

OUR DRINKING WATER AT RISK:

What EPA and the Oil And Gas
Industry Don't Want Us to Know
About Hydraulic Fracturing

Oil and Gas Accountability Project
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Acknowledgements

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All views and opinions expressed in this report are those of OGAP, and do not necessarily reflect the views of reviewers or funders. Any errors are the responsibility of OGAP.

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Photo Credits: Photo of hydraulic fracturing operation (Peggy Utesch).

About the Oil & Gas Accountability Project

OGAP is the only organization in the United States with the sole mission of working with tribal, urban and rural communities to protect their homes and the environment from the devastating impacts of oil and gas development. In our five-year history, we have succeeded in building alliances with economically, racially and politically diverse constituencies. By bringing together such diverse partners as Native Americans, ranchers and environmentalists to work towards a common –and critically important– goal, their ability to voice their concerns and work to lessen impacts has increased.

OGAP's multi-tiered approach involves people who are directly affected by the impacts of oil and gas development in working for strong reforms. Our campaign strategies include media, public education and community organizing components.

OGAP coordinates four program areas: Citizen and Community Support; Governmental Reform; Best Practices; and Public Health and Toxics.

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Executive Summary

Hydraulic fracturing is a common technique used to stimulate the production of oil and natural gas. Typically, fluids are injected underground at high pressures, the formations fracture, and the oil or gas flows more freely out of the formation. Some of the injected fluids remain trapped underground. A number of these fluids qualify as hazardous materials and carcinogens, and are toxic enough to contaminate groundwater resources.

There are a number of cases in the U.S. where hydraulic fracturing is the prime suspect in incidences of impaired or polluted drinking water. In Alabama, Colorado, New Mexico, Virginia, West Virginia and Wyoming, incidents have been recorded in which residents have reported changes in water quality or quantity following fracturing operations of gas wells near their homes. Natural gas development is booming in the U.S., particularly coalbed methane (CBM) development; hundreds of companies are looking to drill for CBM wherever there are viable deposits of coal. In at least ten states (Alabama, Arkansas, Colorado, Kansas, Montana, New Mexico, Virginia, Washington, West Virginia and Wyoming), these coal formations contain drinking water aquifers.

According to the Interstate Oil and Gas Compact Commission, 90 percent of oil and gas wells in the U.S. undergo fracturing to stimulate production.¹ Despite the widespread use of the practice, and the risks hydraulic fracturing poses to human health and safe drinking water supplies, the U.S. Environmental Protection Agency (“EPA”) does not currently regulate the injection of fracturing fluids under the *Safe Drinking Water Act*. The oil and gas industry is the only industry in America that is allowed by EPA to inject hazardous materials –unchecked– directly into or adjacent to underground drinking water supplies.

In 1997, the U.S. Court of Appeals for the 11th Circuit (Atlanta) ordered the EPA to regulate hydraulic fracturing under the *Safe Drinking Water Act*. This decision followed a 1989 CBM fracturing operation in Alabama that resulted in the contamination of a residential water well.

In 2000, in response to the 1997 court decision, the EPA initiated a study of the threats to water supplies associated with the fracturing of coal seams for methane production. The primary goal of the study was to assess the potential for fracturing to contaminate underground drinking water supplies. The EPA completed its study in 2004, finding that fracturing “poses little or no threat” to drinking water. The EPA also concluded that no further study of hydraulic fracturing was necessary.²

Meanwhile, in 2001, a special task force on energy policy convened by Vice President Dick Cheney recommended that Congress exempt hydraulic fracturing from the *Safe Drinking Water Act*. The National Energy Bill currently pending before the U.S. Congress includes this exemption. If the energy bill passes with the exemption intact, states, municipalities and individual property owners will have to bear the burden of the cleanup costs, health risks and loss of property values associated with ground water contamination caused by hydraulic fracturing.

The 2004 EPA study has been called “scientifically unsound” by EPA whistleblower Weston Wilson.³ In an October 2004 letter to Colorado’s congressional delegation, Wilson

¹ Testimony Submitted To The House Committee On Energy And Commerce By Victor Carrillo, Chairman, Texas Railroad Commission, Representing The Interstate Oil And Gas Compact Commission. February 10, 2005. <http://www.rrc.state.tx.us/commissioners/carrillo/press/energytestimony.html>

² U.S. Environmental Protection Agency (EPA). June, 2004. *Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs*. EPA Document# 816-R-04-003. pp. 1-3. <http://www.epa.gov/safewater/uic/cbmstudy.html>

³ Wilson, W. October 8, 2004. Letter to Senators Allard, Campbell and Representative DeGette. Available on the Oil and Gas Accountability web site: http://www.ogap.org/resources/wes_wilson_letter.pdf

recommended that EPA continue investigating hydraulic fracturing and form a new peer review panel that would be less heavily weighted with members of the regulated industry.⁴ In March of 2005, EPA Inspector General Nikki Tinsley found enough evidence of potential mishandling of the EPA hydraulic fracturing study to justify a review of Wilson's complaints.⁵

The Oil and Gas Accountability Project (OGAP) has conducted a review of the EPA study. We found that EPA removed information from earlier drafts that suggested unregulated fracturing poses a threat to human health, and that the Agency did not include information that suggests fracturing fluids may pose a threat to drinking water long after drilling operations are completed. OGAP's review of relevant data on hydraulic fracturing suggests that there is insufficient information for EPA to have concluded that hydraulic fracturing does not pose a threat to drinking water.

OGAP's Main Findings

Hydraulic fracturing fluids contain toxic chemicals.

The EPA states that many chemicals in hydraulic fracturing fluids are linked to human health effects. These effects include cancer; liver, kidney, brain, respiratory and skin disorders; birth defects; and other health problems. The draft EPA study included calculations showing that even when diluted with water at least nine hydraulic fracturing chemicals may be injected into USDWs at concentrations that pose a threat to human health. These chemicals are: benzene, phenanthrenes, naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, fluorenes, aromatics, ethylene glycol and methanol. This important information was removed from the final study.

Chemicals are injected directly into drinking water aquifers.

Some geological formations contain groundwater of high enough quality to be considered underground sources of drinking water. According to EPA, ten out of eleven coalbed methane basins in the U.S. are located, at least in part, within USDWs, and EPA determined that in some cases, hydraulic fracturing chemicals are injected directly into USDWs during the course of normal fracturing operations. Additionally, even if hydraulic fracturing does not occur directly in USDWs, it is possible that USDWs adjacent to hydraulically fractured formations may become contaminated by fracturing fluids. EPA cited a study conducted in six U.S. states, which found that in 50% of CBM hydraulic fracturing stimulations the fracturing fluids moved out of the coals and into adjacent formations.

⁴ *ibid.*

⁵ Alan C. Miller and Tom Hamburger. March 17, 2005. "EPA Watchdog to Investigate Drilling Method." *Los Angeles Times*.

Hydraulic fracturing company recommends that unused fluids be disposed of as hazardous waste.

The hydraulic fracturing company Schlumberger recommends that many of its fracturing fluids be disposed of at hazardous waste facilities. Yet these same fluids are allowed to be injected directly into or adjacent to USDWs. Under the *Safe Drinking Water Act* no other industries are allowed to inject hazardous wastes –unchecked– directly into USDWs. EPA does not provide any scientific data to demonstrate that the hazardous characteristics of fracturing fluids are reduced enough to make it safe to inject these chemicals into or close to USDWs.

Citizens from across the country have been affected by hydraulic fracturing.

Citizens from Colorado, New Mexico, Virginia, West Virginia, Alabama and Wyoming have reported changes in water quality and quantity following hydraulic fracturing operations. Common complaints include: murky or cloudy water, black or gray sediments, iron precipitates, soaps, black jelly-like grease, floating particles, diesel fuel or petroleum odors, increased methane in water, rashes from showering, gassy taste and decrease or complete loss of water flow. In most cases, the agencies conducting follow-up water quality sampling do not know what chemicals have been used in fracturing operations because companies are not required to disclose this information. Consequently, state agencies and EPA do not test for all fracturing fluid chemicals. Citizens have also experienced soil and surface water contamination from spills of hydraulic fracturing fluids.

Some contamination may not show up for decades.

When wells are hydraulically fractured, a portion of the fracturing fluids remains stranded in the target formation. In some areas, hundreds or thousands of wells are hydraulically fractured, often multiple times. At least two hydrogeologists wrote to EPA expressing concern that as groundwater tables rise (post oil or gas development), the groundwater could mobilize these stranded fluids. EPA does not address this issue in its study.

EPA ruled out further study despite huge gaps in scientific data.

The EPA study is essentially a scientific literature review. What becomes clear from reading EPA's study is that there are huge gaps in data on fracturing fluid toxicity, fracture behavior, quantities of fracturing fluid left stranded in the formation, chemical fate and transport of fracturing fluids trapped underground, and groundwater quality following fracturing events. Given the dearth of information, it is irresponsible to conclude that hydraulic fracturing of coal beds or any other geological formations does not pose a risk to drinking water and human health. Yet this is exactly what EPA does.

EPA's findings absolutely support the need to continue to Phase II of the study.

In its study methodology, EPA stated that it would not conduct Phase II of the study if the investigation found that: 1) No hazardous constituents were used in fracturing fluids; 2) Hydraulic fracturing did not increase the hydraulic connection between previously isolated formations; and 3) Reported incidents of water quality degradation could be attributed to other, more plausible causes. As mentioned above, the EPA found that there are numerous hydraulic fracturing chemicals that are toxic or hazardous in their pure and diluted forms. It has been shown that fractures and fracturing fluids move out of targeted formations. And while EPA was unable to find conclusive evidence to directly link citizen water quality concerns with hydraulic fracturing, this in itself does not prove that harm has not occurred or will not occur.

The data that are available support the need to continue evaluating the environmental and human health risks posed by hydraulic fracturing.

OGAP's Recommendations

Further study of the effects of hydraulic fracturing on underground sources of drinking water should be conducted.

EPA should continue with Phase II of its hydraulic fracturing study to verify the Agency's scientifically unsubstantiated assertion that no harm has occurred or will occur from hydraulic fracturing practices. The study design should be broadened to include impacts related to hydraulic fracturing of all types of oil and gas formations—not just coalbed methane.

EPA should develop hydraulic fracturing regulations under the *Safe Drinking Water Act*.

Under the *Safe Drinking Water Act*, EPA and EPA-authorized states are required to have effective programs to prevent underground injection of fluids from endangering USDWs. At the present time, there are no federal regulations and very limited state regulations governing hydraulic fracturing. In all but one state, Alabama, the oil and gas industry is allowed to inject hazardous chemicals directly into drinking water sources. Clearly, EPA is not fulfilling its responsibility of protecting our nation's drinking water.

Hydraulic fracturing should not be exempted from the *Safe Drinking Water Act*.

Approximately half of the water that Americans rely on for drinking comes from underground sources. It is in the public interest to ensure –with a very high degree of certainty– that any substances that are injected underground do not pose a threat to drinking water quality and human health. The EPA study does not provide adequate scientific proof that hydraulic fracturing does not pose a threat to drinking water. Exempting the practice from the *Safe Drinking Water Act* could result in long-term contamination liability for oil and gas companies, and for the American public.

Until they can be proven safe, all potentially toxic substances should be eliminated from fracturing fluids.

Unless companies can produce data to prove that fracturing fluid constituents and mixtures of fracturing fluids do not pose a threat to human health when injected underground, the chemicals and mixtures should be banned from hydraulic fracturing operations. This includes requiring all companies to stop using diesel fuel as a constituent in hydraulic fracturing fluids.

Public accountability mechanisms should be put in place.

EPA and state agencies should require that companies disclose all of the chemicals used in hydraulic fracturing operations, and agencies should track what substances are being injected, where injection into is occurring, and where the safety of USDWs may be threatened. All of this information should be made available to the public.