

Water Wells in Proximity to Natural Gas or Oil Development

What You Need to Know

As oil and gas development increases around the country, NGWA reminds water well owners about the importance of testing their water wells prior to oil and gas well installation. This provides a baseline for comparison after oil and gas production.

What is hydraulic fracturing?

Hydraulic fracturing has captured headlines in areas where gas development is occurring. Hydraulic fracturing is a petroleum-industry process in which fluids, commonly made up of water and a small percentage of chemical additives, are combined with sand and are pumped at very high pressure into a geologic formation holding gas. The resulting fractures allow the release of natural gas, which can be collected.

Currently, the U.S. EPA is studying whether hydraulic fracturing adversely affects groundwater quality as the practice expands rapidly into other types of geologic formations, particularly shales. Preliminary results from this study are expected in late 2012.

Suggested options for water well owners

If you own a water well in an area where hydraulic fracturing activity will soon take place, NGWA suggests some special water testing procedures. You can learn more about these by going to www.NGWA.org, clicking on the “Media Center” tab, then on “Information briefs.”

For some water well owners, the cost of water testing may be an issue. In the rare cases where regulatory or legal action is necessary, a comprehensive analysis is often better. However, water testing—especially for organic chemicals or chemicals in minute amounts—can be expensive.

NGWA has compiled a list of constituents to test in areas of oil or gas development. It includes the major ions in groundwater which consist of calcium, magnesium, sodium, potassium, alkalinity (bicarbonate and carbonate), sulfate, and chloride. These usually make up more than 90% of all dissolved constituents in groundwater, and are used to define a water “type”—similar to labeling blood types. Analyzing this suite of ions both pre- and post-drilling allows for quantitative changes in water quality to be determined.

Following are steps well owners can take before and after oil and gas production takes place:

Step 1. Prior to oil and gas operations, have a professional, such as a qualified water well system professional, test your groundwater quality for appropriate constituents to establish a water quality baseline for post-fracturing or drilling analysis. You can find a professional by going to www.wellowner.org, then click on the “Finding a Contractor” tab.

When seeking a qualified drinking water testing lab, check with your state or local health department, or go to NGWA’s Web site www.wellowner.org and click on “Water Quality” on the menu and then “Water Testing” beneath. If local labs do not test for substances you wish to check, there are national water testing labs that may be able to help, such as the National Testing Labs (www.ntllabs.com) and Underwriters Laboratories (www.ul.com).

Step 2. In the absence of a list developed specifically for your area by a credible source, the following list from NGWA includes basic constituents that should be considered for water quality analysis prior to oil and gas operations.

Major Ions:

alkalinity, calcium, chloride, magnesium, potassium, sodium, sulfate

Minor and Trace Elements:

arsenic, barium, boron, bromide, chromium, iron, manganese, selenium, uranium

Water Quality Parameters:

pH, specific conductance, total dissolved solids (TDS), turbidity

Organic Chemicals:

benzene, toluene, ethyl benzene, xylene (BTEX); diesel range organics (DRO); dissolved methane; gasoline range organics (GRO); total petroleum hydrocarbons or oil and grease (HEM)

Examples of other localized water quality testing recommendations can be found at wri.eas.cornell.edu/gas_wells_5_1489175471.pdf.

Step 3. Once hydraulic fracturing has taken place, water well owners should consider retesting their water quality against the baseline results and against any additional fracturing fluid chemicals that have been voluntarily disclosed. The Ground Water Protection Council (GWPC) Frac Focus Web site (fracfocus.org) lists chemicals used in fracturing fluids voluntarily disclosed by some companies.

Post-drilling water quality testing should be done within six months of completion of drilling and hydraulic fracturing. Continued sampling should be done at least annually as long as practicable. Subsequent screening using the pH and specific conductance, or total dissolved solids measurements, can be less expensive ways to see if changes have occurred. An increase in the concentration or occurrence of these constituents could indicate that further, more sophisticated water quality testing should be done.

What to do if water quality changes

If there is a change in water quality, the well owner should discuss it with local or state health or environmental protection authorities.

Most constituents in water can be treated by in-home systems. When considering a water treatment device, make sure its specifications match the substances and concentrations you wish to treat. You may want to check with the Water Quality Association (www.wqa.org) and NSF International (www.nsf.org) to determine whether the technology being considered has been performance tested.

Where can I get more information?

For more information on your private water well, contact your local contractor. Also, visit the Web site of the National Ground Water Association, www.NGWA.org, and its site just for well owners, www.wellowner.org.