

Hydraulic Fracturing EPA Public Informational Meeting

Denver, Colorado

July 13, 2010

Summary of Public Comments

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Meeting Format

US EPA (hereafter referred to as EPA) held a public informational meeting in Denver, Colorado, on July 13, 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 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 250 individuals attended the meetings and EPA received verbal comments from 68 citizens following the EPA presentations. Both the EPA presentations and public comments are summarized in this document.

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Summary of EPA Presentations

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

Introductory Remarks

Steve Tuber, Assistant Regional Administrator, EPA Region 8

- EPA Region 8 serves Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming, and 27 Tribal Nations.
- Natural gas is a key element of the nation's energy future. We are here to talk about one way to access natural gas: hydraulic fracturing (HF).
- Many have expressed concern over the safety of HF and its potential impact on drinking water supplies. To address these concerns, EPA will conduct a study investigating the potential impacts of HF on public health and the environment, particularly on drinking water.
- The study will be transparent and peer-reviewed, and will emphasize stakeholder input. At today's meeting, EPA asks for public comment on the study's design, scope, and focus.
- While the study will focus primarily on drinking water, there are other concerns, including air emissions, global warming impacts, and local issues such as zoning, truck noise, and traffic.
- EPA places a high priority on this study and hopes that the public's concerns will be addressed and answered through the process.

Why Are We Studying Hydraulic Fracturing?

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

Denver Public Meeting – Summary of Public Comments

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

What Will the Study Include?

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

- We need to find a balance between moving forward with natural gas exploration and extraction and protecting our natural resources.
- Here are the primary questions we hope to address with the study:
 - What HF scenarios might cause impacts on drinking water resources?
 - What approaches are effective for protecting drinking water?
- The major elements of the study are data and information (both quantitative and qualitative), chemical fate and transport (including the identification of chemicals that are used), and case studies (located in areas where issues have already arisen and/or on the site of new HF projects).
- The study could also include regional data collected by other entities, such as the Bureau of Land Management (BLM), the U.S. Geological Survey (USGS), and the Army Corps of Engineers.
- In a typical HF operation, there is a production well that is fairly deep, and there are several geologic strata between the fractures and the drinking water resources. However, there are cases where HF is shallower, and, in the past, there have been cases where HF has taken place within a geologic unit that is classified as an underground source of drinking water (USDW) by the Safe Drinking Water Act.
 - There can be 10 to 20 wells located on one well pad. Up to five million gallons of water can be required to fracture a single well.

Denver Public Meeting – Summary of Public Comments

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

How Can Stakeholders Be Involved?

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

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

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Summary of Public Comments

EPA requested comment on the proposed scope of the study plan and criteria to be used for case study locations. Public comments described regional impacts to public health, the environment, and economics; and provided recommendations on subjects or methods of study, regulation, and identification of chemicals. Public comments have been grouped by common theme: impacts specific to EPA Region 8, recommendations for the hydraulic fracturing study, regulation, and general comments.

Hydraulic Fracturing in Region 8

Commenters stated that HF is a safe and proven technology, and that it provides economic opportunities and the opportunity for energy independence for the U.S. Individuals supportive of HF noted that industry workers are committed to safety and asserted that there have been no verifiable cases of contamination as a result of fracturing activities. Landowners reported mixed impacts from HF -- some have not experienced any impacts as a result of fracturing, while other landowners stated that their water has been contaminated. Local watershed groups are beginning to conduct water quality monitoring programs and are seeking help from industry.

EPA’s Hydraulic Fracturing Study

A scientifically sound, impartial study with peer review was requested by commenters. Several commenters urged EPA to limit the scope of the study to the Congressional mandate while others asked EPA to examine the impact of HF on air quality. Commenters were split as to whether fracturing has led to any verifiable instances of contamination. Several commenters asked that the study consider the economic impact of HF. Potential case study sites suggested by the public included La Plata and Las Animas counties in Colorado. Cooperation among EPA and state and other federal agencies to share relevant information was requested. Commenters identified knowledge gaps, and referenced studies, findings, and potential cooperative partners for the study.

Regulating Hydraulic Fracturing

Multiple commenters stated that states can do and have done an adequate and efficient job of managing and regulating HF and other environmental risks, and managing natural resources. Other commenters asked for implementation of environmental best practices or stricter controls on industry. Commenters stated that EPA needs to regulate HF if states cannot do so effectively. Recommendations for full disclosure of fracturing fluid compounds and industry initiatives to develop more environmentally friendly chemicals for fracturing were presented by a few individuals.

General Comments

Commenters stated that HF is a safe and proven technology, and that it provides economic opportunities and the opportunity for energy independence for the U.S. Commenters also noted that the industry is aware of public concern and has been refining the techniques used over the years. Other commenters stated that families are already experiencing contaminated water as a result of fracturing, and that oversight and monitoring of facility operation and construction is a significant problem.

Detailed Public Comments

Public comments have been grouped by common theme: impacts specific to EPA Region 8, recommendations for the hydraulic fracturing study, regulation, and general comments.

Hydraulic Fracturing in Region 8

Comments from the public describing hydraulic fracturing in EPA Region 8 are as follows:

- Natural gas represents a tremendous opportunity to reduce pollution and reduce the United States' dependence on foreign oil; the nation needs HF.
- Natural gas in western Colorado is critical to the success of rural communities' economies. The abundant Colorado reserves, like all reserves, require some stimulation.
- A 2008 USGS study estimated that 4.3 billion barrels of natural gas in North Dakota are recoverable; these reserves can only be recovered with HF. This is a great economic benefit to the state. North Dakota moved from the 9th to the 4th largest oil-supplying state. The state's unemployment is very low, and the budget has a surplus.

Denver Public Meeting – Summary of Public Comments

- Several local citizen watershed groups are starting to conduct their own water quality monitoring programs, and they could use assistance from industry. There are two sides of the story: it is safe, and people are getting sick from it.
- A land-owning and ranching family has monitored water in wells on thousands of acres and has worked with producers for over 50 years. They have also been the host of over 1,000 fracs. Two hundred fifty of their wells have been drilled by 15 different companies, and they have received full disclosure from all companies of all chemicals used on their lands. HF has not caused any contamination. Their considerable personal experience has convinced them that state regulations will protect ground water quality.
- A former field worker with HF experience noted that every workday began with a safety meeting and concluded with a safety meeting. Workers had to follow the rules and regulations. Any accident was reported; there was never any effort to cover up incidents or discourage workers from speaking up.
- Southwest Colorado has one of the most productive natural gas basins in Colorado and the world. Fracking is important to maximize recovery in the southwestern basin and to coalbed methane development.
- On June 30, 2010, a Colorado couple was pumping water from their cistern while HF activity was taking place nearby. They pulled up murky water; they had been using the water well for 7 years and it had always been clean. The next day, the drilling operator and the Colorado OGCC took samples of the water, but they said they would not test for fracking chemicals. The gas operator refused to accept any responsibility. Now, the couple has to travel 80 miles to get clean water.
- As of July 1, 2009, there have been no documented cases of ground water contamination in Wyoming due to hydraulic fracturing that have been reported. Wyoming has 1,316 conventional gas wells, 100 percent of which were prepped with hydraulic fracturing. This resulted in no documented cases of ground water contamination.
- Most wells in Colorado rely on hydraulic fracturing; this technology is vital to unleashing gas reserves. To date, there are no verified instances of water contamination. Independent consultants have identified no such instances. COGCC updated their regulations with the following inclusions: a requirement for operators to inventory fracking fluids and provide the list to COGCC, a requirement to protect aquifers, and other requirements to ensure that fracking fluids do not leak.
- Technology of hydraulic fracturing has enhanced the ability to keep up with increasing demand for natural gas. In Colorado, the economy depends on this resource. The oil and gas industry has lots of experience using this technology.
- A landowner in Las Animas County has not experienced any ill effects from the wells on their land. Their water is tested by an independent hydrologic company.
- Four generations of a family live on a Wyoming ranch, they can no longer drink their water due to safety concerns. Profits should not come at the expense of the things people truly cannot live without —air, water, and health.
- The natural gas industry creates high-paying jobs, and many based in Colorado rely on HF to be competitive. These tax funds go to local schools and infrastructure. More than 127,000 jobs are supported by industry. For every job that is created, two more are created indirectly.
- Weld County, north of the Denver area, has over 30,000 wells, which is more than any other county in the nation. There has not been one incident of HF contaminating

underground water sources. Industry met with residents who had flammable water and performed tests. The state followed through as well, and both found that it was naturally-occurring.

EPA's Hydraulic Fracturing Study

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

- Seven commenters stated that EPA should limit the scope of the study to the Congressional mandate.
 - EPA's study proposition is too broad and should stick to the Congressional intent. The study should not deviate from the intent of Congress. Congress was clear on seeking guidance on underground sources of water, not all water resources. The distraction of issues that are not immediately relevant should be avoided.
- EPA must ensure that the study is scientific and peer-reviewed. The study should focus on fracking, not above-ground activities.
- EPA should also investigate the correlation between air quality and water. What will happen if these chemicals volatilize and return to drinking water? How safe is fracking? How safe are fracking fluids? There should be an analysis of the efficacy of the fluid return.
- EPA should include peer reviewers with technical expertise for the study.
- There is a tremendous amount of misinformation out there, and EPA needs to get accurate information.
- EPA needs to take advantage of state experience and expertise, and should document specific state experiences. The state agencies are a source of information.
- The study will not be worthwhile until the industry is held to higher cradle-to-grave waste disposal standards. Industry says that HF fluid is both proprietary and benign, which is neither acceptable nor true. EPA must find out what is in the fracking fluid.
- EPA should study gas wells with water wells close by.
- EPA should write the report using common language so that everyone can understand the report; EPA needs to dispel the myths about HF.
- The study is not clearly defined; it needs to be made clear. Is the study restricted to just shale gas or will it examine all unconventional reservoirs? There has to be study on well construction, and the study should also include geologic reservoir characteristics. You want to have natural fractures present when you conduct hydraulic fracturing; that is one aspect that needs to be included in the study.
- The study should be scientifically-credible and available for public comment.
- The misinformation about fracking should not encourage EPA to expand the study into water use; this will dilute the effectiveness of the study.
- The Agency should conduct a realistic evaluation of tradeoffs of incremental improvements rather than a one-time slash regulation that would have a huge impact on the industry. Any one-size-fits-all regulation would be negative.
- Since the 1990s, Colorado has had a water well testing program in La Plata County. The program tested water before drilling began, and two additional tests, 3 years apart, were also required. There are over 5,300 data sets from over 2,100 fracking wells. This is the type of reliable information that will be useful in this study.

Denver Public Meeting – Summary of Public Comments

- Investigations on the impacts of natural gas drilling on drinking water have shown no connection between the two. Results were collected by qualified technicians and analyzed by an EPA-certified lab. The monitoring wells which were tested included basins and domestic wells. Many domestic wells have problems were associated with poor well maintenance. EPA should include this issue in their study.
- The exception to the Safe Drinking Water Act must be rescinded. EPA must demand a full disclosure of the chemicals pumped into the water. Existing regulations are routinely ignored for the sake of expedience, and meaningful fines must be instituted.
- Mounting evidence shows that water and air impacts from hydraulic fracturing are more than anecdotal. There is a possibility that water resources could be contaminated from spills. Water and chemical mixes can also leak into ground water. The disposal of fracking water can cause additional water quality issues. EPA should examine the results of existing studies and test their validity, but also conduct new studies. An example includes the 2008 study conducted in Colorado that concluded drilling has degraded water quality.
- Investigations have found problems with ways domestic water wells have been drilled. Most of the reported incidents and problems are caused not by HF, but by the way domestic water wells are drilled. The EPA study must consider how construction and maintenance of domestic water wells affects water quality.
- EPA's study should include the benefits, direct and indirect, of the natural gas industry on communities. EPA should look at taxes, community giving, employee spending, and all the economic benefits.
- There are gaps in the knowledge relating to hydraulic fracturing and natural water wells – the study should fill in these gaps.
- It is imperative that EPA maintains an impartial study to investigate impacts of HF on environment and human health. There are several real occurrences where Colorado landowners' drinking water resources have been impacted. There should be verifiable disclosure of all chemicals being used. Oil and gas companies must follow the rules.
- EPA is bound to best-available science standards. The study should investigate the science. EPA should review the recent oil and gas regulations passed as the Agency moves forward.
- This study should be comprised of the strongest possible research to fully investigate the impacts of fracking on ground water. The fact that citizens have a new brand of fire water coming out of their faucets should not go unnoticed or un-researched.
- EPA should examine the industry's best practices and technologies, particularly in regard to reducing the volume of water used. The study to be relevant and current when it is published; there are many cutting-edge emerging technologies, including water use reducers.
- EPA should conduct a cost benefit analysis. Every time something under local control has an accident, the federal government has to come fix it. When things go wrong, somebody has to foot the bill.
- In October 2004 a former EPA engineer prepared a report to Congress and EPA's Office of the Inspector General (OIG) alleging problems with EPA's study. The first problem was with the toxic components that are not returned in the HF process. Illogically, EPA determined that there was no fault, and that the data was invalid..
- EPA's highest priority should be that this be a scientifically-based study.

Denver Public Meeting – Summary of Public Comments

- The scope of the study should be limited to the direct impacts of HF on drinking water underground. The effects on surface and supply waters are separate issues. There are a number of inaccuracies in EPA's figures; the figures do a poor job of representing where fracks are created, and their orientation, lengths, and everything else is out of scale.
- EPA should include the context in the findings: how many wells have been drilled, how many fracks are there; of those, how many problems have occurred?
- The study should include academia to complement what EPA is doing. There should be surveillance and monitoring of operations and water quality impacts. The bonding of wells and the company that performs the drilling should be considered so that there is some accountability in the process.
- Soil studies could also be used to track the chemicals at each well. USGS and USDA have done a lot of soil studies that EPA can use. It is important to look at relationship between surface and subsurface in the context of underground injection.
- The design of the study is important. This is an emotional topic, but the study must be scientific, not emotional.
- The Science Advisory Board (SAB) should make sure any study is an objective assessment that takes into account state perspectives; states are already regulating this and have extensive experience.
- EPA should also include the participation of state regulatory agencies, like GWPC, as they implement the study.
- EPA should utilize different data models to analyze different types of well scenarios. Some models may not be appropriate for all areas.
- EPA should use ranch case studies from Los Animas County, where HF activities are significantly affecting water sources. EPA should also consider the lack of public disclosure – industry does not tell the public what contaminants are being used.
- What are the implications of HF in the arid west, where millions of gallons of water are wasted on these activities?
- EPA should consider the economic benefits of HF in its study.

Regulating Hydraulic Fracturing

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

- Colorado requires the disclosure of all chemical constituents used.
- States should retain regulatory authority of HF.
- State regulatory agencies and the Bureau of Land Management (BLM) can and have efficiently managed environmental risks.
- Each state has developed sound regulatory standards which ensure that ground water is protected; industry members worked with Colorado to develop these. One provision of the regulation ensures that appropriate information about fracking chemicals is available. State programs are in the best position to regulate HF.
- State governors and state agencies do a great job of regulating HF.
- Industry is regulated and held legally liable under the Clean Water Act and the Safe Drinking Water Act by GWPC and IOGCC, which unlike EPA, have the scientific and technical expertise to better understand the practice.

Denver Public Meeting – Summary of Public Comments

- If EPA decides to regulate HF, their inability to approve wells in a reasonable amount of time will impact the lifecycle of wastewater.
- State regulatory agencies already protect ground water effectively.
- This past June, COGCC adopted rules on fractured stimulation.
- EPA should look at how successful Colorado has been in managing these resources. The state has been effectively managing our natural resources in this so far. Overregulation could hinder the production of good, clean energy.
- Best practices to maintain the state's land, air, wildlife, and health must be implemented. Local agencies have been less responsive to issues than they should be. There are concerns with state agencies regarding conflicts of interest between industry and the state agencies.
- Timely regulation would be a good start in addressing the multitude of concerns about air and water quality.
- There should be an increase in ground water monitoring, which could be funded by fines for noncompliance.
- Industry's chemicals cannot be designated as proprietary anymore; they must be disclosed.
- There needs to be continuity between the agencies that are set up to protect the public.
- One-size-fits-all-regulation does not fit all basins and geologic formations.
- If the practice of HF is safe and benign, then categorical exclusions should be done away with. A full list of contaminants should be disclosed to the public at large.
- Industry should be challenged to come up with an environmentally clean fracking compound on its own; then there would be no need for public meetings and EPA studies.
- The public needs to know what is in the fracking chemicals and what is happening to the waste.
- Colorado has the expertise to regulate effectively.
- It is EPA's responsibility to determine the risks and protect the public. Congress needs to get the full story on what is going on. This is not the time to be politically correct; if states are not taking care of the situation, then EPA needs to come in and say so.

Hydraulic Fracturing – General Comments

Commenters stated that HF is a safe and proven technology, and that it provides economic opportunities and the opportunity for energy independence for the U.S. Commenters also noted that the industry is aware of public concern and has been refining the techniques used over the years. Other commenters stated that families are already experiencing contaminated water as a result of fracking, and that oversight and monitoring of facility operation and construction is a significant problem.

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

- Fracking has been used for decades; it allows the U.S. to be energy independent. Environmental groups say that it poses a danger, but the greater risk is posed by those who want to shut down domestic energy production.
- Fracking is safe, reliable, and necessary for the state and national economy.
- In over 60 years, HF has not caused issues.

Denver Public Meeting – Summary of Public Comments

- HF technology has been refined over 60 years.
- Industry has extensive experience with the techniques used to develop shale gas. This technology is crucial to meeting domestic energy needs with natural gas.
- Industry is aware that there has been substantial public concern and supports EPA's study on the impacts of HF on ground water. Companies have already developed documents that outline safety measures at the surface and with wastewater.
- Not too many of the directors of industry have worked in the field, and that is the perspective that is missing from the dialogue. These are not plants that are built under the supervision of inspectors. These are not facilities where there are utility inspectors and people with meters checking compliance routinely. These are mineral extraction sites in remote locations of the state—away from oversight—with few boots on the ground and few eyes on the field. Bichromate was dumped on the ground and rinsed in the ground, diluted in water; cattle drank it. Pipelines of waste were dumped into freshwater. There were broken pipelines. This lack of oversight is the tip of the iceberg.
- Everyone should do themselves a favor and watch the movie *Gasland*; it showed the number of wells already up and running, and the families who have already experienced contaminated water. The film is no more biased than some of the testimony from industry and states.
- Global competition is important and natural gas needs to be developed in this country.
- EPA should know that HF is not new. Industry has invested a lot of money in coming up with new technology and new chemicals.
- Energy needs between now and 2050 will triple; natural gas is important to our energy future and it is important to keep it as a resource. It should be produced in a safe and environmentally-friendly way.