

GROUND WATER IS PROTECTED



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The industry drills and hydraulically fractures (commonly known as “fracking”) thousands of oil and natural gas wells each year without incident. The combination of proven engineering technologies and industry risk management practices and standards, coupled with a complex web of federal and state regulatory regimes, ensure that operations are performed and managed effectively and that groundwater is protected.

BACKGROUND:

REGULATORY

Robust state laws are designed to effectively ensure the protection of groundwater. These laws and regulations address and effectively manage the potential environmental vulnerabilities and potential impacts. State regulatory programs have protocols requiring operators to identify the fresh water zones, provide for casing and cementing (zonal isolation) of those zones and well construction requirements that provide assurance that the targeted production zones will not impact shallow potable water supplies.

There is a long and successful history of state oversight of oil and gas activities. States are best positioned to tailor laws precisely for the local geology and hydrology, while also addressing and preventing surface impacts. State regulators continually review their regulations through collaborative efforts with industry and through public-private partnerships such as FracFocus, the State Review of Oil and Natural Gas Environmental Regulations (STRONGER), and the State Oil and Gas Regulatory Exchange.^{1, 2, 3}

TECHNOLOGY

To protect groundwater in energy production zones, oil and natural gas wells are designed with multiple layers of steel casing and cement to create multi-layered, solid barriers between energy development

and groundwater resources. While steel casing serves as a primary shield to protect groundwater, specialized cement is used to create a pressure-tested seal between each layer of casing.

In between each layer of steel casing is a space that must be filled to hold the casing in place and create a solid, sealed barrier between the well and the groundwater. Cement, developed in laboratories for the unique conditions found in oil and gas development, is used as the glue to seal these layers of the casing together. During well construction, cement is pumped down the interior of the casing, forcing the cement up from the bottom of the well so that it completely fills the space between the outside walls of the drilled hole and the casing inside of it. The average unconventional well – used to produce natural gas and oil from shale – uses 3 million pounds of mutually reinforcing steel and cement.

State regulations dictate the depth by which casing is “set” to protect groundwater.⁴ Before fracking begins, drillers use multiple, high-tech tools, including measuring the travel times of sound waves, to verify that cement has created a solid bond with the casing. These tools are used to verify the strength of seals in the well before any well stimulation or energy production begins.

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GEOLOGY

While the design and construction of oil and natural gas wells is critical to safeguarding groundwater resources, the depth of wells also matters. Groundwater is typically found close to the surface. Energy-bearing zones of rock, like shale formations, are often a mile or more below ground. The energy production zone can be separated from groundwater by thousands of feet of impermeable cap rock including siltstones, mudstones and shales. The impermeability of these thick rock barriers prevents hydraulic fracturing fluids, oil and/ or natural gas from moving through them.

REFERENCES:

1. FracFocus is web-based voluntary chemical disclosure registry led by the Ground Water Protection Council (GWPC) and Interstate Oil and Gas Compact Commission (IOGCC). Launched in April of 2011, FracFocus, now in its fourth generation, allows operators to post data describing the chemical composition of hydraulic fracturing fluids at one web site, using a simple, informative, and consistent format. The website provides information on a well specific basis to the public and serves as the reporting mechanism for 27 states. (<http://www.fracfocus.org>)

2. From 2013 to 2016, according to the GWPC, state agencies finalized over 100 groundwater-related rulemakings affecting upstream oil and gas operations. (https://www.gwpc.org/sites/gwpc/uploads/documents/publications/State-Regulations-Report-2017_Final.pdf)

3. The State Oil and Gas Exchange facilitates multi-state collaboration and innovative regulatory solutions for oil and natural gas producing states (<https://www.stateoilandgasregulatoryexchange.com>)

4. ANSI/API Bulletin 100-1, Well Integrity and Fracture Containment (https://www.api.org/-/media/Files/Policy/Exploration/100-1_e1.pdf)



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