THE FACTS ABOUT HYDRAULIC FRACTURING

Production of the gas deposits will help lower Ohio's natural gas costs to consumers and grow our economy

WHAT IS HYDRAULIC FRACTURING?

Hydraulic fracturing is an engineered, extensively monitored process, in which fluids are pumped at a pressure sufficient to create fractures in rock that are connected to a wellbore. When used by the oil and gas industry, hydraulic fracturing allows crude oil and natural gas trapped deep in the earth to be produced for many purposes including heating our homes and businesses, electricity generation and as fuel for most cars.

THE FACTS ABOUT HYDRAULIC FRACTURING

- Hydraulic fracturing has been used safely in more than 1 million U.S. wells.
- The first commercial well was hydraulically fractured more than 65 years ago.
- Hydraulic fracturing has been used for more than 60 years in Ohio to stimulate oil and gas production.
- Since its inception in 1952 in Ohio, more than 80,000 Ohio wells have been stimulated by hydraulic fracturing.
- The Ohio Department of Natural Resources (ODNR) Division of Oil and Gas Resources Management has conducted water well investigations in response to citizen complaints since 1983– none of the investigations revealed groundwater quality problems caused by hydraulic fracturing.

HOW DEEP IS A SHALE GAS WELL?

The true vertical depth of horizontal wells completed in the Marcellus Shale or Utica/Point Pleasant ranges from 5,000 to more than 10,000 feet (typically more than a mile below freshwater aquifers).

HOW AND WHY IS SHALE HYDRAULICALLY FRACTURED?

Shale is a type of sedimentary rock that typically has very low permeability. As a result, fluids such as crude oil, natural gas, or water move very slowly through shale. If shale is not stimulated by hydraulic fracturing, it will not yield crude oil or natural gas in commercial quantities. Therefore, after a well is drilled and multiple protective barriers consisting of cemented steel casing are in place, a mixture that is typically 99.5 percent water/ sand, and 0.5%chemical additives, is pumped at a pressure sufficient to fracture the shale. The sand acts as a proppant to keep the fractures in the shale open after pressure is released. The propped fractures provide conduits for crude oil and natural gas to flow to the cased wellbore.

HOW DO HORIZONTAL SHALE WELLS DIFFER FROM TRADITIONAL VERTICAL WELLS?

Wells have been drilled vertically into gas bearing shale formations in the United States since 1821. While exploring for natural gas in the Barnett Shale of Texas, drillers discovered that they could combine two time-tested technologies: horizontal drilling (which began in the 1930s) with hydraulic fracturing to recover vast quantities of natural gas from the hydrocarbon-rich shale deposits. Horizontal drilling allows significantly greater contact between the wellbore and the target formation. The horizontal portion of a wellbore typically penetrates over a mile of the target natural gas reservoir, while a vertical wellbore would only be in contact with tens to hundreds of feet of the reservoir.

HOW ARE HYDRAULIC FRACTURING STIMULATIONS USED IN HORIZONTAL SHALE GAS WELLS DIFFERENT THAN STIMULATIONS USED IN TRADITIONAL VERTICAL WELLS?

Conceptually, the hydraulic fracturing stimulations used in traditional, vertical wells and horizontal, shale gas wells are very similar. Vertical wells are often stimulated in a single stage. Horizontal wells are often stimulated in multiple stages, across the horizontal axis of the well, allowing for a greater amount of the targeted resource to be accessed through fewer bore holes. Though the combined scale of horizontal well completions is larger than a vertical well because there are multiple stages, the methods use the same technology.

CAN FRACTURES CREATED BY THE HYDRAULIC FRACTURING OF SHALE WELLS EXTEND UPWARD INTO FRESHWATER?

There are a variety of reasons that this is not possible. The bedrock between the fractured shale reservoir and the surface is very thick (5,000-10,000 feet). This thick intervening zone contains multiple low-permeability confining zones and permeable "bleed-off zones" making it impossible to create fractures that extend thousands of feet upward into freshwater aquifers or to the ground surface. The variable nature and thickness of the layers of rock create a natural barrier to vertical fracture propagation. Furthermore, hydraulic fracturing at depths below 1,200 feet creates fractures that are primarily vertical. At shallow depths of less than 1,200 feet, hydraulic fracturing creates a horizontal fracture in rock. Therefore, it is not possible to create fractures that extend vertically from great depths to the shallow subsurface.

HOW MUCH NATURAL GAS IS CURRENTLY BEING PRODUCED IN OHIO?

Over 511 billion cubic feet of natural gas was produced in Ohio in 2014, an increase of over 344 billion cubic feet from 2013 gas production.

OHIO DEPARTMENT OF NATURAL RESOURCES
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