Hydraulic Fracturing

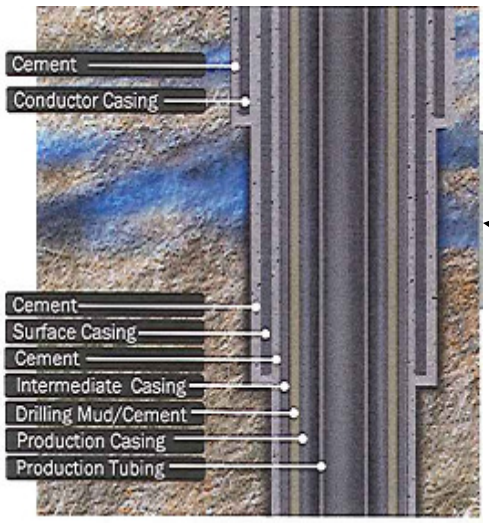
What Is Hydraulic Fracturing? Hydraulic fracturing is a mechanical and chemical well stimulation technology that frees natural gas and oil from the geologic formations that hold them underground. *For shale gas and shale oil formations, it is an essential technology to allow their production.*

Where Is Fracturing Used? Fracturing is used in underground formations that are so dense that they must be cracked open and then held open with a proppant to allow the natural gas or oil to flow. In recent years, fracturing is most frequently associated with the development of shale gas and shale oil. These formations typically lie between one and two miles below the surface.

What Are The Environmental Risks Of Fracturing? Because fracturing occurs so far below the surface and below ground water (ground water is less than 1000 ft below the surface), it poses no risk from the formation. Instead, if there are risks, they would result from the well bore or on the surface.

The first commercial application of hydraulic fracturing as a well treatment technology designed to stimulate the production of oil or gas likely occurred in either the Hugoton field of Kansas in 1946 or near Duncan Oklahoma in 1949. In the ensuing sixty years, the use of hydraulic fracturing has developed into a routine technology that is frequently used in the completion of gas wells, especially those drilled into unconventional reservoirs such as tight shale. — STATE OIL AND NATURAL GAS REGULATIONS DESIGNED TO PROTECT WATER RESOURCES (Ground Water Protection Council, 2009)

Are These Risks Controlled? Risks to ground water are effectively controlled and have been for decades prior to the use of hydraulic fracturing. Regulations require that, as well bores pass through ground water, multiple steel pipes (casing) are placed between the well bore and the water formation. These are cemented in place to assure that fluids from the well bore — oil, produced water, fracturing fluids — cannot move into ground water and that ground water cannot move into the well. When the fracturing fluids reach the surface, they are regulated to manage the risk that they might seep into ground water and to assure their proper disposal.

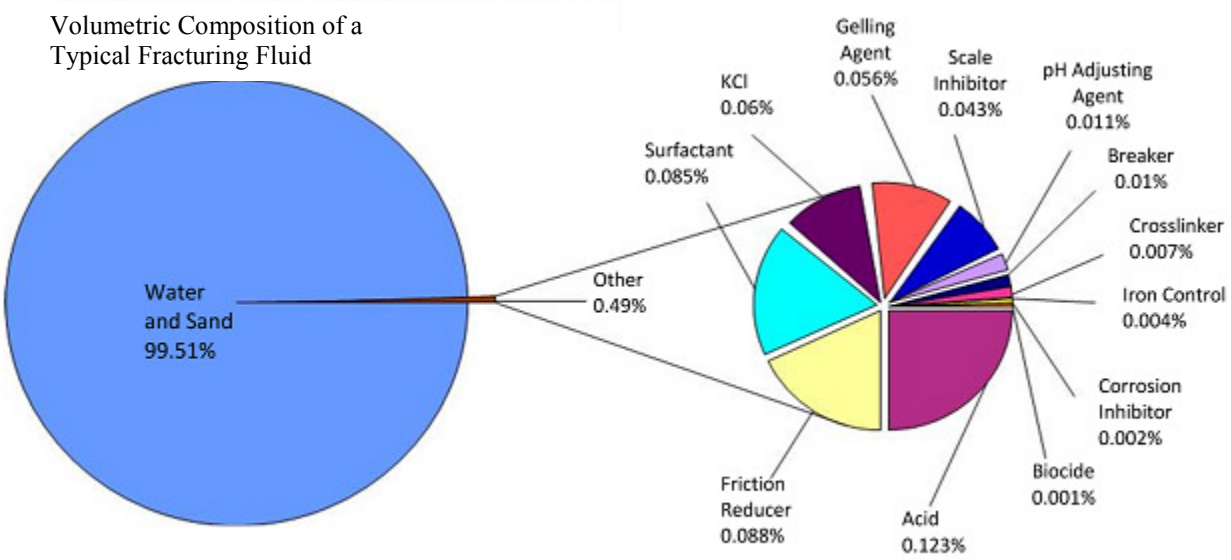


The combination of horizontal drilling and advanced hydraulic fracturing is the key to the development of America's shale gas resources — opening resources that can add 100 years to America's supply.

Who Regulates Fracturing? States are responsible for setting well construction standards — the principle regulatory protection. States have used this authority for over 100 years. The federal Clean Water Act regulates discharges into rivers, primarily through delegating its permitting authority to states. The federal Safe Drinking Water Act regulates any produced water and fracturing fluids that are disposed of in Class II Underground Injection Control wells, again primarily giving states primacy to regulate these operations. States regulate the management of drilling fluids and produced waters on the surface of natural gas and oil well operations.

Isn't Fracturing Exempt From The Safe Drinking Water Act? The Safe Drinking Water Act protects underground water resources from waste disposal. Waste fracturing fluids disposed in underground wells are regulated under the Safe Drinking Water Act. *However, the Safe Drinking Water Act has never regulated the fracturing process during well stimulation; there are no federal regulations that have been promulgated. In 2005, Congress put the fracturing process under the scope of the Safe Drinking Water Act if diesel fuel is used during fracturing.*

Aren't There Chemicals That Could Contaminate Drinking Water? There are chemicals needed for the fracturing process. These chemicals are a small fraction of the total fracturing fluid. They are controlled by the same regulatory measures that prevent the fluids from moving into ground water.



Source: ALL Consulting based on data from a fracture operation in the Fayetteville

What Are These Chemicals Used For? The basic fracturing process uses water to hydraulically break into the formation and then push a proppant into the fractures. Chemicals are needed for several purposes. The water must be treated to prevent carrying bacteria or algae into the well where it could grow. The well bore must be conditioned to allow the mixture to flow and not corrode the steel casing. The proppant must be suspended in water for the one to two mile vertical drop to the bottom of the well and then the half mile or longer horizontal leg. Once the proppant is pushed into the fracture, the properties of the mixture must change to release the proppant and allow the water to flow out of the fracture.

How Can We Find Out What They Are? Information on the chemicals used in fracturing is available at production facilities and many companies post it on websites. More significantly, the Interstate Oil and Gas Compact Commission and the Ground Water Protection Council — organizations of state regulators — announced the development of a national registry of chemicals used in fracturing operations.

How Do We Know Fracturing Is Effectively Regulated? The risks of fracturing have been studied several times. For example, the EPA released a study in 2004 concluding that fracturing was safely regulated. The Ground Water Protection Council analyzed the effectiveness of ground water protection regulations and released that study in 2009; it reached the same conclusion. EPA is conducting another study that it plans to conclude in 2012.

Are There Other Benefits Of Hydraulic Fracturing? Fracturing allows for fewer wells to produce more natural gas or oil. Modern technology allows multiple wells (6 to 8) on the same site producing the amount of natural gas that would have required 16 or more separate well sites in the past. The average well site is 30 percent of its size in 1970; yet it can access up to 60 times more below-ground area.

Will The Technology Improve? Companies are developing the capability to clean and reuse water, limiting the amount of fluid that must be managed. Fracturing companies are revising the chemicals that are being used to make them "greener" and more efficient.