



What is hydraulic fracturing?

Hydraulic fracturing is the process of creating tiny fractures in dense rock formations, such as shales, in order to extract natural gas and oil. In hydraulic fracturing, or “fracking,” as it’s commonly known, water, sand and a small amount of chemical additives are pumped into the wellbore to create fissures. These fissures then allow natural gas and oil to flow through the wellbore to the surface.

Why is hydraulic fracturing important?

The extraction of natural gas and oil from tight formations, such as shales, has transformed the energy picture in the U.S. and around the world because shales are the “source rocks” of hydrocarbons. The fact is that natural gas and oil cannot be extracted from shales without hydraulic fracturing. It has been predicted that hydraulic fracturing will account for nearly 70 percent of natural gas development in the future due to its potential to free up massive sources of clean-burning natural gas, thus greatly enhancing domestic energy supplies.

When was hydraulic fracturing first used?

The first use of hydraulic fracturing to extract natural gas took place in the Hugoton gas field in Grant County, Kansas, in 1947. This small-scale, experimental effort was made to bypass pore space near the wellbore in an oil-bearing limestone rock formation that was clogged by drilling mud. The first commercial operations were performed two years later in Texas and Oklahoma. To date, hydraulic fracturing has been used in more than 1 million natural gas and oil wells.

How does hydraulic fracturing work?

Hydraulic fracturing is a well completion technique, meaning it is used after a well has already been drilled. Once the well has been constructed and a steel casing inserted into the wellbore and cemented into place, a mixture of water, sand and a small amount of chemical additives are pumped at high pressure through holes in the steel casing into the rock formation. Fracture fluid is usually 99.5% water and sand and 0.5% chemical additives. The exact composition of the fracture fluid used in a particular well in Texas is listed on fracfocus.org.

The pressure builds to a level that is greater than the strength of the rock, creating fractures that are held open with the sand particles from the injected mixture. The gas is then free to flow up the wellbore and to the surface. Once the fracturing process is completed, the fracturing mixture comes back to the surface. This mixture, referred to as flowback water or produced water, is then recycled or injected into deep saltwater disposal wells.



Is hydraulic fracturing regulated?

A combination of federal, state and local laws regulate the processes involved in hydraulic fracturing. At the federal level, the EPA Office of Water regulates the disposal of flowback water, but most regulation of hydraulic fracturing occurs at the state level. Barnett Shale operations are regulated by the Railroad Commission of Texas (RRC), which governs the drilling of all natural gas and oil wells in Texas. Specifically, the RRC issues permits for oil and gas wells and monitors well drilling, completion, production and plugging operations.

In order to protect groundwater, the RRC requires that natural gas and oil wells be constructed using several layers of steel casing and cement. The first layer is the surface casing, which is a steel pipe encased in cement, traveling from the surface to below the deepest groundwater level. Surface casing acts as a protective sleeve through which deeper drilling is performed. The second layer is the production casing, consisting of a pipe that is cemented permanently in place in the wellbore to the well's total depth.

Once hydraulic fracturing is completed, operators are required to provide detailed information about the drilling process and production results, including details about the makeup of the fracturing fluid. The makeup of the hydraulic fracturing fluid is publically available on the website <http://www.fracfocus.org>.