the actual number of chemicals used would be really useful. EPA should limit this study to the process of HF itself, base all determinations on peer-reviewed science, and give frequent updates for transparency.
- There is no doubt that extraction of these massive gas reserves could cause great harm to public health and the environment. The EPA study should consider cumulative impacts based on scientific analysis. EPA has taken this approach in improving the health of our nation's water bodies, such as the Chesapeake Bay, and EPA should do the same in regards to hydraulic fracturing. EPA should also consider air quality because fracking

surely will impact it. There is alarming evidence, in fact, that natural gas extraction from the Barnett Shale in Texas has generated pollutants that have compromised public health. In evaluating fracking's cumulative impacts, EPA's study should address these issues.

- Everything possible must be done to protect our air and water. There is lot of misunderstanding and public confusion about HF. Some of it has been caused by EPA, which EPA should work to remedy. The terms of the study need to be defined clearly. The stimulation process functions to release gas, but EPA has failed to draw a distinction between the fracturing moment and the HF processes, saying they are all aspects of natural gas development. This can be seen in EPA's PowerPoints. As a result of this, every historical problem at a well site has been blamed on HF.
- NYDEC has stated that fracking hasn't contaminated drinking water. Citizens are rightfully outraged about the ruined wells in Dimock, Pennsylvania, but these problems were caused by overly aggressive drilling and casing failures, not well stimulation. EPA needs to define what stimulation is and clarify what is being studied.
- High volume slickwater multi-stage HF and horizontal drilling is a new technology that has a history of eight years, not 60. This new process should be the main target of EPA's evaluation.
- EPA should examine the types of formations that are being fractured and explain the how the risks vary by formation type. Differences caused by geology need to be explained and clarified. HF is used in many formations, including low-permeability shales and coal beds; in the Marcellus and Utica Shales, geology provides a measure of safety. In coal beds, however, HF is inherently more risky because it intersects with water.
- The City of New York commends EPA on initiating a comprehensive study on the potential adverse impacts that HF may have on water quality and public health. The New York City water supply may be unique in many ways but other public water supplies, large and small, surface and subsurface, will be facing many of the same issues in the coming years.
- Doctors need a diagnosis to heal patients. The same idea can be applied to the HF study and especially to the human health impacts. First, take a complete history. The history contains the clues and must be thorough to get an accurate diagnosis. EPA must conduct a full and thorough analysis of the issue as it concerns the health of people to arrive at an accurate conclusion. It is the health of many, many lives. EPA should to conduct a full lifecycle analysis of water and air effects.
- Water contamination is water contamination no matter where the contamination is from, whether it is from a spill, crash, or leak, and EPA must study it all.

EPA's Hydraulic Fracturing Study: Knowledge Gaps

Comments from the public regarding knowledge gaps on the subject of hydraulic fracturing are as follows:

- EPA should ask all companies performing HF to disclosure their fluid compositions.
- Estimates indicated that \$32 billion need would be needed in New York State alone for better wastewater treatment, and \$77 billion nationwide. Will wells be located near treatment plants? If the produced fluids are potentially radioactive, how does this affect the methods needed for wastewater treatment? Will this out-compete the existing needs for wastewater treatment? How do the storage systems for wastewater treatment stack up?
- Industry should be required to provide complete chemical disclosure, along with percentages, concentrations, and results of combinations. The industry reintroduces wastes into water supplies—this is millions of gallons of endocrine disruptors and carcinogens. It gets into water, air, and food. This is toxic hazardous waste, including radioactive materials, with no treatment methods in place.
- It is clear that biological waste treatment plants cannot handle the harmful components of flowback.
- If EPA severely restricts gas drilling, what is the impact of the increased use of oil and coal?
- Are there other viable fracturing practices such as those using non-toxic additives? Does the fracturing process create fault lines that could provide migratory pathways for fracturing fluids, or for substances from other strata such as methane, to reach local water supplies?
- Casing construction faults, human error, and natural pathways can all provide pathways for toxic migration. Other areas of concern include: hundreds of miles of pipeline, the transportation of toxic chemicals, storage of toxic chemicals in unprotected open pits, and spraying of toxic chemicals in open air to promote evaporation. Additionally, 30% of hazardous waste toxic comes to the surface having no approved treatment method. Then there are naturally-occurring seismic shifts in the earth, the venting of toxic fumes from wells around the clock, and use issues associated with multiple millions of gallons of clean water infused with chemicals and rendered into toxic hazardous waste.
- There is need for clear information in rural areas, reflecting the actual geology and hydrology and intense development. The study must generate actionable information to protect wells and to provide grounds for baseline and ongoing water testing protocols. Finally, water from much of this region flows into the Chesapeake Bay, a vital ecological system that it is national policy to protect and restore. Identify the potential cumulative effects of shale gas extraction on the health of the Chesapeake.

- EPA should take advantage of the vast amount of citizen-gathered information. People are living with fracturing literally in their backyards, and know all too well its impacts on the water on which they rely. What they experience and document daily is critical to the study.
- Look at gaps in knowledge using the science and facts and not emotions and politics.
- The vast majority of past case studies suffer from a lack of accurate data. Direct evidence might be hard to come by, but circumstantial evidence is abundant and points to the connections between HF and contamination of water. Don't worship science at the cost of truth. EPA must find a way to resolve the dilemma of a lack of information. A measure of scientific intuition and judgment needs to be brought to the case studies. Many cases exist in which families must sign a silencing clause in order to have the gas companies provide them with water—that's what's behind the lie of the claim of no contamination. It is a word game at the cost of people's health.
- Over the last few years many serious concerns have been raised about HF in tight shale. EPA should focus on the cumulative effects of the process, especially on the cumulative effects of repeated fracturing in the same well. There is considerable experience in HF in conventional fields. In tight shale formations, the process is vastly different. It is performed at higher pressures in lower porosities and repeated at many, many different times over the life of the well. Experience with this technology goes back only 10 years and only a few of the early wells have been fractured for the second time, which is necessary due to the rapid decline in production of the wells. We simply do not know the cumulative effects of this repeated HF. This is one of the gaps EPA needs to look at. Each subsequent fracture will extend the fracture zone further beyond the horizontal wellbore and bring a greater rise of subsidence or connection with natural fractures that can bring gas drilling fluids out of the shale and into zones that communicate with aquifers. This can also cause subsidence of the surface and the increase well casing and cement failures.
- Central New York has very high levels of radon. The radon can be found in the soil and accumulates within the buildings, in basements. Would HF increase levels of radon migrating into water and homes, thus increasing exposure? What is the likelihood that drilling or injecting waste will induce earthquakes and thus increase radon releases?
- Swarms of earthquakes have occurred in Oklahoma, Wyoming, and Dallas/Fort Worth where drilling has occurred. In most cases, they occurred where seismic activity has rarely occurred before, according to the Oklahoma Geological Survey.
- EPA, please look at the facts. High-volume slickwater HF has been practiced only within the last eight years.
- Look at the Susquehanna River Basin Commission's model to examine quality and quantity of water. A knowledge gap is the distinction between contamination from actual migration versus surface spills and casing failures.

- There is an extremely low probability of injection fluid contaminating drinking water aquifers or surface water.
- 8,867 wells have been drilled in Pennsylvania since the first of this year. Most of these new wells are in the Marcellus. The facts are that there have been problems with three and none of the problems have been related to fracturing itself. That is a 99.84% success rate. The problems with many of these wells have nothing to do with fracturing; the 0.16% failure rate has nothing to do with HF: this is a gap the public should know.
- Regarding the recovery and processing of flow back: one company, Salt Water Solutions, claims to have the ability to address risks associated with produced fluids. EPA should evaluate them because they plan to expand.
- What are the gaps in the knowledge? The great information vacuum appears to be on two levels: a lack of comprehensive and accurate geologic studies of subterranean migration.
- Look at the reporting around accidents and incidents that concern gas operations. What has been recorded and what has not? Survey the regulatory agencies that would have oversight and record when they did not have the needed capacity to follow up on reports of concern. Phone calls to numerous departments of health revealed they did not have the capacity to deal with the reports. Test for nutrients and bacteria.
- There needs to be a better understanding of how the number of variables impact the community. What impacts will clearing of essentially virgin land have to tributaries and streams, such as storm water runoff and increased sedimentation? What about withdrawal impacts, especially from waterways that are already being used by other users? What are the types of chemicals and effects, not just individually, but together? What about the impacts of fractures, the possibility of migration, and the storage and disposal of fluids? Has the potential for recycling and reuse of these fracturing fluids been examined? What will the impacts be when we have to dispose of these used fluids?
- Deep injection is not the answer for the same reason there is concern about the migration of chemicals from HF. Be concerned about deep injection—EPA did not let General Electric inject PCBs, so don't let this stuff be injected. Fracking fluids contain benzene and VOCs. EPA should be seriously concerned at the anticipated levels of HF and refracturing.
- For NYDEC to allow drilling within 50 feet of a lake or 100 feet of a surface water source is an arbitrary and an unacceptable risk to our water. EPA needs to know more about how fluids migrate underground.
- There are concerns about the associated negative impacts of HF on communities and way of life. Communities will be forever changed and not for the better. Case studies are available, including Sublette County, Wyoming and the Garfield County, Colorado communities of Rifle and Silt. In addition to degradation of water and air, these

communities have experienced massive negative community, economic, and social impacts, including massive industrialization, haphazard development, a boom-bust local economy, damage to roads and infrastructure, increased demand for already stressed local services, increases in the cost of living, escalating housing costs, and more.

- EPA should use all legal methods available to compel companies to reveal all of the chemicals used. Lawn care companies are required to disclose what they spray. Gas companies are excluded from regulations, so there is no level of confidence in their safety
- What endocrine disruptors do in trace amounts should be investigated. Water table effects need to be looked at. Five million gallons per frack times 32,000 wells equals, conservatively, 160 billion gallons from New York wells, rivers, and lakes. If it is drawn away and rendered unusable, this will undermine the economy.
- Industry would have us believe that HF is an exact science, but it's not. Their models lack the complexity of the real world. The Marcellus Shale is not a solid formation and the region has already been fractured over eons by natural forces. There are already natural fractures that can allow migration. Over the past 150 years, tens of thousands of conventional wells have been drilled, and many are abandoned and have been long forgotten. There are over 18,000 to 48,000 abandoned wells in New York State alone that offer potential paths of least resistance to drinking water aquifers. Will these chemicals never migrate into drinking water? Where's the proof? What really happens when a region as geologically complex as the Northeast is fractured and injected?
- The skin is the largest organ, it gives us separation. It goes both ways. Skin breathes and drinks in the surroundings. Human skins drinks what it is supposed to. People can be given bottled water for drinking, but they cannot be given bottled water to bathe or wash. If people shower or bathe with water that is contaminated with toluene or benzene or ETX, is EPA going to tell them this will not affect their hormones? That this will not be the cause of various cancers? All of the water about us needs to be treated as drinking water. What crops and animals take in as drinking water affects us and supports us in health or disease. The world as a whole has a lack of fresh clean water. Just because this region has much in comparison to the rest of the world does not allow us to pollute it. Life is water; water is life.
- In the few years HF has been done, there have been numerous cases of contamination. Way over a thousand cases of water contamination have been documented by courts and governments. Proponents say those problems have been human error; the technology is fine, but how do we eliminate human error and apply all of this technology?
- Disposal of waste fluid is fast becoming a complex and costly problem, even according to Halliburton. For years they spread waste fluid on the roads, but this does not fly when people realize what is going on. If causal dumping is prohibited and if—and this is a big if—illegal dumping can be controlled, this waste must be recycled or trucked off to treatment plants. However, treatment and recycling are still in their infancy and

expensive. There are no treatment facilities in New York ready to accept and process this waste.

- If the BP oil spill in the Gulf of Mexico has taught us anything, it is that accidents can happen—no matter how unlikely we are told they are—and when they do, they have the potential to be devastating. EPA needs to ensure proper techniques are used to prevent spills of fluids and gas leaking out of wells into drinking water, both now and in the long term, when the original company has sold or abandoned the well. In the event of a spill it is also vital that we know what chemicals are being used, and have been used in the past; something gas companies have been protected from sharing.
- Vertical wells have been fracked for a long time but that does not involve the injection of millions of gallons of chemicals or dealing with millions of gallons of wastewater like horizontal fracking. Vertical well technology is only about eight years old, which is much too short a time to know what is migrating up into aquifers. What would we look for? People may have to get sick in order to realize there is contamination, and this might not occur for a generation or two. Don't wait for people to get sick. Should our grandchildren be the canaries in the coal mine?
- A mayor thinks that EPA should also look at industrial byproducts like produced water and flowback, which are two highly toxic byproducts of fracking. There are too many unanswered questions regarding proper disposal. Should companies be required to test their workers for radioactive exposure? If the drilling equipment shows excessive levels of radioactivity, should it be deemed hazardous waste? How will companies ship massive amounts of such hazardous waste across state lines? How will the shipments be tracked for compliance and enforcement? How will we protect the workers that handle such waste and the communities where it is located?
- EPA should look at Otsego2000.com for additional information.
- Frack waste water can be purified to a drinking water standard or reused. The chemicals in frack fluid are 99.94% are water and sand. The other one half of one percent is basic stuff, like salt, barium, iron, calcium, and sulfates; these are not secrets.
- In New York State over 33,000 instances of suspected contamination have been studied and evaluated. How many have been linked to groundwater contamination from fracturing? Not one case has been linked in over 30 years, according to NYDEC—in 30 years and 300,000 investigations. There is nothing else in this life with this success rate. NYDEC has been looking at every conceivable scientific document available for two years.
- High volume, high pressure HF may actually increase our carbon emissions. This is a huge gap in our knowledge. This should be EPA's highest priority: the true cost in greenhouse gas emissions. In the Barnett Shale, the emissions from daily drilling activities are roughly equivalent to a 1,500 MW coal-fired power plant. Based on this

figure, there may be an additional 2.3 billion tons of carbon emissions for 30 years of drilling.

EPA's Hydraulic Fracturing Study: Case Studies

Comments from the public regarding case studies to be conducted during the study are as follows:

- Case studies should be conducted right here in New York and Pennsylvania, taking into account difference in safety requirements in each state. Everything we do has risks; balance the risks and the benefits.
- EPA should study recent events in Pennsylvania.
- A commenter was glad that EPA is emphasizing individual wells. Near their home, there are 3,000 people and all on private wells or surface waters within zones that casings would need to protect. EPA should see how toxins introduced in the fracking fluid are moving through the food chain since livestock also drink the water.
- EPA should study five or ten sites with different geologic, geographic, social, and economic settings. Make unannounced visits to well sites at different stages to see the real practices, and not best practices, in action.
- The Pennsylvania Land Trust Association identified 1,435 violations by drillers in 2.5 years, the vast majority of which affected or could have affected the environment.
- Fractures can pollute water for 100 years and the fractures cannot be plugged. It is obvious that this happened in Dimock, Pennsylvania. DEP shut down gas wells for polluting 14 water wells. Far more than 100 polluted wells have been reported across the country. Last March, 8,000 pounds of drilling mud slid off a pad and a newspaper reported that DEP took samples to determine a proper disposal method. The chemicals should have been posted at the site.
- Pennsylvania should post the location and knowledge of every well that has been contaminated by HF. Everyone needs to know that and the 10 or 15 most critical scenarios.
- EPA should look at sites where problems have been identified. It is absurd to partner with a gas company and study a new site. First; it doesn't appear that water contamination is a problem at every site. Don't partner with gas companies because then they will be especially careful. Disposal of fracturing fluid is especially harmful. EPA should inventory as many sites as possible throughout the country and catalog the complaints, even if the evidence collected is anecdotal, to give an overall picture of the issues.

- EPA needs to get their arms around the issue fast. Revisit the 1988 study that lead to the exemption of production waste from the Resource Conservation and Recovery Act (RCRA). The Inspector General needs to resume its investigation into the potential mishandling of information in 2004.
- Investigate the reports of contamination in Pennsylvania.
- There has not been a single instance of contamination of ground water or surface water. In fact, in all the industry's records, there has been no actual, factually-supported contamination due to HF.
- One commenter noted the growing number of water buffalos near her town, which also has several cases of methane migration. EPA should look at Towanda. When the commenter asked someone with a water buffalo what they were going to do in winter, they didn't know.
- A citizen of Bradford County, Pennsylvania, where a relatively large number of gas wells have been drilled and tracked, related problems the area has experienced, including four instances of contamination of water wells adjacent to the drilled and fractured gas wells. In April, a well near Spring Lake was contaminated. More recently, water wells on Paradise Road showed strong signs of contamination. According to the DEP, there have also been leaks and spills in Bradford County from drilling pits, which contain drilling cuttings, drilling mud, and oil and grease.
- EPA should study Rifle, Colorado and Bainbridge, Ohio.
- Focus on what's happened in Dimock; look at the Pennsylvania DEP's findings from the Cabot wells. They provide a summary of what EPA will need to address. From a sample of 63 wells, 39% had surface problems, like spills or diesel in the creek. Eight of them had casing failures, which is what happened in the BP Deepwater Horizon failure.
- There has never been an instance of fracturing contaminating water; this claim is based on a narrow view in which only the technology and very instance of fracturing are considered.
- Investigate Fort Worth, which has 1,000 gas wells within the city limits. These wells have been drilled since 1999 with the current horizontal fracturing technology. More importantly, the health indices measured by the National Institutes of Health indicated that health has actually improved, contrary to what might be expected.
- An environmental group compiled a report that documents over 100 case studies around the United States where state and federal regulations have demonstrated that gas wells are the known or suspected causes of contamination to drinking water. Talk to landowners in Pavilion, Wyoming and Bainbridge, Ohio, and Dimock, Pennsylvania. These are hard-working Americans that didn't ask for water contamination, but that is what they got.

- There are wells going dry in Towanda that are not even adjacent to drilling sites. Make this location part of the case studies.
- EPA should look for water samples taken for other purposes to retroactively establish a baseline. Sometimes samples are stored and old surveys might be available. For example, in some places when people want to sell a house, homeowners take well samples to prove the quality of the well.
- The Barnett Shale has established this technique, even in heavily populated areas. Look for that historical information.
- In the Marcellus Shale, in the northwest corner of Pennsylvania and the Northern Tier, study current and developing practices.
- EPA must look at communities that are already impacted by gas drilling and include these in the study. To see impacts, EPA needs to look where these processes have already been used and damaged the environment, air, livestock, and lives. Truly, this is the heart of the matter. If you don't look where damage has happened, does this mean there was no damage?
- Conduct at least two case studies in Pennsylvania, looking at the cumulative impact of what happens to aquifers, streams, and rivers when forests and other natural areas are cleared for access roads and pipelines, and at the effects of storm water and runoff in highly sensitive areas, especially in areas where there is storage of HF chemicals.
- EPA must get out into the field where HF is now taking place to see HF operations first hand, including well drilling, stimulation and well completion. During these visits to well sites—some of which should be surprise visits—EPA must involve local citizens and consult nongovernmental organizations about how drilling operations are impacting local communities.

Regulating Hydraulic Fracturing

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

- Laws protecting our public health and environment, and the regulatory apparatus needed to enforce these laws, needs to keep pace with ever-changing circumstances. This includes the unconventional, harm-causing drilling technique known as high volume HF.
- HF should not be exempted from environmental regulations. It is wrong and dangerous to grant industry wholesale exemptions from our country's most important public health laws.
- EPA should mandate that drillers provide a list of chemicals and their concentrations and the formula mixtures that are going down in the hole and what is coming back up and

being hauled away in tankers. The dose makes the poison and interactions among toxins are critical to any assessment.

- A closed loop system should be mandatory.
- In 1971, the Safe Drinking Water Act was signed by President Nixon; in 2005 President Bush signed legislation that exempted HF from the Safe Drinking Water Act. Clean water is a God-given right; please protect it for us.
- The problem underlying most of this is the intense economic pressure brought to bear by the immense riches potential in the Marcellus Shale. Impoverished governmental bodies, insufficiently manned regulatory authorities, and private citizens who have struggled economically for years are all consciously or unconsciously impelled to overlook and ignore the negative effects of the gas drilling.
- Technology is improving every day and New York State has been studying HF for over two years. When their study is released there will be no stricter regulations anywhere in the world. Their new standards will only help to improve the process. EPA should consider adopting these new regulations.
- In order to protect drinking water, restore all protections and federal regulations to the process of HF.
- There are no regulatory provisions in place to protect us from the destructive chemicals and there is no proper or safe way to handle the wastewater. Both EPA and NYDEC are not properly staffed to adequately monitor this, and it's impossible to stop every chemical from entering the water supply. There have been more than 1,400 violations from gas companies since January 2008 in Pennsylvania alone.
- A commenter personally observed over 20 large tanker trucks withdraw water from a river during drought conditions, and they suspected illegal withdrawals. The applicable permit is inadequate, since 1,000 gallons per minute can be removed from the river even if there is no water in the river.
- The country needs domestic energy and the area needs jobs; we must move forward. Following the industry's best management practices and regional, state, and federal regulations, we can move forward to once again make the Susquehanna River Valley the valley of opportunity.
- Technology (e.g., closed loop) is available today that can allow for safe HF. NYDEC's draft SGEIS regulations will be able to protect the environment.
- Fracturing is proceeding nationwide in the absence of comprehensive, sound regulations, threatening drinking water for countless communities. A good study has the potential to vastly improve understanding and state and federal policies.

- Tens of millions of Americans' water is at risk, federal regulations have been stripped away, and there is little state protection in the form of regulations.
- States are well equipped to regulate this industry.
- Pennsylvania and other states should continue to regulate operations within their borders to protect resources as they have done for the past 100 years.
- Only EPA can properly investigate and regulate this practice.
- A speaker observed ten seconds of silence, to represent the lost sounds of children's playgrounds, migratory birds and animals, university professionals attracted by the quality of life, farmers growing sustainable produce, the tourist coming to see the sights, and the clean water flowing from wells shallow and deep missing from this industrial wasteland associated with the proposed drilling if it is allowed to proceed with the proposed level of exemptions from oversight.
- The top priority should be to provide energy in a safe, technologically sound way with the least possible impact on the environment. EPA should work in cooperation with other federal and state governments to develop design standards, recommended practices, and guidance documents that will improve operational integrity and regulatory processes across the board.
- New York State has the best regulations in the nation and can regulate the industry. The State intends to preserve the environment while promoting clean energy growth.
- In 2004 and 2005 the rules and regulations protecting drinking water from these practices cause were stripped and the industry was able to run amok. Now we are trying to catch up. EPA needs to get out ahead of the curve, setting rules and regulations for industry to follow.
- An elected official is working closely with New York State NYDEC on an update of the SGEIS for horizontal drilling and high-volume HF to develop the Marcellus Shale. The moratorium should remains in place while comprehensive peer reviewed studies are conducted on topics such as drinking water quality and cumulative impacts. New York is demonstrating its long-standing commitment to the environment in the approach it is taking. A study at the federal level aims to provide national guidance on the topic of hydraulic fracturing. In some ways, New York is ahead of EPA in its study of the same topic. It's possible that NYDEC's research could be useful in EPA's own study at some point. Hopefully, New York State will stay in communication with EPA as this process moves forward.
- The composition of frack fluid is an issue of long-term public health and emergency response. Simply stated, the composition should be disclosed whether or not Congress passes the FRAC Act. Some companies have already done this. NYDEC already requires

disclosure. EPA should not become bogged down in an issue that is already being resolved.

Hydraulic Fracturing - General Comments

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

- The 2004 EPA study that focused exclusively on coal bed methane deposits in the South was, in many ways, misleading and incomplete. The conclusion that fracking posed no risk to water supplies was contradicted by in-depth reviews by independent experts and an EPA whistleblower, as well as by some of the study's own findings. Additionally, the outcome was heavily influenced by non-scientific political appointees in the prior administration.
- In 2004, EPA studied the risks from HF in coal seams. This detailed study concluded that there is no significant threat to ground water aquifers. These areas are within hundreds of feet of aquifers, so it seems almost certain that fracturing of Marcellus and Utica Shales, thousands of feet below aquifers, would lead to no contamination.
- This issue is complex and emotional. Based on this science, HF does not contaminate groundwater resources. Nothing is perfect. Driving is not perfect but we don't give up our cars.
- Despite all of the recent innovations and intentions, the fact remains that we still need conventional fuels for the foreseeable future. If the resistance to HF is driven by a "not in my backyard" mentality, then where should our fuel come from? More wells in the Gulf of Mexico? More coal mines in West Virginia? Shipping in more oil? More nuclear power plants? Can Pennsylvania and New York afford to turn down the opportunity for these 280,000 new jobs? There are no sources of energy that do not come with new costs, and HF is no exception. Natural gas from HF can help wean us from foreign oil and provide a bridge to cleaner fuels. Please let science and facts drive this study.
- The study must be driven by facts and science, not politics and emotions. There are intelligent people on both sides. Sanctity of nature is important and something that nobody should take lightly, but it is important realize that this nation needs a great deal of fossil fuels. To suggest otherwise would be less than honest.
- There is substantial public concern over the use of HF. Any incident associated with oil and gas operations is one incident too many. EPA's ongoing scientific review of fracturing technology and its potential relationship with and impact on ground water resources is important.
- EPA must live up to its name. People's lives are at stake.
- The only refrain from those who want to speed up the gas play is "We need the money." While the desire for economic improvement is understandable, in the absence of a strong regulatory framework short-term, it is inadvisable to sacrifice public health, waterways,

and communities for the financial game of some. Twenty years from now we will look back at this pivotal moment with either pain or comfort. Consider all factors and make an intelligent and meaningful decision

- Natural gas is not the clean, green energy of the future—that couldn't be farther from the truth.
- A landowner's group is pro-clean energy and pro-United States energy independence.
- Drilling is safe and will bring financial prosperity to New York State. Look at the evidence from Pennsylvania and Wyoming, places where drilling has been allowed to proceed. Taxes from gas benefit taxpayers, reducing property tax. All homeowners and business will benefit.
- Special interests groups and politicians are promoting fear. They made a movie with flaming faucets, even though the footage is from an area where this can be a natural phenomenon. Dunkard Creek was blamed on HF even though the real culprits were the coal mines. They are quick to blame HF for contamination in Wyoming, even though other sources are the more likely culprits. HF has a long safety record. Close to a million wells have been fracked with few incidents. Until renewables are viable, natural gas is the safest, cleanest source of energy. Rich people do not want gas drilling or economic development in their backyard. They do not obstruction of the scenery from their vacation homes. They want to fish and hike without seeing anything but trees. They have no concern over how people make a living.
- Everyone has rights whether they own land or not, and that's been left out of the discussion. The context of this study is important.
- Remove the appearance of EPA bias from the study: the Web site and literature both repeat, "Natural gas plays a key role in our nation's clean energy future and the process known as HF is one way of accessing that vital resource." This does not sound like the starting point for an unbiased scientific study. EPA should promptly remove that language to ensure public faith in EPA's efforts.
- EPA should disclose their standard for eliminating or dealing with toxic chemicals in the United States, as the EPA Web site says that the preferred way for disposal of hazardous wastes is deep injection. HF is on par with deep injection.
- HF involves injecting chemicals into the ground and is inherently and indisputably dangerous. If EPA employed the precautionary principle, this practice would not be going on today. This study is long overdue.
- We should all come together to move forward in a positive direction. If this can be done right, it will be for the betterment of all Americans. There are towns in New York State where people do not have food on their table. Landowners are being forced to lose their land.

- Billions of dollars of economic impact are at stake, but economic gain does not have to come at the price of environmental protection. EPA has already repeatedly concluded that hydraulic fracturing is safe. Numerous reviews have shown that HF has already withstood the test of time and scrutiny. EPA's new study will reach this same conclusion armed with science and fact and in an expedient way.
- A newspaper wrote that "Residents and municipal officials are trying to balance the benefit of money and jobs with the right to clean water and air." What is this economic callousness, to balance the clean wind and clean air benefits of everyone against potential for benefit to a few? This is the most basic right—more basic than the right to vote, the right to a democracy, the right to an economic system. The most basic service we ask the government to provide is the right to live healthy, productive lives. This is the most basic right. The bulk of the money goes to energy companies, not states, increasing costs for water treatment, infrastructure, and health costs. Most of the high-paying jobs go to people that are out of state. There might be some jobs for vendors who service those who have the real high-paying jobs. All this will last for five years per well site, but the polluted water and air will remain for generations. Look at the real science and fact. EPA is not the Energy Protection Agency; it is the Environmental Protection Agency.
- Industry is selling a bill of goods that they cannot back. Look before you leap.
- Fear makes for bad policy. HF fluids have been the subject of considerable misinformation and distortion, which leads to fear. A scientist suspects that fear of these additives is the main reason why EPA is planning his study, not the actual risks and impacts. The study will not undo the fear and myth that surround HF today. This is an opportunity to educate and inform and correct misinformation. If EPA does not use their resources to reframe the conversation, this study, like all others, will be rejected and we may never see the full benefits of shale gas in this country.
- Energy is life. It is the key to our civilization, progress, and future. Water is a resource.
- Help the United States move forward with clean, friendly, natural gas.
- Water is wasted on golf courses in the desert and consumed by cities and suburbs. Thirty-five million gallons of water leak out of the New York City water system every day and people shrug their shoulders. Where is the outrage or concern for that?
- High-volume HF builds wealth, saves jobs, and creates hope. It preserves and protects our ability to prosper. Solar panels and windmills cannot and will not meet today's energy needs.
- The ethics of big gas and oil is not a way to cure the recession.
- Kids deserve a safe place to live in a true democracy that relies on the wisdom of individual people, not a "mock-racy" governed by corporate interest. Little people are

most in danger when big people are behaving badly. People are gullible when they are scared, and everyone is scared over the economy today, so everyone is dangerously gullible. Does EPA really think foreign-based conglomerates would treat us better when banks and firms here were willing to screw everyone?

- This technology is crucial to gaining access to clean-burning and domestically abundant natural gas, which will help meet energy needs for generations of Americans to come.
- True environmentalists are pro-responsible drilling.
- We don't want to trade water for gas.
- We already have a glut of natural gas on the market today. We know the harmful effects of HF. The destruction of land, water, and air quality, and hazardous health issues, do not make for good economics.
- A common argument against HF is that it will deplete our water supply. Meanwhile the Delaware Aqueduct continues to leak 35 million gallons of water every day. That's a billion gallons a month. Since 2001 over a hundred billion gallons of water have simply leaked away.
- HF has been a safe and proven technology that has been used successfully for 60 years. There has not been a documented case of ground water contamination from HF. As EPA moves forward, let the science and engineering determine the form of the study and not the misleading information that has been written on the Internet blogs.
- Natural gas is touted as a green source of energy that emits less CO₂ when burned, but obtaining it causes the emission of significant amounts of heat-trapping gases during exploration and drilling. Compared to conventional extraction, even more emissions are created by high volume HF. This is only part of the story. Natural gas is composed of methane, a potent greenhouse gas. During extensive HF operations, unburned methane leaks directly into the atmosphere as well as into ground water, where it returns to the surface to bubble further into the atmosphere. Methane is a far more potent heat-trapping gas than CO₂. According to the 2007 Intergovernmental Panel on Climate Change (IPCC) report, methane has 72 times the heat-trapping potential of CO₂. Its lifetime in the atmosphere is 15 years, during which the planet will pass or not pass crucial tipping points which will determine the future path of the planet. James Hansen lists six especially damaging methods for extracting fossil fuels, including using HF to extract every last bit of gas. There is nothing remotely climate friendly about natural gas from hydraulic fracturing contrary to industry claims, especially when considering the widespread deployment of HF.
- Make sure it is good science and engineering in this study, and not politics. Don't let elected officials override sound science because it does not fit their agenda. They only care about keeping their positions. Let the facts call the shots on science, not the politicians. Any task can be completed safely if it is understood from a technical

standpoint and the person in charge demands and checks that it is done correctly. It sounds simple, but it is difficult. Don't trust the jaded science and propaganda used by both sides of this issue. An objective analysis will get us to the right conclusion.

- The anti-drilling crowd says we need to switch to green energy, but we are not ready to replace the 85% of our energy that comes from fossil fuels for some pipe dream of green energy. And how green is it really? President Obama has given hundreds of millions of dollars to geothermal projects even though geothermal uses the same fracturing technology. Who has a greater stake in the protection of our local environment? The landowners or MoveOn.org?
- The study may not be needed, as oil and gas companies have used fracturing since the 1950s.
- Several newspaper accounts from the late 1800's (before HF existed) that documented methane contamination and other water quality problems relating to drinking water wells in Pennsylvania. Pennsylvania residents have also experienced methane migration, where no HF is occurring. Methane often occurs naturally in ground water and wells in shale gas regions and that the color, taste, and smell of water can be affected by sulfur and iron naturally occurring in water.
- If each well has five million gallons, then hundreds of billions of gallons or trillions of gallons of toxic fluid will be injected. 80% or 90% will remain underground as a threat for decades to come.
- For a county of 40,000 people, the lease money will bring in approximately \$80 million dollars, the equivalent of 2,000 jobs paying \$40,000 each. Energy is a national security issue and we have the opportunity at hand to produce much more energy in our nation and cut our dependence on foreign sources.
- By developing our natural gas reservoirs we can greatly reduce the pollution of our environment. Coal is our primary fuel for producing energy in the United States and a study released last week by the Clean Air Task Force out of Boston found that health problems related to coal use cost over \$100 billion yearly in the United States. The study estimated that coal-fired power plants will cause 13,500 premature deaths nationwide this year.
- The 21st century is the age of water, and the 20th century was the age of oil. Lack of access to clean, safe drinking water kills a child every eight seconds; this is the highest death rate attributable to any single cause on the planet. The Pentagon expects the next world war to be fought over water.
- The economy is in need of help due to the recession. The United States is spending \$27 billion a month buying foreign oil. Technology is here to allow us access to a vast quantity of clean-burning natural gas. We can use that and we have been since 1820.

- The United States is converting from an oil-based society to a natural gas-based society. Federal laws under consideration, like H.R. 1835, a transportation bill, would also move in that direction. Eighty percent of air pollution comes from transportation, so a move to lower carbon could be afforded to us by that industry. The opportunity is now to put America back on its feet.
- EPA should think about how corporations behave. Tobacco corporations said nicotine was not addictive; they lied and funded study after study that told us there was no direct link between smoking and cancer, misleading the public. We look back at people who have died and say that the tobacco corporations poisoned the American public for decades about the effects to make a profit. Now there is a new set of corporations and they have an interest too. They are starting out on the wrong foot with a lie of omission by refusing to disclose all of the substances that go into the fracturing fluid. This is corporate interest, and they have deep pockets like the tobacco industry. They can fund study after study after study that shows that everything is fine. Don't let 40 years to go by and have the hindsight that the wrong decision was made.
- A landowning family pledged not to lease their 80 acres because it poses a health and safety threat to residents and water. By not leasing, they believe they are protecting themselves, their neighbors, and their community from the adverse effects of HF. They believe high-volume slickwater fracturing is dangerous.
- A commenter formed a group for people who leased their land because the facts regarding the safety of HF were kept from them.
- Natural gas extraction has been occurring in Nigeria for 30 years. The average life span in Nigeria is 61 years but in the Niger Delta, where gas is extracted, it is 41 years. The United States is not Nigeria—we have better regulatory agencies—but it is the same American energy industry. They asked for an exemption in 2005, and they will not give it back. If it is safe, why won't they give back these exemptions?
- HF combines environmental complexity, scientific uncertainty, high stakes, and high reward. This mix calls for a slow, deliberate, precautionary approach.
- People who sign leases are too trusting and believe that the drilling industry will not damage water supplies. Then those industries deny that damage has anything to do with their actions.
- HF is important to the African American community in New York, among which the unemployment rate is at 14.8%. Now is not the time to limit job opportunities for those in need. We are standing on top of the second largest natural gas field in the world, and so far it has gone untapped.
- Do not forget about the justification behind the idea of putting chemicals onto the ground, rendering the earth toxic. There is no safe disposal, only illegal dumping and injection wells.

- Life on earth evolved without exposure to the toxic substances we're sucking out of the earth. We have passed the point at which natural processes can repair this damage. We need to stop doing what we are doing, not do more.
- This is a very emotional issue. It has split communities apart.
- A commenter related their experience allowing a gas company to build a pipeline across their land. The commenter had a lawyer review the lease, and the gas company paid for pre- and post-fracking water testing, as well as pond protection, timber rights, special seeding, a hold harmless clause and a cleaning of a closing pipeline for the future. The commenter believed that all proper precautions had been taken, but then learned more about HF and realized all of the concerns against which they were unprotected. What chemicals would be used in the fracking one mile away, which could migrate with methane through fracked or natural fissures into our water supply? Or what the risks might be with this new procedure, or who would do the testing of water and what they should be looking for, what materials would be used in the pipeline, how long they were expected to last, and who was going to supervise them once installed? Since the pipeline was installed, the commenter has faced the erosion of soil into one pond, and significant erosion of a hillside into a stream and serious erosion of a stream bank. In the past two years in Pennsylvania, there have been 277 violations of erosion control and 100 clear stream violations. Don't let that happen here.
- From an environmental group's standpoint, there already have been major impacts, and all of them are negative.
- Why, although only 20% of humanity needs natural gas and 100% of humanity needs water, are water resources are being jeopardized? President Obama should support the FRAC Act.
- There is no good reason to compromise our water for economics. In Pennsylvania in the last two years there have been dozens of environmental accidents at drill sites and more than 1,400 safety violations relating to gas wells.
- HF will increase climate change will lead to more melting glaciers and temperature extremes. There are floods in Pakistan, a drought in Russia, and a heat wave on the East Coast. It's past time to wean ourselves off from fossil fuels. All subsidies and exemptions should be taken away from oil, gas, and coal. Instead, the United States needs to be subsidizing energy conservation and clean energy from wind, sun, tides, and geothermal. These could produce 100% of our energy needs. Transportation could go electric. We must escape from fossil fuel dependency or it will kill us.
- Profits do not make good environmental policy. Think of future generations.
- Water scarcity is the biggest threat to world peace. The only way to keep water safe is to keep it under local control. Prudent use of water must be respected. In the Sahara, we see

the thrilling results of subsistence farmers. In South America indigenous peoples would die to protect the water, a belief that led their countries to true democracy. But in Pennsylvania there are families that need water trucked to them because their waters have been fouled by industry and the dereliction of duty by government agencies.

- Drilling fluids include diesel fuel or petroleum distillates containing benzene, which is carcinogenic. According to Schlumberger's Web site, sodium dichromate is also a drilling fluid, and it contains hexavalent chromium which is now contaminating water wells near Midland, Texas, where cancer incidence is high.
- Injection of fracturing fluid disrupts heavy metals and radioactive materials that are present within the earth. Anyone that claims that chemicals cannot migrate is not adhering to the laws of physics. Storage is not safe, like in Hickory, Pennsylvania. Injection wells are dangerous because even if cementing is done correctly the casing can crack.
- Disposal of toxic flowback fluid is not safe. Radioactive drill cuttings can contaminate landfills.
- Once the drilling starts, you cannot go back. Destroying good water for HF makes no health, environmental, or economic sense. We need water to sustain life; without good clean water, we have nothing. We are living in a worldwide clean water crisis today. With this tremendous population growth, over 2 billion people are living in water-stressed regions of the world. We're running out of potable water. The World Health Organization reports that contaminated water is implicated in 80% of all disease worldwide, with one child dying every eight seconds. Is this what we want to happen here? New York has last remaining vestige of good water in the United States and the world. Why destroy this for gas?
- The issue is tremendously important to our economy and social future. It has been performed safely and effectively in New York for almost 30 years and in the United States for 60 years. There have been thousands of wells fracked without a single incident, according to EPA's latest assessment.
- The problem is not just that HF does damage but the intensive drilling, fires, explosions, blowouts, naturally occurring faults, casing failures, spills, overflows, wastewater, and hauling out contaminated wastewater with no safe place to store, clean, and recycle it—it all leads to contamination plus air pollution and eventual drought.
- There is no one with a greater interest in water and land protection than the landowners, who live on the land and drink from it.
- The oil and gas industry has not left a legacy of environmental splendor. Let's leave a legacy of hope and opportunity for our children.

- Fear mongering and the misinformation regarding HF are a significant concern. EPA can work with the facts, figures, and science to correct the misinformation.
- Equipment fails and materials fatigue; the unexpected happens. Nothing is foolproof. Oil and gas is not an exception. The Gulf of Mexico provides this evidence. The actual HF event happens underground but can only happen when support processes occur above ground, where we live.
- The need for alternative fuels and decreased reliance on foreign energy sources will keep the pressure on developing this natural resource to its full capacity. EPA must ensure that the need for high quality drinking water will not be forgotten in the process.
- What about the dynamics of managing the commons? The water, air, land, health, and the sustainability of our community are neither public nor private goods. These issues will arise with greater frequency in the future. Hear this plea and become involved in this dialogue in our community.
- Silt, Colorado, a city with a population of 6,000, placed the cost of new gas drilling related infrastructure needs at \$67 million.
- Look to science, not industry talking points. The oil and gas industry has worked very hard to influence the science community and the general public. The American Clean Skies Foundation is chaired by energy representatives, and MIT's study "The Future of Natural Gas" was essentially paid for by the industry. The Ground Water Protection Council is dominated by gas-friendly regulators and executives. The old families and landowner groups that used to represent the interests of the people have sadly fallen by the wayside and now we are left with industry regulators that call people who care about the environment extremists and liars. This is what we the people are up against as we attempt to have a substantive dialogue. An independent EPA study is what all of us demand from our public servants.
- Even without the toxic chemicals, the geology potentially already contains substances such as radionuclides and heavy metals that can contaminate water. Fracturing the bedrock requires a force of up to 15,000 psi, which is 30 times the pressure of an air bomb. So this is a giant, multi-stage pipe bomb. Unless all existing faults are mapped, migration is an extreme hazard, since extreme pressure can create new pathways linked to the existing ones. Everywhere where this drilling is practiced is at great risk.
- Extensive research has shown that HF is safe, that it will not pollute lakes, aquifers, or the air, and that improvements are being made daily. There is no evidence of long term damage and when accidents have occurred they have been repaired.