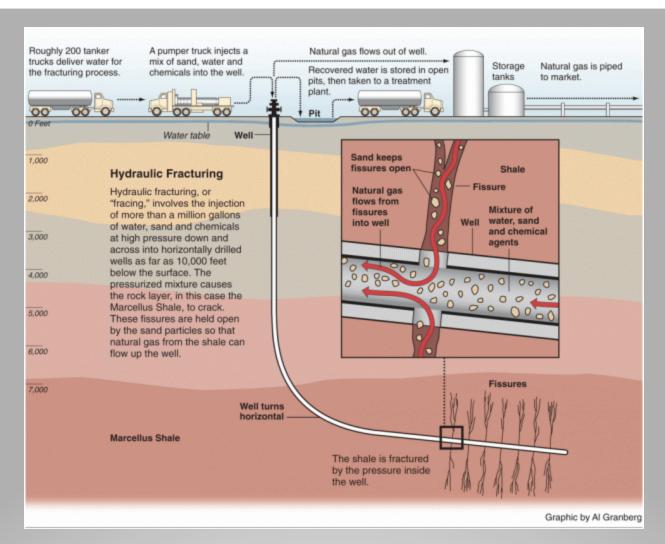
# What the Frack?

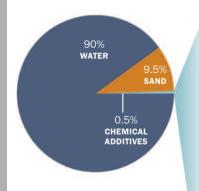
An examination of hydraulic fracturing and its environmental impact

Environmental Toxins CU Boulder Jun 2013



### What is it?

#### Solvents: Benzene, 2-BE



Compound	Purpose	Common application
Acids	Helps dissolve minerals and initiate fissure in rock (pre-fracture)	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 anti-freeze, 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	Thickener in 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

Source: DOE, GWPC: Modern Gas Shale Development in the United States: A Primer (2009)

# Fluid composition

- Seismic activity
- Water use
- Water contamination
  - Groundwater
  - Surface water
- Sediment runoff
- Exempt from Safe Drinking Water Act

#### Concerns

- "CleanStim" by Halliburton
- Food additives



Governor Hickenlooper

- Tracers in drinking water
- Seismic tests
- Better regulations
- Long-term monitoring



- http://www.energyfromshale.org/ hydraulic-fracturing/how-hydraulicfracturing-works
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### Sources