

Water Quality and HYDRAULIC FRACTURING

A publication of the
Guadalupe-Blanco River Authority

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What is hydraulic fracturing?

Are you concerned about how hydraulic fracturing or “fracking” may affect the water quality of your water wells? If so, it might help you to know that such issues are being considered on the national, state, and local levels.

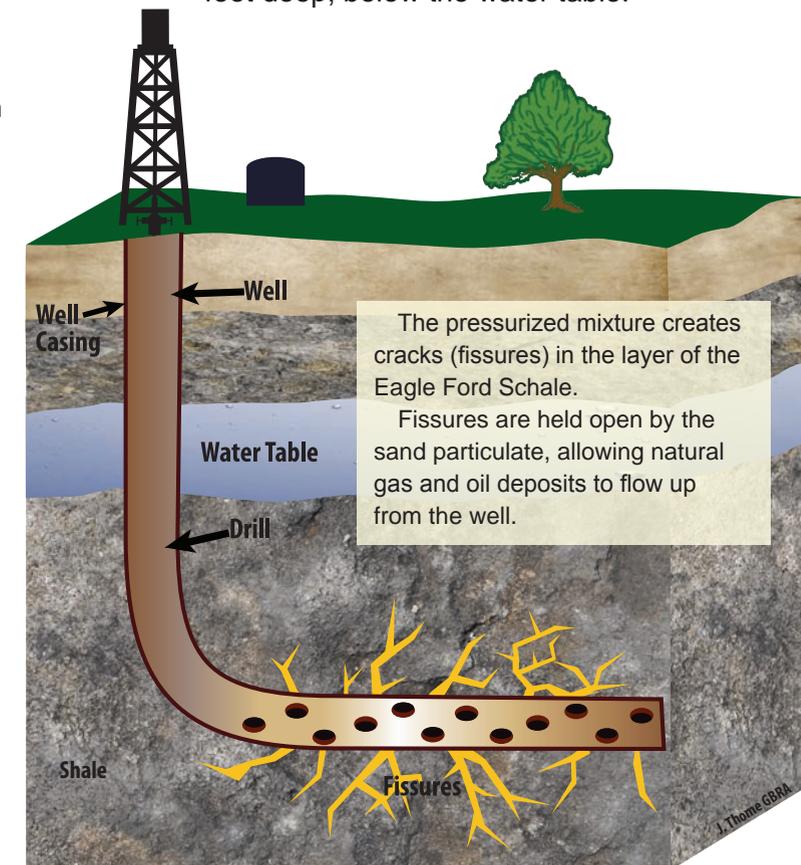
The first question one might ask is, “What is fracking?” Well, fracking is a process used by gas producers to stimulate wells and recover natural gas from sources such as coal beds and shale gas formations. The technique creates fractures

that extend from a well bore into rock or coal formations. These fractures allow the oil or gas to travel more easily from the rock pores, where the oil or gas is trapped, to the production well. To create fractures, a mixture of water, proppants (sand or ceramic beads) and chemicals is pumped into the rock or coal formation. The chemicals used in this process are what pose the potential problem. A variety of chemicals make up the proppants.

Are there concerns about hydraulic fracturing at the federal level?

In its Fiscal Year 2010 budget report, the U.S. House of Representatives Appropriation Conference Committee identified the need for a focused study of this topic. Environmental Protection Agency (EPA) scientists, at the direction of Congress, are undertaking a study of the practice to better understand potential impacts of hydraulic fracturing on drinking water and groundwater. The EPA consulted with experts in the field through peer review, and technical workshops and engaged stakeholders in a dialogue about the study through facilitated public meetings. The EPA finalized the study plan on Nov. 2011 (*Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* EPA/600/R-11/122). Initial research results will be evaluated with an EPA goal of producing a report in 2014. For more information, visit: www.epa.gov.

A mixture of sand, water and chemicals are injected into the well at high pressures. Generally wells are drilled thousands of feet deep, below the water table.



What is GBRA's stance?

GBRA's 10-county statutory district intersects with a significant portion of the Eagle Ford Shale Formation. This sedimentary rock formation underlies much of South and East Texas and is one of the most actively drilled targets for oil and gas in the United States. GBRA is taking an observe-and-monitor approach to Eagle Ford Shale hydraulic fracturing activities within its basin. As rules and regulations are promulgated, GBRA will adjust its internal processes and services accordingly.

More information about hydraulic fracturing can be found on the following websites:

- <http://www.fe.doe.gov/programs/oilgas/index.html>
- <http://www.netl.doe.gov/technologies/oil-gas/index.html>
- <http://www.netl.doe.gov/kmd/Forms/Search.aspx>
- <http://ead.anl.gov/index.cfm>
- <http://www1.eere.energy.gov/geothermal/>
- <http://fracfocus.org>

How is the state addressing the issue?

The State of Texas Legislature sent a bill to Governor Rick Perry requiring the Texas Rail Road Commission (RRC) to complete the rulemaking process that would require disclosure of hazardous chemicals used in the hydraulic fracturing processes. The bill also requires the RRC to complete rulemaking for all chemicals used in the process by July 1, 2013. The RRC and Texas Commission on Environmental Quality (TCEQ) already have regulations in place for groundwater protection. For more information, visit the websites of the RRC and the TCEQ. For updates to the Hydraulic Fracturing Chemical Disclosure Requirements refer to the following link: (Chapter 3 section 3.29) www.rrc.state.tx.us/rules/rule.php.

What substances or compounds could be of concern?

According to the EPA's *Plan to Study the Potential Impacts of Hydraulic Fracturing on Drinking Water Resources* (EPA/600/R-11/122) November 2011, there are over 1,000 potential chemicals identified in the hydraulic fluid and flowback/produced water processes.

2,2-Dibromo-3-Nitropropionamide	Diesel (use discontinued)	Mesh Sand (Crystalline Silica)
2-butoxyethanol	Ethane-1, 2-diol	Methanol
2-methyl-4-isothiazolin-3-one	Ether	Mineral Spirits
5-chloro-2-methyl-4-isothiazotin-3-one	Ethoxylated Alcohol Prop-2-yn-1-01	Monoethanolamine
Acetic Acid	Ethoxylated Alcohol	Monoethanolamine
Acetic Anhydride	Ethoxylated Alcohol Propan-2-01	Oil and Grease
Aliphatic Acid	Ethoxylated Octylphenol	Petroleum Distillate Blend
Aliphatic Alcohol	Ethylene Glycol	Polyethoxylated Alkanol (2)
Ammonia Persulfate	Ethylhexanol	Polyethylene Glycol Mixture
Aromatic Hydrocarbon Mesh Sand	Ferrous Sulfate Heptahydrate	Polyglycol
Aromatic Ketones	Formaldehyde	Polysaccharide
Boric Acid	Gas Organics and Diesel Organics	Polysaccharide
Boric Oxide	Glutaraldehyde	Potassium Carbonate
Butan 1-01	Glycol Ethers	Potassium Hydroxide
Chlorides	Guar Gum	Propargyl Alcohol
Citric Acid	Hemicellulase Enzyme	Propylene
Conductivity	Hydrochloric Acid	Sodium Bicarbonate
Cristobalite Polyethoxylated Alkanol (1)	Hydrogen Sulfide	Sodium Chloride
Crystalline Silica	Hydrotreated light distillate	Sodium Hydroxide
Dazomet	Isopropanol	Sucrose
Dazomet Polyethylene Glycol Mixture	Isopropyl Alcohol	Tetramethylammonium Chloride
Diatomaceous Earth	Magnesium Nitrate	Volatile Organic Compounds

What can you do?

While hydraulic fracturing wells tend to be drilled significantly deeper than groundwater wells for human and livestock consumption, some landowners may feel compelled to be more proactive in monitoring their groundwater. The GBRA's TNI (The NELAP Institute) accredited Regional Laboratory can be a resource in the effort to analyze and produce water quality data of groundwater that does not have an established "baseline" for specific well sites on or near the Eagle Ford Shale region. Land owners who have private wells in this region and would like to have groundwater analyzed for various substances or compounds may bring water samples to the GBRA Regional Laboratory for testing at discounted rates.

The American Water Works Association (AWWA) list of "potential hydrofracking chemicals" taken from its *Opflow Magazine* July 2011 issue includes a reference list. In an attempt to condense the numerous compounds identified in the fluids from both the hydraulic fracturing process and the flowback-produced water, the following is a list (see "Laboratory Testing Fees" next panel) recommended by GBRA Regional Laboratory staff to provide a baseline for drinking water wells or wells that will be used in the hydraulic fracturing process.



Laboratory Testing Services:

Alkalinity
 Bromide*
 Chlorides
 Conductivity
 Fluoride
 Hardness
 Heavy metals*
 (As, Ba,B,Cd,Ca,Fe,Pb,Mg,Mn,K,Na,Se,Ag)
 Hydrogen sulfide-H2S*
 Mercury*
 Methane and Ethane* (dissolved)
 Nitrate-nitrogen
 Oil and Grease (EPA 1664 Rev. B)
 pH
 Sulfate
 Total Chromium
 Total Coliform
 Total Dissolved Solids
 Total Petroleum Hydrocarbons-TPHs*
 Uranium*
 Volatile Organic Compounds-VOC's*
 *subcontracted
 Volume discounts are also available.

To obtain additional information about the hydraulic fracturing discount testing package, please contact the GBRA Regional Laboratory.



Regional Laboratory

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