

AS A MATTER OF FACT... HYDRAULIC FRACTURING

OHIO OIL & GAS ENERGY EDUCATION PROGRAM



It's time to set the record straight and present some of the facts and history of Hydraulic Fracturing. Hydraulic Fracturing, also known as "fracing" or "fracking" is a technical process used to stimulate geologic formations, thereby increasing oil and gas production.

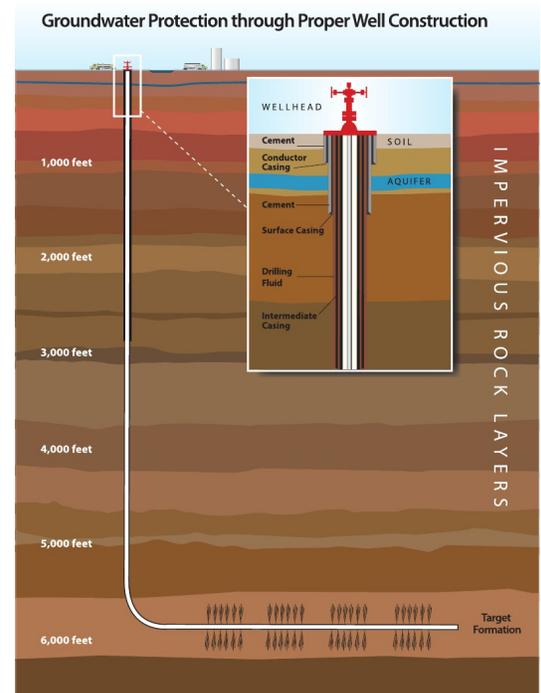
WHY FRAC?

Crude oil and natural gas is found in more than 30 geologic formations under Ohio. These formations range from porous sandstone to dense shale. In order to increase the flow of both crude oil and natural gas from these formations, producers often stimulate the geological formation. Many techniques have been used over the years to achieve this goal, but the most widely used and most efficient is hydraulic fracturing.

WHAT IS HYDRAULIC FRACTURING?

Hydraulic fracturing is a process where a mixture of water, sand and a few chemicals are pumped at high pressure into a formation in order to create small fractures or fissures in the rock. The sand is necessary to hold these small fractures open, allowing the crude oil and natural gas to flow into the wellbore more freely. Chemicals are needed for a variety of uses including: eliminating bacteria; allowing the water to flow more easily; increasing the effectiveness of additives; preventing corrosion of the wellbore and other uses. Many of these additives are found in products used every day, such as ice cream, table salt or laundry detergent. Large pumps push the fluid through multiple layers of steel and cement until it reaches the target geological formation. The water exits the wellbore through holes called perforations and comes in contact with the rock.

A well may be hydraulically fractured in stages to ensure enough pressure is created and a specific area is stimulated. In using multiple stages, technicians are able to stimulate the shale more economically and efficiently. Specially designed plugs separate each stage of operations, which occurs thousands of feet below the surface and groundwater resources. The hydraulic fracturing fluid will remain in the formation until the plugs are removed and the fluid, crude oil and natural gas flows back to the surface. The composition of the rock determines how much hydraulic fracturing fluid remains in the formation; the percentage amount that flows back to the surface varies greatly based on the local geologic conditions.



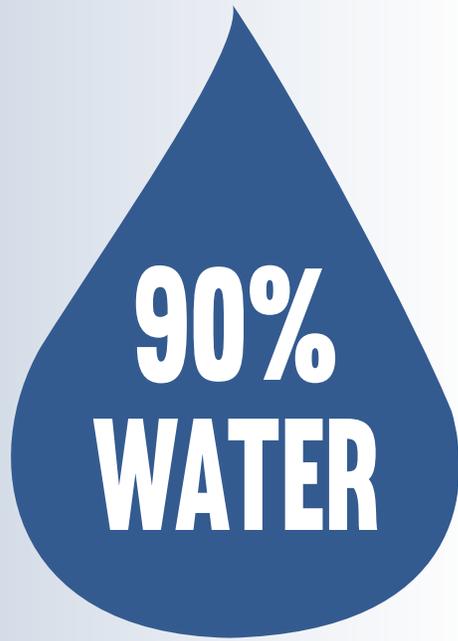
RIGHT NAME, WRONG USE

Fracing is only part of the overall process of developing oil and gas. It lasts from two hours to a few days depending on the type and depth of a well. It's improper to label all oil and gas activity, workers or companies as "fracking" when only a few companies and expert engineers actually perform the highly specialized and highly technical work.

OLD IDEAS, NEW USES

Hydraulic fracturing was first used as a well stimulation technique in 1949. Ohio's first well was hydraulically fractured in 1951. Since then, it has been estimated that more than 80,000 wells in Ohio have been stimulated by fracing.

HYDRAULIC FRACTURING FLUID



9.5% SAND



0.5% ADDITIVES*

*Additives vary by recipe

COMPOUND	PURPOSE	COMMON APPLICATION
Acids	Helps dissolve minerals and initiate fissures in rock (pre-fracturing)	Swimming pool cleaner
Sodium Chloride	Allows a delayed breakdown of the gel polymer chains	Table salt
Polyacrylamide	Minimizes the friction between fluid and pipe	Water treatment, soil conditioner
Ethylene Glycol	Prevents scale deposits in the pipe	Automotive antifreeze, deicing agent, household cleaners
Borate Salts	Maintains fluid viscosity as temperature increases	Laundry detergent, hand soap, cosmetics
Sodium/Potassium Carbonate	Maintains effectiveness of other components, such as crosslinkers	Washing soda, detergent, soap, water softener, glass, ceramics
Glutaraldehyde	Eliminates bacteria in the water	Disinfectant, sterilization of medical and dental equipment
Guar Gum	Thickens the water to suspend the sand	Cosmetics, baked goods, ice cream, toothpaste, sauces
Citric Acid	Prevents precipitation of metal oxides	Food additive; food and beverages; lemon juice
Isopropanol	Used to increase the viscosity of the fracture fluid	Glass cleaner, antiperspirant, hair coloring

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