LET’S TALK ABOUT
Hydraulic Fracturing Technology
A few days is all it takes to unlock decades of energy production from an oil or natural gas well. How the process happens goes back to the days of Bob Hope, Bing Crosby and Humphrey Bogart. We’re talking about hydraulic fracturing – known as fracking.

**THE HISTORY OF FRACKING**

- **Late 1940s**: Hydraulic fracturing is used for the first time to extract natural gas. Commercial use of the modern-patented “Hydrafrac” process begins.
- **Mid 1950s**: About 3,000 wells a month are being hydraulically fractured.
- **Early 1990s**: Horizontal drilling techniques are successfully combined with hydraulic fracturing, making it possible to access vast supplies of oil and natural gas that were once thought to be unreachable.
- **2003**: Fracking’s new golden age begins, as oil and gas producers start to explore the nation’s massive shale formations in earnest.
- **Today**: Since the late 1940s, hydraulic fracturing has been used in more than 1 million U.S. wells to produce more than 600 trillion cubic feet of natural gas and 7 billion barrels of oil.
Building a Well

Fracking usually takes about 2-3 days in the 2-3 month development process for a brand new well, which could produce oil or natural gas for the next 20-30 years.

**Drilling**

After careful geologic mapping, a drilling rig drives a drill bit often a mile or deeper to reach a target zone where oil or gas exists, then may push it another mile or more horizontally across the target zone. Once a well is drilled, layers of steel pipe – called casing – are cemented into place around the wellbore. This seals off the path where oil or gas will flow up to the surface, separating it from shallow fresh water zones.

**Fracking**

Engineers use heavy-duty, high-horsepower pumps to stimulate (jump start) oil and gas production by injecting a mixture of water, sand and additives under high pressure down the wellbore and then through small perforations in the deep horizontal lateral. The pressure of the fluid creates tiny openings (fractures) in the rock where oil or natural gas is trapped. The sand props open the fractures, allowing oil or gas to flow up the wellbore.

**Producing**

A wellhead and some tanks are about all that’s left after the drilling rig and the frack pumps are gone. Trucks or pipelines collect oil from a well site. Pipelines gather natural gas, which is often transported to a processing plant where valuable liquids such as propane or ethane are extracted from the raw natural gas.
How are Air and Water Protected?

- **Government Requirements.** Oil & gas operations are regulated under 8 federal environmental laws and numerous state laws and local ordinances. For example, the EPA develops and implements regulations under the Clean Air Act to govern emissions from hydraulic fracturing pumps and engines.

- **Industry Standards.** The American Petroleum Institute (API) is the world’s leading standard-developing organization for oil and gas. API has outlined more than 100 best practices for hydraulic fracturing. API’s process is accredited by the American National Standards Institute (ANSI) – the same institute that accredits U.S. national laboratories for science and technology.

- **Transparent Reporting.** Hundreds of companies have registered tens of thousands of oil and natural gas wells on a website called FracFocus.org. This is where you can see the content of the fluids that fractured these wells. The service is managed by the Ground Water Protection Council and the Interstate Oil & Gas Compact Commission. WPX was one of the first companies to register wells.

- **Geology and Physics.** Normally, 4,000-8,000 feet (up to 1.5 miles) of solid impermeable rock separate shallow fresh water zones that are relatively close to the surface from the deeper depths where fracking happens – sometimes miles down into the earth.

- **Monitoring and Sampling.** It’s possible to see what’s happening underground. Tracking technology called microseismic analysis shows where fractures went and how much they opened the rock layer where oil and gas are trapped. Where permissible, WPX also takes groundwater samples from the area surrounding a well for analysis before drilling and after fracking.

- **Scientific and Safety Expertise.** WPX employs environmental, health and safety specialists. Our environmental specialists have degrees and backgrounds in fields ranging from biology, industrial safety, engineering and geology to public administration and environmental science. We work with federal agencies such as the Environmental Protection Agency, Bureau of Land Management and the U.S. Fish & Wildlife Service, as well as state agencies and local jurisdictions.
The Future of Fracking

Fracking is making America more energy secure. According to the Energy Information Administration, the U.S. now produces more natural gas than any country on Earth. The U.S. also is racing past Saudi Arabia and Russia to become the world’s top oil producer. Here’s how fracking is helping here at home:

**Electric Power**
Compared to other electricity sources like coal, natural gas is usually cheaper, uses less water, uses less land and emits a fraction of the emissions. Since 1992, rising natural gas use contributed to a 70 percent decline in sulfur dioxide and smog forming nitrogen-oxide emissions.

**Petrochemicals and Agriculture**
Dow, DuPont and others use the unique chemical properties of natural gas to make plastics, fertilizers and fabrics. They are relocating some foreign factories back to the U.S. to be closer to cheaper raw materials and to take advantage of our new global competitive advantage in energy.

**Transportation**
Compressed Natural Gas (CNG) vehicles are a small but growing market. Fleet vehicles such as city buses are making the switch to natural gas, too. Many natural gas refueling stations are being built across the country.

**Federal, State and Local Governments**
The oil and gas industry is a significant revenue source for government services. We deduct standard business costs from our taxes but receive no government subsidies. Oil and gas companies pay about $30 billion annually to the federal government in bonus payments, rent, royalties and taxes – that’s $85 million every day.

**The U.S. Economy**
The oil and gas industry directly and indirectly supports more than 9 million jobs. Our industry typically invests more than $500 billion annually in the economy through capital spending, wages and dividends.
WPX’s position on...

**Regulation:** We believe that states should retain the lead in regulating oil and gas operations, which is an appropriate balance between a “one-size-fits-all” approach by the federal government or thousands of overlapping ordinances by local municipalities.

**Water Management:** We support the re-use and recycling of water used in oil and gas operations where possible. In fact, we have an economic incentive to recycle the water we use to frack wells. In western Colorado, we recycle nearly 100 percent of the water in our operations. We have reused some of it for as many as five years to frack new wells. This lessens our need for fresh water and reduces our costs.

**Public Disclosure:** We continue to publicly disclose our fracking fluids on FracFocus.org. The website allows for a centralized reporting database with the flexibility to tailor compliance needs by individual states. More than 99 percent of frack fluid is a mixture of sand and water. It also contains small amounts of chemical additives like guar gum (used in ice cream), isopropanol (used in deodorant) and sodium carbonate (used in detergent). The additives help carry the water and sand all the way down the wellbore.

**Compliance:** WPX is committed to protecting clean air, clean water and the communities where we produce oil and natural gas. Compliance is part of our company values. We embrace the need to follow the rules that govern our business and to communicate openly with regulators and policymakers.