



## Does Federal Regulation of Hydraulic Fracturing Make Sense?

Posted by [Gail the Actuary](#) on June 12, 2009 - 10:09am

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A few days ago, Federal Legislation was introduced to regulate Hydraulic Fracturing. Dow Jones Newswire reported:

### [Industry Warns Bill May Halt Natural Gas Development](#)

U.S. lawmakers Tuesday unveiled a bill that industry warns could prevent development of trillions of cubic feet of natural gas by putting regulation of a key production technique under federal oversight.

It is unclear how much support the proposal could get in Congress or from the White House, but the oil and natural-gas industry has already geared up for a fight to oppose the provision given its potential impact on the sector.

The legislation would repeal an exemption for the process of "hydraulic fracturing" in the Safe Drinking Water Act that requires disclosure of the chemicals used the production process.

By forcing hydraulic water, sand and a small percentage of lubricating chemicals into unconventional types of reservoirs called tight sand and shale gas, companies are able to fracture underground rocks and release the trapped gas not traditionally accessible. States' offices, such as Pennsylvania's Department of Environmental Protection, currently regulate the 60-year-old practice.

## Arguments Against Federal Regulation

The industry arguments against stopping the current practice include:

1. The practice is already regulated by the states. Federal legislation would be duplicative, cause delays, and be expensive.
2. The practice has been used for more than 50 years, and seems to be safe.
3. The chemicals that are injected are injected thousands of feet below the water table. There is generally rock that acts as a barrier to keep the chemicals where they are re-injected. It would be very difficult for them to get back up to the water table again.

## Arguments for Federal Regulation

The sponsors of the new legislation are concerned because drilling is being proposed near major urban areas, such as New York City. A small problem could be catastrophic. [According to](#) Senator Bob Casey (D-PA), who is one of the sponsors of the legislation:

Drilling for natural gas in the Marcellus Shale across much of Pennsylvania is part of our future. I believe that we have an obligation to develop that natural gas responsibly to safeguard the drinking water wells used by 3 million Pennsylvanians. We already have private wells contaminated by gas and fluids used in hydraulic fracturing. We need to make sure that this doesn't become a state-wide problem over the next few decades as we extract natural gas.

[According to the website](#) of another sponsor of the legislation, Diana DeGette (D-CO),

Hydraulic fracturing – also known as “fracking”, which is used in almost all oil and gas wells, is a process whereby fluids are injected at high pressure into underground rock formations to blast them open and increase the flow of fossil fuels. This injection of unknown and potentially toxic chemicals often occurs near drinking water wells. Troubling incidents have occurred around the country where people became ill after fracking operations began in their communities. Some chemicals that are known to have been used in fracking include diesel fuel, benzene, industrial solvents, and other carcinogens and endocrine disrupters.

One issue I have not seen discussed too much is the quantity of water used in fracking--probably because the legislation is not aimed at addressing water use. Perhaps readers can add more on the issue of water use. At the recent hearing House Hearing on Hydrofracturing, testimony by Albert F. Appleton who is a ~~Infrastructure~~ <sup>former</sup> ~~and the~~ <sup>former</sup> ~~Environment~~ <sup>Director</sup> of the City Water and Sewer System, does touch on the water withdrawal issue. According to [a post by Heading Out](#), his testimony can be summarized as follows:

He has been, as one concerned with the NY water supply, a critical evaluator of what goes on in the watershed that feeds water to the city and the state. He spoke to the fact that we are supposed to be moving away from fossil fuels toward renewable ones, that there are concerns with the fluids that are used in hydrofracing, and the industry that says it can't afford more regulation is the one that makes these huge profits. His main concern was that the fluids used are toxic and do not biodegrade, so that even though they are stored in deep wells, they are still there as a threat. But there are also concerns that there are not enough regulators to ensure compliance with the regulations, and that water withdrawal may have severe and negative impact on communities. And he returned to the point that the Government is now pouring billions into green energy but this will compete with natural gas, so that if we subsidize the gas by easing the regulations we are undercutting the green energy program. And we have to be concerned about global warming.

## Results of Analysis for the American Petroleum Institute

According to a report (which can be downloaded [here](#)) prepared by IHS Global Insight commissioned by the American Petroleum Institute, **elimination** of hydraulic fracturing would have a huge impact on the industry. By 2104, the United States elimination of hydraulic fracturing could be expected to experience a 17% in oil production and a 45% reduction in natural gas production, relative to the reference case.

Of course, no one is really talking about eliminating hydraulic fracturing, just enacting federal regulation. The calculation of what happens if hydraulic fracturing is eliminated is really an intermediate result, in trying to figure out what would happen if regulation is enacted.

The report offers two regulation scenarios. If the new regulation results in only additional reporting, the report estimates that there will be a 20.5% reduction in the number of natural gas wells drilled over a five year period, and a 10% reduction in natural gas volumes. No estimate is given with respect to impact on oil production, but presumably it would be significantly less.

The report prepared for API also looks at a scenario where the types of fluids that can be used for hydrofracturing would be restricted. In this scenario, gas production would decrease by 22% and oil production by 8%, relative to baseline.

All of the analyses in the report prepared for API depend very much on the price of oil and of natural gas. If the price of natural gas remains low, there could be a big drop in production, with or without the proposed regulation.

## Chemicals Used in Hydraulic Fracturing

[Heading Out posted](#) this general list of fracking fluids, introduced by Mr. Mike John of Chesapeake Energy at the House Hearings:

<b>EXHIBIT 36: FRACTURING FLUID ADDITIVES, MAIN COMPOUNDS, AND COMMON USES.</b>			
<b>Additive Type</b>	<b>Main Compound(s)</b>	<b>Purpose</b>	<b>Common Use of Main Compound</b>
Diluted Acid (15%)	Hydrochloric acid or muriatic acid	Help dissolve minerals and initiate cracks in the rock	Swimming pool chemical and cleaner
Biocide	Glutaraldehyde	Eliminates bacteria in the water that produce corrosive byproducts	Disinfectant; sterilize medical and dental equipment
Breaker	Ammonium persulfate	Allows a delayed break down of the gel polymer chains	Bleaching agent in detergent and hair cosmetics, manufacture of household plastics
Corrosion Inhibitor	N,n-dimethyl formamide	Prevents the corrosion of the pipe	Used in pharmaceuticals, acrylic fibers, plastics
Crosslinker	Borate salts	Maintains fluid viscosity as temperature increases	Laundry detergents, hand soaps, and cosmetics
Friction Reducer	Polyacrylamide	Minimizes friction between the fluid and the pipe	Water treatment, soil conditioner
	Mineral oil		Make-up remover, laxatives, and candy
Gel	Guar gum or hydroxyethyl cellulose	Thickens the water in order to suspend the sand	Cosmetics, toothpaste, sauces, baked goods, ice cream
Iron Control	Citric acid	Prevents precipitation of metal oxides	Food additive, flavoring in food and beverages; Lemon Juice ~7% Citric Acid
KCl	Potassium chloride	Creates a brine carrier fluid	Low sodium table salt substitute
Oxygen Scavenger	Ammonium bisulfite	Removes oxygen from the water to protect the pipe from corrosion	Cosmetics, food and beverage processing, water treatment
pH Adjusting Agent	Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers	Washing soda, detergents, soap, water softener, glass and ceramics
Proppant	Silica, quartz sand	Allows the fractures to remain open so the gas can escape	Drinking water filtration, play sand, concrete, brick mortar
Scale Inhibitor	Ethylene glycol	Prevents scale deposits in the pipe	Automotive antifreeze, household cleansers, and de-icing agent
Surfactant	Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antiperspirant, and hair color
<b>Note:</b> The specific compounds used in a given fracturing operation will vary depending on company preference, source water quality and site-specific characteristics of the target formation. The compounds shown above are representative of the major compounds used in hydraulic fracturing of gas shales.			

## Other Thoughts

In many ways, the current legislation seems to reflect emotional concerns over what might happen, and what might be done to prevent what seems to be a fairly low chance of contamination. The problem is that if contamination did occur, the consequences could affect a huge number of people, and be difficult to resolve.

The issue of too much water use is not really addressed by current legislation. If the EPA

regulates fracturing fluids, it may increase the cost of drilling wells, and thereby cause some wells which might have been economic without regulation to fall into the non-economic category. As a consequence, fewer wells will be drilled. This will reduce water use for hydraulic fracturing in proportion to the fewer wells drilled, but not otherwise.

The proposed legislation does not appear to have a good chance of passing. Supporters asked to get the legislation attached to energy packages, but were not successful in doing so. It seems to me that state legislation, in states like New York and Pennsylvania, will have a greater chance of passing.



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