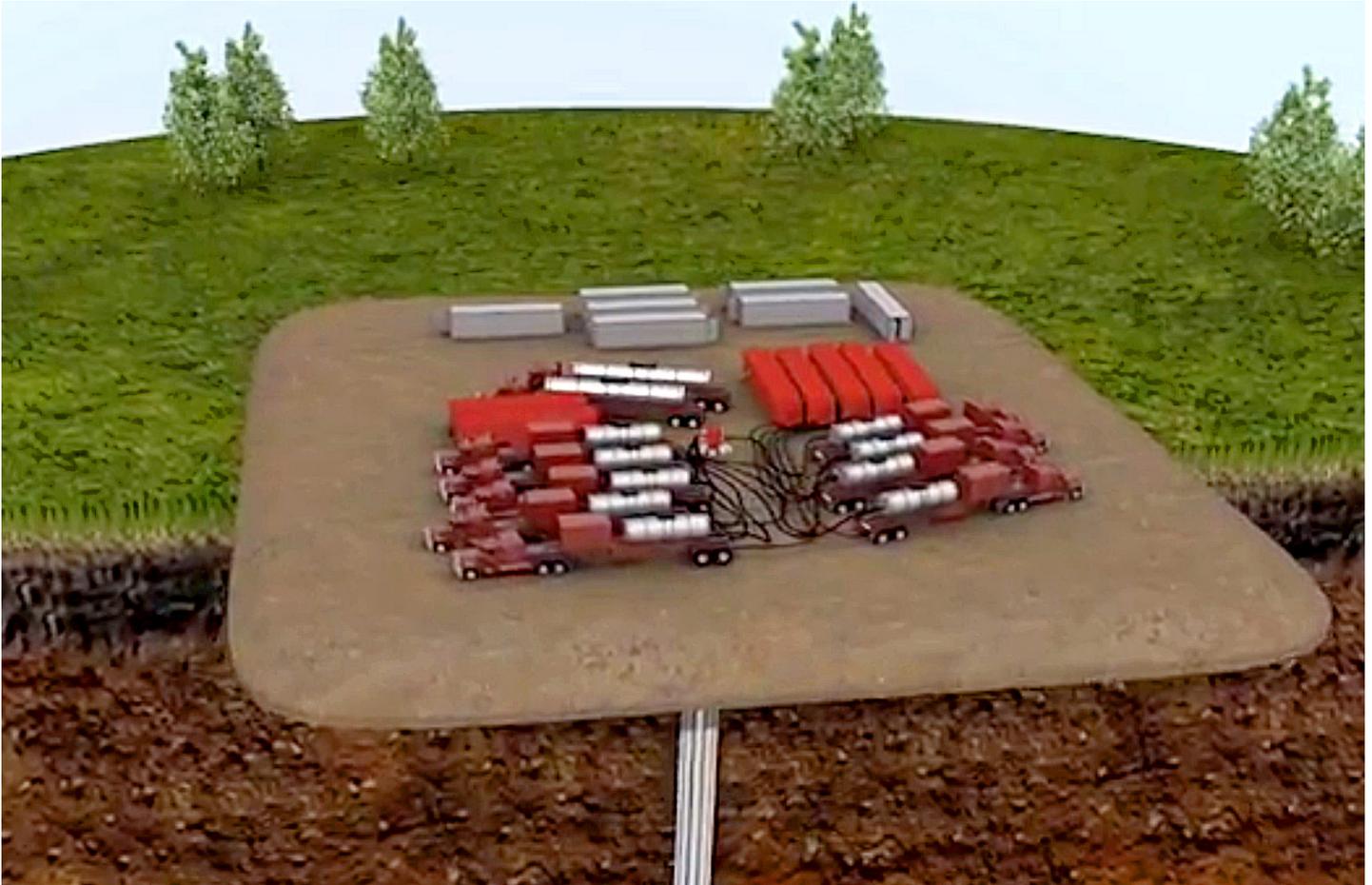


# Hydraulic Fracturing



The following information provides a closer look at hydraulic fracturing, or fracking, and how it has been safely used by the oil and gas industry for more than 60 years.

## **WHY IS FRACKING SO IMPORTANT TO THE OIL AND GAS INDUSTRY?**

Fracking is the process of creating small cracks in geologic formations located thousands of feet beneath the surface to allow oil or natural gas to flow into the well and up to the surface. This process is used in the majority of natural gas wells and many oil wells drilled worldwide today. Importantly, without horizontal drilling and fracking, the vast oil and natural gas resources found in deep shale rock formations would be unrecoverable.

## **HOW DOES FRACKING WORK?**

Shale reservoirs consist of oil and/or natural gas trapped within microscopic pores in the rock layers. During the fracking process, a liquid mixture, which is generally made up of 90 percent water, 9.5 percent sand and 0.5 percent chemicals such as gels and surfactants, many of which are found in everyday products such as dish soap, is pumped into the shale formation under high pressure to create small fractures allowing the oil and natural gas to flow more easily into the well. The sand remains underground and prevents the fractures from closing, allowing the oil and natural gas to continue flowing into the well.



Shale reservoirs are generally between 6,000 and 15,000 feet below the earth's surface, while underground water aquifers are typically less than 500 feet below the earth's surface. The fluid used in the hydraulic fracturing process is contained at the depth of the reservoir by the same rock layers that contain the oil and natural gas and prevent it from leaking to the surface. In addition, any fracking fluids, along with oil and natural gas that flow back to the surface for processing, do so through layers of steel pipe and cement which prevent leakage of oil and natural gas or other materials into shallow formations.

### **BUT AREN'T YOU DRILLING THROUGH THE WATER TABLE?**

Yes, that's true. The fundamental way to protect drinking water is through managing the well's integrity. It is important to realize that the well is completely sealed

off from the aquifer with two or more steel and cement casings or liners, which are monitored for integrity prior to, during and after the fracture stimulation. These casings are pressure tested before a fracking job to ensure they do not leak, and they are monitored for pressure buildup during the process.

Marathon Oil has a long-standing commitment to protecting the environment. The facts are that hydraulic fracturing is a safe procedure that has been used by the oil and gas industry for more than 60 years on more than 1 million wells with great success and for the benefit of energy consumers.

To view a brief video that illustrates the hydraulic fracturing process, please visit Marathon Oil's YouTube site at <http://www.youtube.com/watch?v=VY34PQuiwOQ>