

Hydraulic fracturing FRAC Act



FRACKing with the water supply

By

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Introduction



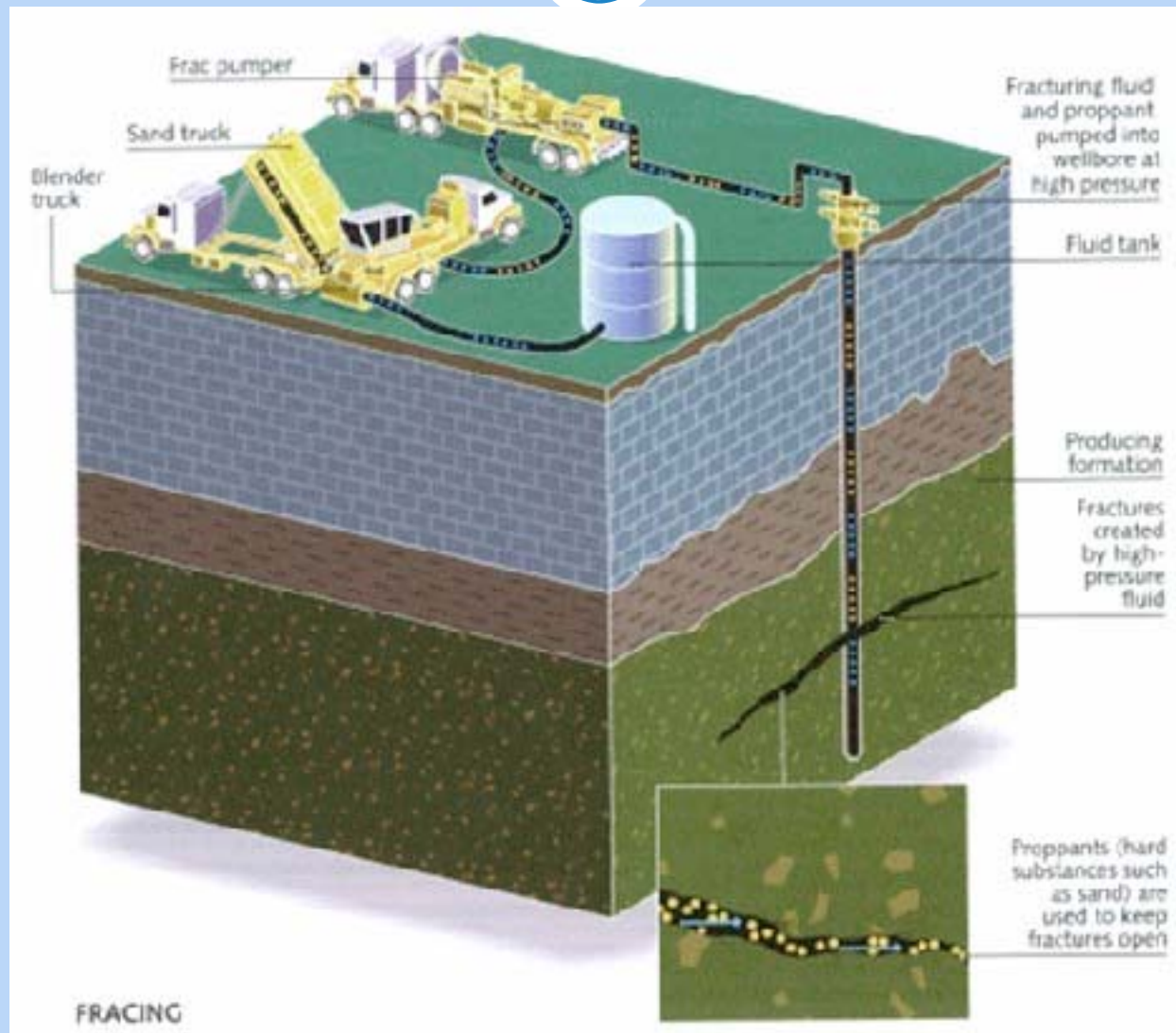
- **Technical Background**
- **Legal Background**
- **Major Players**

Technical Background



- Oil or Gas Bearing formations have poor flow rates from low permeability
- Problem is common in tight sands, oil shales and coal bed methane.
- Solution is Hydraulic Fracturing or Fracking
- Technique involves drilling into formations and creating fractures to allow easier movement of oil and gas
- Water, proppants, and various chemicals are injected into the formation
- The formation cannot absorb the fluids at the rate of injection
- The pressure causes fracturing and the fractures are held open by the proppants
- The gas and oil flow out more freely

Introduction



Technical Background



- <http://www.youtube.com/watch?v=8gvxFBvHRUY>

Technical Background



- Hydraulic fracturing is happening in 34 states
- Many proppants or fracturing fluids contain chemicals that can be toxic to humans and wildlife and chemicals that are known to cause cancer:
 - diesel fuel, which contains benzene, ethylbenzene, toluene, xylene, naphthalene and other chemicals; polycyclic aromatic hydrocarbons; methanol; formaldehyde; ethylene glycol; glycol ethers; hydrochloric acid; and sodium hydroxide.
 - Very small quantities of chemicals such as benzene, which causes cancer, are capable of contaminating millions of gallons of water.
- EPA has determined that in some cases, hydraulic fracturing chemicals are injected directly into USDWs (underground sources of drinking water) during the course of normal fracturing operations
- Chemicals may be injected at concentrations that are anywhere from 4 to almost 13,000 times the acceptable concentration in drinking water

Economics and Environment



- **Benefits to Business**
- **Trade Secrets**
- **Safety Concerns**
 - Earthquakes
 - Well Explosions
 - Well Contamination
 - Remnant Fluids
 - Proper Disposal

Hydraulic Fracturing Technology



- Hydraulic fracturing first developed by Halliburton in 1948
- Nine out of ten gas wells in the U.S. use fracturing
- Key step to developing shale gas reservoirs and has allowed for huge expansion in this area
- The industry group says hydraulic fracturing has a track record of safety and is regulated sufficiently by the states.

Benefits to Business



BusinessWeek

DRILLING GIANTS

Three large natural-gas service companies share about 90% of the \$15 billion market for hydraulic fracturing:

COMPANY	REVENUE	EMPLOYEES	
Schlumberger	\$23.3 billion	84,000	Brothers Conrad and Marcel Schlumberger began doing oil surveys in Europe and Africa in the 1920s
Halliburton	\$15.2 billion	51,000	Dick Cheney, formerly the company's CEO, helped expand the commercial use of hydraulic fracturing
BJ Services	\$4.8 billion	16,700	The company, which started in the late 19th century, now operates in some 50 countries

Data: Companies

Benefits to Business



- The Consumer Energy Alliance in the Project BRIEF – Bringing Real Information on Energy Forward stated that new regulations on hydraulic fracturing would:
 - Force the closure of more than half of America's oil wells and a third of our gas wells
 - Cost the federal government \$4 billion in revenue; state treasuries would lose \$785 million
 - Slash domestic oil production by 183,000 barrels per day; natural gas by 245 billion cubic feet per year

Trade Secrets



- There is no specific disclosure on chemicals used in fracking because:
- "A disclosure to members of the public of detailed information...would result in an unconstitutional taking of [Halliburton's intellectual] property," the company said in a filing to Colorado's Oil & Gas Conservation Commission.
- "If these formulas were to become available to other companies, it is possible that we could lose our competitive advantage with respect to those companies, not only in Colorado but throughout the world," Halliburton spokeswoman Diana Gabriel
- Chesapeake and its contractors are facing disclosure demands from New York state officials before they can drill in a massive Appalachian gas reserve known as the Marcellus Shale.

Safety Concerns

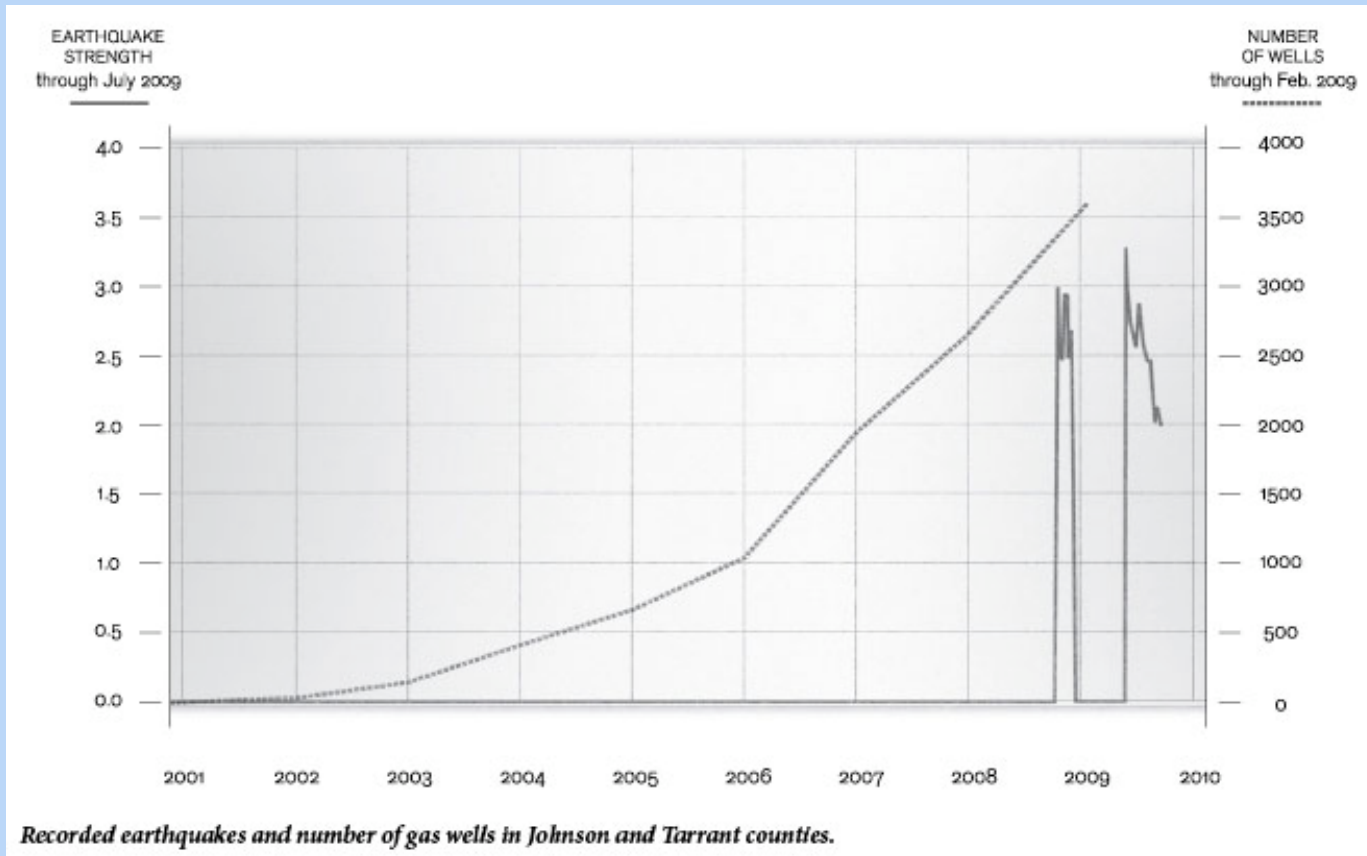


- **Earthquakes**
- **Well Explosions**
- **Well Contamination**
- **Remaining Fluids**
- **Too Water Intensive**

Earthquakes



- Tremors in Northern Texas

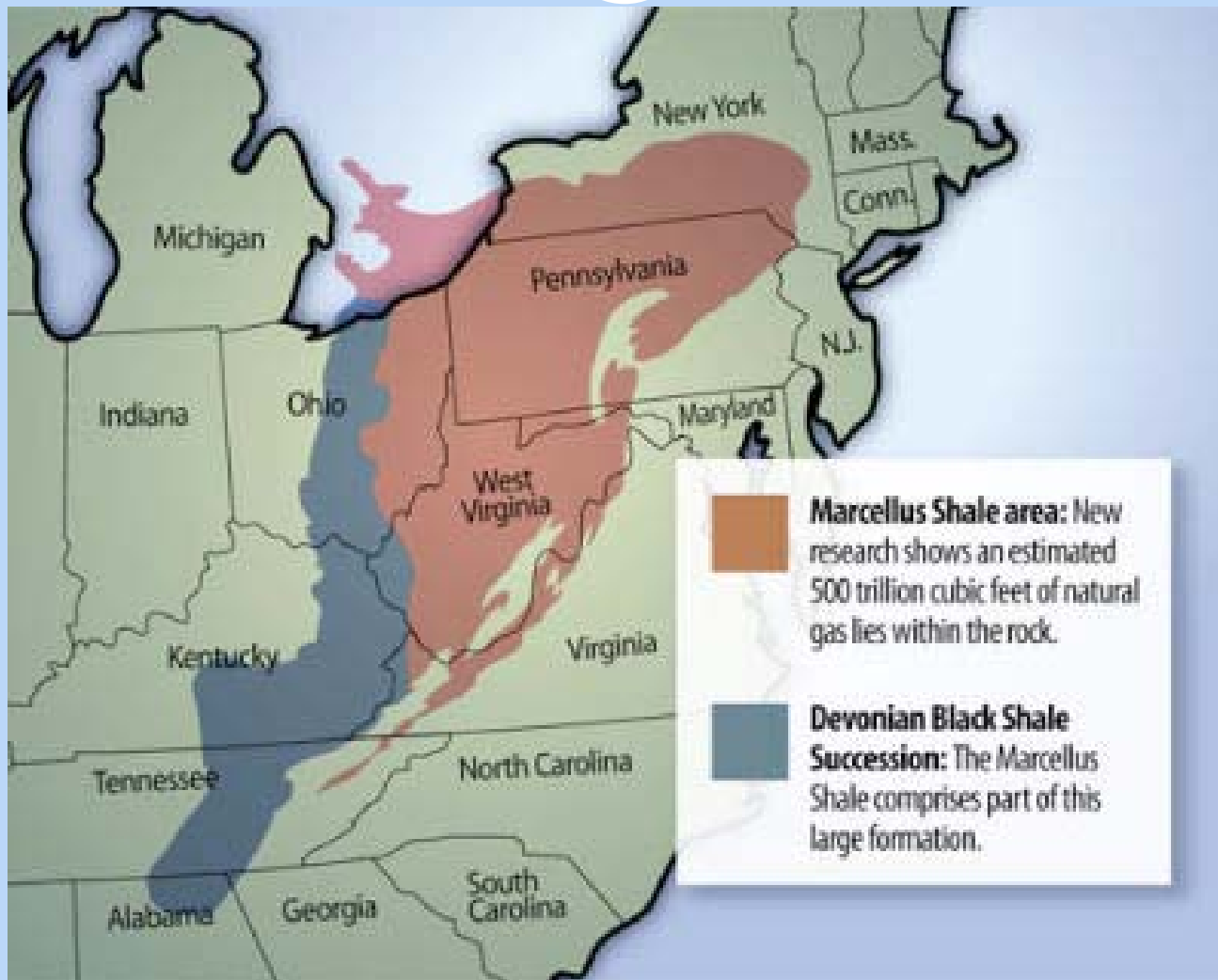


Are the wells safe?



- In Dimock, Pennsylvania, we have a recent example of the risks involved with hydraulic fracturing. On New Year's Day, Norma Fiorentino's drinking water well exploded. It literally blew up. Stray methane leaked and migrated upward through the rock and into the aquifer as natural gas deposits were drilled nearby. An investigation by the Commonwealth of Pennsylvania shows that a spark created when the pump in the well house turned on may have led to the explosion. The blast cracked in half the several-thousand-pound concrete slab at the drilling pad on Ms. Fiorentino's property and tossed it aside. Fortunately, no one was hurt in the explosion. But throughout the town, several drinking water wells have exploded and nine wells have been found to contain so much natural gas that one homeowner was advised to open a window if he plans to take a bath. Tests of the well water show high amounts of aluminum and iron, which leads researchers to believe that drilling fluids are contaminating the water along with the gas. So this is a real concern. We are talking about serious implications if we don't develop the Marcellus Shale carefully and responsibly.
—Senator Casey PA Floor Comments

Marcellus Shale



Well Contamination



- Serious episodes of water contamination near drilling sites have been documented in: Alabama, Colorado, Montana, New Mexico, Ohio, Texas, and Wyoming
 - ✦ In 2004 a well casing shattered beneath a rig at Divide Creek, a tributary of the Colorado River, which supplies water to seven states.
 - ✦ 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
- It is estimated that 60 out of 300 chemicals thought to be in use by drillers are listed as hazardous by the federal government.
- The concern is that dangerous chemicals may escape from some well sites as a result of leaky waste pits, spills caused by worker negligence, or underground leaching.

Long Term Safety



- The potential long-term consequences of dewatering and hydraulic fracturing on water resources have been summed up by professional hydrogeologist who spent 32 years with the U.S. Geological Survey:

At greatest risk of contamination are the coal bed aquifers currently used as sources of drinking water. For example, in the Powder River Basin (PRB) the coal beds are the best aquifers. CBM production in the PRB will destroy most of these water wells; BLM predicts draw downs...that will render the water wells in the coal unusable because the water levels will drop 600 to 800 feet. The CBM production in the PRB is predicted to be largely over by the year 2020. By the year 2060 water levels in the coal beds are predicted to have recovered to within 95% of their current levels; the coal beds will again become useful aquifers. However, contamination associated with hydro-fracturing in the basin could threaten the usefulness of the aquifers for future use.

Letter from John Bredehoeft, PhD to Joan Harrigan-Farrelly, Chief, Underground Injection Control, Prevention Program, Environmental Protection Agency. May 22, 2003.

Is there a real connection?



- Shale rock subjected to the fracturing is thousands of feet below the surface of the Earth
- Most aquifers that supply drinking water are only hundreds of feet below the surface
- The well bores themselves are shielded from the surrounding earth by steel and cement casing.



Proper Disposal of Fraking Chemicals



Hydraulic fracturing fluids or additive	Recommended Disposal
Foaming Agent F104 Corrosion Inhibitor A186 Organic Acid L36 Chelating Agent Liquid Breaker Aid J318 Breaker J218 Biocide B69 PSG Polymer Slurry J877	Hazardous waste disposal facility.
Water Gelling Agent J424	Hazardous waste landfill, incineration, or sanitary landfills in some jurisdictions.
Potassium Chloride M117	Hazardous waste landfill. Material may be acceptable in some sanitary landfills.
Coalbed Methane Additive J473	Incineration, disposal well injection or other acceptable methods according to local regulations.
Borate Crosslinker J532	Inject in disposal well. Small amounts may be acceptable in sanitary sewer.
Gelling Agent U28	Neutralized material is generally acceptable in sanitary sewers.

Legal Background



- **State Laws**
- **Federal Laws**
 - LEAF v. EPA
 - 2004 EPA Study
 - 2005 EPA Act with the Halliburton Loophole
 - 2009 FRAC Act

State Laws



- **Several oil and gas producing states do have regulations governing some aspects of hydraulic fracturing, BUT**
 - Laws do not require companies to provide detailed information on types and quantities of chemicals being used
 - whether the amount injected underground returns to the surface or remains underground.
 - companies do not have to prove that fractures have stayed within the target formations.
 - Companies do not have to monitor water quality when there are drinking water formations in close proximity to areas where hydraulic fracturing occurs.

Local resolutions supporting stronger regulation of hydraulic fracturing (asterisked resolutions explicitly support ending the Halliburton loophole)



- **Colorado**

- [City of Durango](#)*
- [City of Glenwood Springs](#)*
- [County of Huerfano County](#)*
- [County of La Plata](#)*
- [County of Pitkin](#)*
- [County of San Miguel County](#)*
- [County of Saguache](#)*
- [County of Saguache, Baca Grande Water District](#)*
- [Town of Carbondale](#)*

- **New York**

- [City of New York](#)
- [County of Otsego](#)
- [County of Tompkins](#)*
- [Town of Cherry Valley](#)

- **Pennsylvania**

- [Township of Nockamixon](#)*

- **Texas**

- [City of Dish](#)*

- **Wyoming**

- [Teton County](#)*

Legal History



LEGAL ENVIRONMENTAL ASSISTANCE FOUNDATION v. EPA

- 1989 Alabama residence claim water well contamination from fracking
- 1994 LEAF petitioned EPA study a claim by Alabama residence that their drinking water had been contaminated by the hydraulic fracturing process and to proceed to rule making
- 1995 EPA denied the petition because it found hydraulic fracturing did not fall within the regulatory definition of “underground injection.”
- 1997 the 11th Circuit Court of Appeals ruled that hydraulic fracturing should be regulated under federal law, namely the Safe Drinking Water Act
 - EPA argued that “(1) the statutory definition of “underground injection” is ambiguous, (2) Congress intended to exclude wells whose principal function is not the injection of fluids from the UIC regulatory scheme, and, therefore, (3) EPA's regulations are a permissible interpretation of the statutory language”
 - “Congress directed EPA to regulate “underground injection” activities, not “injection wells.” In view of clear statutory language requiring the regulation of *all* such activities, they must be regulated, regardless of the other uses of the well in which these activities occur”
 - In sum, we conclude that hydraulic fracturing activities constitute “underground injection” under Part C of the SDWA. EPA's contrary interpretation cannot be squared with the plain language of the statute and thus must fall. “[T]hat is the end of the matter.”

EPA Responds



- 2000, in response to *LEAF v. EPA*, the EPA starts a study of the threats to water supplies associated with fracking
- 2001, Vice President Dick Cheney creates a special task force to recommended that Congress exempt hydraulic fracturing from the Safe Drinking Water Act.
- 2004, EPA completes study finding that hydraulic fracturing "poses little or no threat" to drinking water and that no further study of hydraulic fracturing was necessary

EPA Criticized



- Shortly after 2004 EPA report, Weston Wilson, a scientist and 31-year veteran of the EPA, sought protection under the federal Whistleblower Protection Act and wrote an 18 page letter stating:

EPA's conclusions are unsupportable. EPA has conducted limited research reaching the unsupported conclusion that this industry practice needs no further study at this time. EPA decisions were supported by a Peer Review Panel; however five of the seven members of this panel appear to have conflicts-of-interest and may benefit from EPA's decision not to conduct further investigation or impose regulatory conditions.

Wilson 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

- 2005, EPA Inspector General, Nikki Tinsley, found enough evidence of potential mishandling of the EPA hydraulic fracturing study to review of Wilson's complaints

Congress Acts



- Energy Policy Act of 2005, hydraulic fracturing was exempted from regulation under the Safe Drinking Water Act
- This exemption is commonly known as the "Halliburton loophole" because former Vice President Dick Cheney, ex-CEO of Halliburton, is associated with its creation.
- Current law is that hydraulic fracturing remains unregulated
- June 2009, the FRAC ACT was introduced to both houses of Congress



FRAC Act



- House Bill (H.R. 2766)
- **6/9/2009:** Referred to the House Committee on Energy and Commerce.
- “Fracturing Responsibility and Awareness of Chemicals Act of 2009 - Amends the Safe Drinking Water Act to: (1) repeal the exemption from restrictions on underground injection of fluids near drinking water sources granted to hydraulic fracturing operations under such Act; and (2) require oil and gas companies to disclose the chemicals used in hydraulic fracturing operations.”

FRAC ACT



- **Senate Bill (S. 1215)**
- **6/9/2009:**Sponsor introductory remarks on measure. (CR S6380-6381)
- **6/9/2009:**Read twice and referred to the Committee on Environment and Public Works. (text of measure as introduced: CR S6382)
- **Senator Casey Floor Comments:** "The oil and gas industry uses hydraulic fracturing in 90 percent of wells. The process, which is also called ``fracking," involves injecting tens of thousands of gallons of water mixed with sand and chemical additives deep into the rock under extremely high pressure. The pressure breaks open the rock releasing trapped natural gas, which is then captured. Fracking often occurs near underground sources of drinking water. Unfortunately, a provision included in the 2005 Energy Policy Act exempted hydraulic fracturing from compliance with the Safe Drinking Water Act. The oil and gas industry is the only industry to have this exemption."

House Sponsors



House Sponsors

Rep DeGette, Diana [CO-1]
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Rep Baird, Brian [WA-3] - 7/23/2009
Rep Berman, Howard L. [CA-28] - 10/6/2009
Rep Capps, Lois [CA-23] - 7/8/2009
Rep Carnahan, Russ [MO-3] - 9/25/2009
Rep Clay, Wm. Lacy [MO-1] - 9/15/2009
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Rep Hall, John J. [NY-19] - 9/17/2009
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Rep Murphy, Patrick J. [PA-8] - 6/16/2009
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Rep Sestak, Joe [PA-7] - 9/8/2009
Rep Smith, Adam [WA-9] - 11/17/2009
Rep Stark, Fortney Pete [CA-13] - 10/29/2009
Rep Tonko, Paul D. [NY-21] - 9/10/2009
Rep Wexler, Robert [FL-19] - 9/14/2009
Rep Woolsey, Lynn C. [CA-6] - 6/25/2009

Senate Sponsors



Sen Casey, Robert P., Jr. [PA]

Sen Cardin, Benjamin L. [MD] - 7/24/2009

Sen Feinstein, Dianne [CA] - 9/22/2009

Sen Gillibrand, Kirsten E. [NY] - 10/1/2009

Sen Sanders, Bernard [VT] - 10/19/2009

Sen Schumer, Charles E. [NY] - 6/9/2009

Major Players



- Halliburton
- Oil and Gas Accountability Project
- Ground Water Protection Council

Halliburton



Water-based Gel Systems

- Halliburton's water-based gel systems are enhanced, proprietary fluid systems with characteristics that help achieve enhanced well performance and more flexible service delivery.
- [DeepQuestSM Service](#) Halliburton's DeepQuestSM service is weighted stimulation fluid system that can achieve required bottomhole treating pressure
- [Delta FoamSM Service](#) Delta Foam service reduces fluid requirements, increases control of fluid loss, provides more complete cleanup for wells, enhances fracture conductivity, reduces formation damage and improves proppant transport.
- [Delta Frac[®] Service](#) Halliburton's advanced fluid technology introduces an optimized borate fracturing fluid with high viscosity and as much as 33% less gel concentration.
- [SeaQuest[®] Service](#) Applicable in both shelf and deepwater environments, this service includes a new proprietary fluid system with characteristics that help achieve enhanced well performance
- [SilverStimSM LT Fracturing Service](#) SilverStim LT fracturing service raises the bar for fracturing fluid performance, convenience and value compared to conventional low polymer systems. SilverStim LT fracturing service is based on enhanced fluid technology that takes full advantage of Halliburton's knowledge of guar-based polymer chemistry and crosslinking reactions.
- [SiroccoSM Fracturing Service](#) The latest addition to Halliburton's high-performance low-polymer fracturing systems performs up to 400° F - and it's salt tolerant.
- [Ultra Clean Fracturing Fluid Technology](#) Today, all of Halliburton's most widely used water-based fracturing fluids meet the requirements of the Energy Act of 2005 and the Clean Water Act.
 - The fluids are ultra clean in that they contain no BETX components. BETX stands for benzene, ethylbenzene, toluene and xylene, the aromatic hydrocarbons that are discouraged in injected water. New food-grade carrier fluids for Halliburton's liquid gel concentrates help enable the formulation of these ultra clean fracturing fluids.

Oil and Gas Accountability Project



- The Oil and Gas Accountability Project (OGAP) has reviewed the 2004 EPA study, ***Our Drinking Water at Risk***, and "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."
- 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.

Oil and Gas Accountability Project



OGAP's Recommendations

1. Further study of the effects of hydraulic fracturing on underground sources of drinking water should be conducted.
2. EPA should develop hydraulic fracturing regulations under the Safe Drinking Water Act..
3. Hydraulic fracturing should not be exempted from the Safe Drinking Water Act.
4. Until they can be proven safe, all potentially toxic substances should be eliminated from fracturing fluids.
5. Public accountability mechanisms should be put in place.

Ground Water Protection Council



- GWPC expressed concern that additional federal regulation of hydraulic fracturing "will divert compliance and enforcement resources from higher priority issues that pose significant threats of endangerment to underground sources of drinking water."
- More concerned about water contamination from agricultural practices and groundwater runoff than from hydraulic fracturing.
- STATEMENT OF SCOTT KELL ON BEHALF OF THE GROUND WATER PROTECTION COUNCIL
HOUSE COMMITTEE ON NATURAL RESOURCES SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES WASHINGTON, D.C. JUNE 4, 2009
- First, a study of effective hydraulic fracturing practices should be considered for the purpose of developing Best Management Practices (BMPs) that can be adjusted to fit the specific conditions of individual states.
- Second, the state review process conducted by the national non-profit organization State Review of Oil and Natural Gas Environmental Regulations (STRONGER) is an effective tool in assessing the capability of state programs to manage exploration and production waste and in measuring program improvement over time
- Finally, the GWPC concludes that implementation and advancement of electronic data management systems has enhanced state regulatory capacity and focus
- We believe that state regulations are designed to provide the level of water protection needed to assure water resources remain both viable and available. The states are continuously striving to improve both the regulatory language and the programmatic tools used to implement that language. In this regard, the GWPC will continue to assist states with the purpose of protecting water, our most vital natural resource.

Non-toxic and Less Toxic Solutions



- In off-shore drilling less toxic fracturing fluids are used to meet federal requirements of the Clean Water Act
- Fluids are non-toxic to marine organisms
- Slurry System, developed for use in all types of fracturing and gravel-packing operations in environmentally sensitive regions, features a unique carrier fluid. The new carrier fluid can be easily metered using all existing equipment.
- Just use water as an effective means to fracture

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- <http://www.earthworksaction.org/halliburton.cfm>
- **OUR DRINKING WATER AT RISK What EPA and the Oil And Gas Industry Don't Want Us to Know About Hydraulic Fracturing(<http://bit.ly/8wQQdI>)**