WELCOME

Welcome to FracFocus, the hydraulic fracturing chemical registry website. This website is a joint project of the Ground Water Protection Council and the Interstate Oil and Gas Compact Commission.

On this site you can search for information about the chemicals used in the hydraulic fracturing of oil and gas wells. You will also find educational materials designed to help you put this information in perspective.

LEARN MORE >

Welcome | Hydraulic Fracturing | Casing & Cement | State Regulations | Chemical Use

Looking for information about a *well site near you?*

Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

FAQs

1 / 3

Q. **I know there are wells in my area that have been fractured, but when I search for them I get no results. Why?**

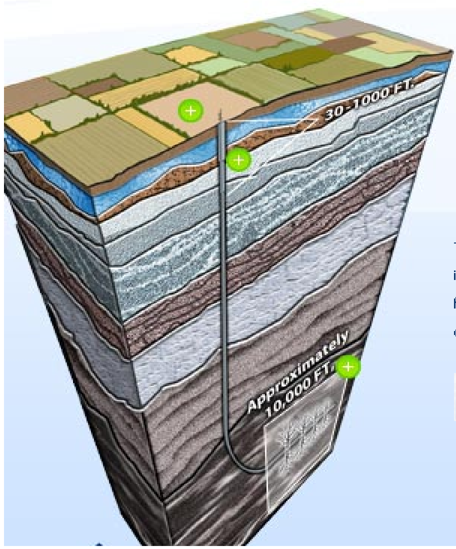
A. The most likely reasons are that either the wells were fractured before January 1, 2011 or they have not yet been entered into the system. Only wells fractured after January 1st will be entered into the system and since the uploading of records began only recently it will take some time before a large number of wells is available. Please keep checking back as wells are added on a daily basis.

All FAQs »

Groundwater Protection: Priority Number One

Oil and natural gas producers have stringent requirements for how wells must be completed. The genesis of these requirements is water safety.

Casing is the first line of defense used to protect freshwater aquifers.



Hydraulic Fracturing
& HOW IT WORKS

This technique uses a specially blended liquid which is pumped into a well under extreme pressure causing cracks in rock formations underground. These cracks in the rock then allow oil and natural gas to flow, increasing resource production.

LEARN MORE ABOUT CASING >

Hydraulic Fracturing: How it Works

- History of Hydraulic Fracturing
- Hydraulic Fracturing: The Process
- Site Setup
- Fracturing Fluid Management

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SITE SETUP

A HISTORIC PERSPECTIVE

A Historic Perspective

Historical perspective

Hydraulic Fracturing Job Circa 1950

Hydraulic fracturing is not new. The first commercial application of hydraulic fracturing as a well treatment technology designed to stimulate the production of oil or gas likely occurred in either the Hugoton field of Kansas in 1946 or near Duncan Oklahoma in 1949. In the ensuing sixty plus years, the use of hydraulic fracturing has developed into a routine technology that is frequently used in the completion of gas wells, particularly those involved in what's called "unconventional production," such as production from so-called "tight shale" reservoirs. The process has been used on over 1 million producing wells. As the technology continues to develop and improve, operators now fracture as many as 35,000 wells of all types (vertical and horizontal, oil and natural gas) each year.

Hydraulic fracturing has had an enormous impact on America's energy history, particularly in recent times. The ability to produce more oil and natural gas from older wells and to develop new production once thought impossible has made the process valuable for US domestic energy production. Without hydraulic fracturing, as much as 80 percent of unconventional production from such formations as gas shales would be, on a practical basis, impossible.

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Hydraulic Fracturing: The Process

What Is Hydraulic Fracturing?

Contrary to many media reports, hydraulic fracturing is not a "drilling process." Hydraulic fracturing is used after the drilled hole is completed. Put simply, hydraulic fracturing is the use of fluid and material to create or restore small fractures in a formation in order to stimulate production from new and existing oil and gas wells. This creates paths that increase the rate at which fluids can be produced from the reservoir formations, in some cases by many hundreds of percent.

The process includes steps to protect water supplies. To ensure that neither the fluid that will eventually be pumped through the well, nor the oil or gas that will eventually be collected, enters the water supply, steel surface or intermediate casings are inserted into the well to depths of between 1,000 and 4,000 feet. The space between these casing "strings" and the drilled hole (wellbore), called the annulus, is filled with cement. Once the cement has set, then the drilling continues from the bottom of the surface or intermediate cemented steel casing to the next depth. This process is repeated, using smaller steel casing each time, until the oil and gas-bearing reservoir is reached (generally 6,000 to 10,000 ft). A more detailed look at casing and its role in groundwater protection is available HERE ‡.

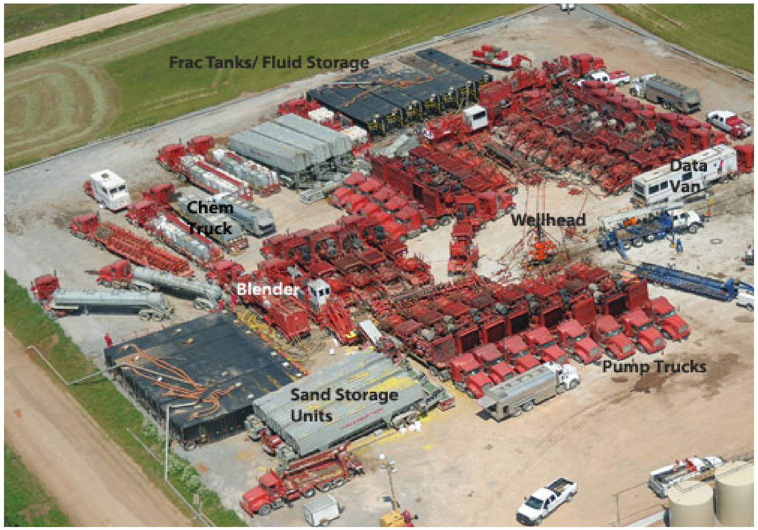
With these and other precautions taken, high volumes of fracturing fluids are pumped deep into the well at pressures sufficient to create or restore the small fractures in the reservoir rock needed to make production possible.

What's in Hydraulic Fracturing Fluid?

Water and sand make up 98 to 99.5 percent of the fluid used in hydraulic fracturing. In addition, chemical additives are used. The exact formulation varies depending on the well. To view a chart of the chemicals most commonly used in hydraulic fracturing and for a more detailed discussion of this question, click HERE ‡.

Hydraulic Fracturing: How it Works
History of Hydraulic Fracturing
Hydraulic Fracturing: The Process
Site Setup
Fracturing Fluid Management

surrounding the site as equipment such as the drill rig, bulldozers, graders, water trucks and other heavy equipment is transported to and from the site. This traffic increase usually lasts a few weeks, and once well drilling, completion and fracturing are finished, should decrease substantially.



Depending upon the specific conditions of the site and the nature of the drilling fluid, drill pits may or may not be used and may be lined with special liners to prevent fluid infiltration into the subsurface.

Once the well has been drilled and constructed and the drill rig removed, the site is prepared for well stimulation. The photo above shows the typical layout of a site that has been prepared for hydraulic fracturing. The surface facilities and layout typically involve a number of pieces of mobile equipment including fracture fluid storage tanks, sand storage units, chemical trucks, blending equipment and pumping equipment. All facets of the hydraulic fracturing job from the blending and pumping of the fracture fluids and proppants - solid material, usually sand, that is pumped into fractures to hold them open - to the way the rock formation responds to the fracturing, are managed from a single truck often referred to as the Data Monitoring Van.

‡ - When you click links marked with the ‡ symbol, you will leave the FracFocus website and go to websites that are not controlled by or affiliated with this site.

Fracturing Fluid Management

Fluid Storage – "Pits"

From the time the first oil and gas wells were drilled, "pits" have been used to hold drilling fluids and wastes. Pits can be excavated holes in the ground, or they can be above ground containment systems such as steel tanks. Pits are used for storage of produced water, for emergency overflow, temporary storage of oil, burn off of waste oil, and for temporary storage of the fluids used to complete and treat the well.

The containment of fluids within a pit is the most critical element in the prevention of contamination of shallow ground water. The failure of a tank, pit liner, or the line carrying fluid ("flowline") can result in a release of contaminated materials directly into surface water and shallow ground water. Environmental clean-up of these accidentally released materials can be a costly and time consuming process. Therefore, prevention of releases is vitally important.

For pits constructed from ground excavation, pit lining may be necessary to prevent infiltration of fluids into the subsurface of the ground, depending upon the fluids being placed in the pit, the duration of the storage and the soil conditions. Typically, pit liners are constructed of compacted clay or synthetic materials like polyethylene or treated fabric that can be joined using special equipment.

Depending on the state, there are a number of other rules regarding pits and the protection of surface and ground water. In addition to liners, some states also require pits used for long term storage of fluids to be placed a minimum distance from surface water to minimize the chances of surface water contamination should there be an accidental discharge from the pits. In California, for example, pits may not be placed in areas considered "natural drainage channels". Some states also explicitly either prohibit or restrict the use of pits that intersect the water table.

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Frac Focus
Chemical Disclosure Registry

Groundwater
PROTECTION & WATER USAGE

Pure, clean groundwater. Nothing can replace it. This is why fresh-water aquifers are protected through strictly regulated exploration and production practices.

ABOUT GROUNDWATER PROTECTION >

Groundwater Protection

- Hydraulic Fracturing Water Usage
- Groundwater & Aquifers
- Groundwater Quality & Testing
- Well Construction & Groundwater Protection
- Fluid Flow in the Subsurface (Darcy's Law)

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HYDRAULIC FRACTURING WATER USAGE

Hydraulic fracturing requires large quantities of water.

HOW CASING PROTECTS GROUNDWATER

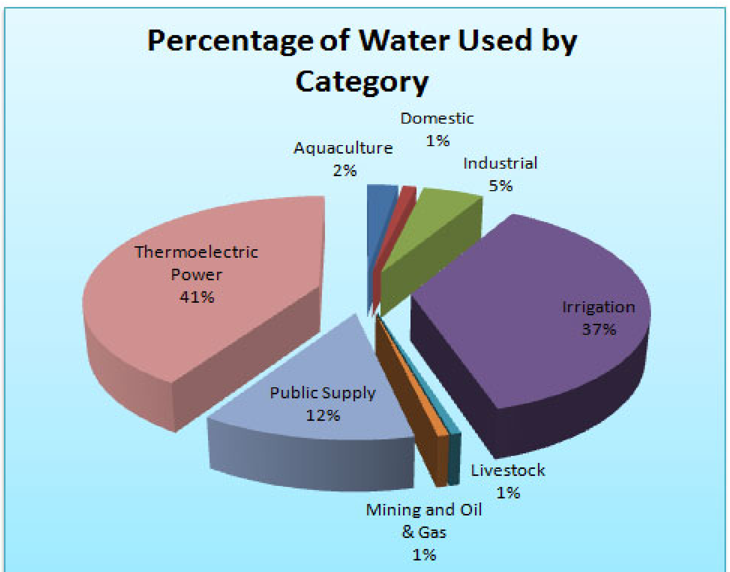
Casing is a process that is regulated by the state for each hydraulically fractured well site.

of the water is very important because impurities can reduce the efficiency of the additives used in the process.

Most water used in hydraulic fracturing comes from surface water sources such as lakes, rivers and municipal supplies. However, groundwater can be used to augment surface water supplies where it is available in sufficient quantities. In some states, the water used for fracturing is controlled by a river basin commission or water resources board such as the Susquehanna River Basin Commission ‡ or the Texas Water Development Board ‡. In other places, water is owned by private individuals who can allocate it at their discretion.

The amount of water used in hydraulic fracturing, particularly in shale gas formations, may appear substantial, but it is small when compared to other water uses such as agriculture, manufacturing and municipal water supply. For example, electric generation uses nearly 150 million gallons a day in the Susquehanna River Basin, while the projected total demand for peak Marcellus Shale activity in the same area is 8.4 million gallons per day.

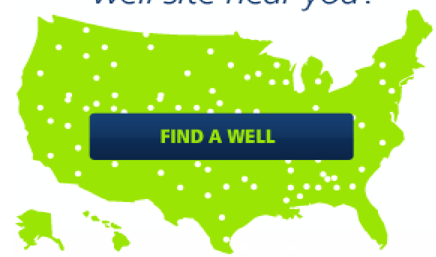
The chart below shows estimated water usage in the United States for 2005 by category. Oil and gas operations are only part of the Mining category which in total comprised about 1% of the total water used in the United States in 2005.



Source: Estimated Use of Water in the United States 2005, USGS 2005 ‡

Well Construction & Groundwater Protection
Fluid Flow in the Subsurface (Darcy's Law)

Looking for information about a *well site near you?*



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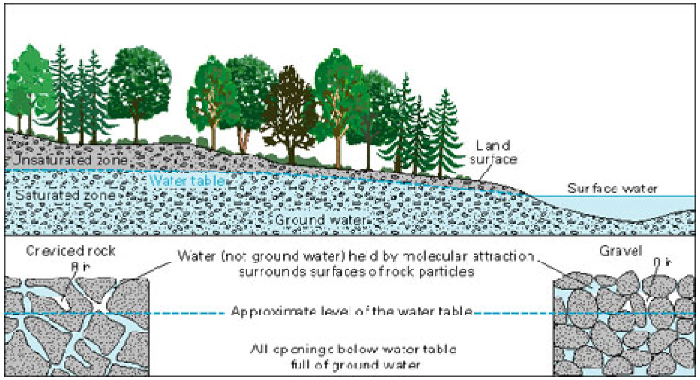
Groundwater & Aquifers

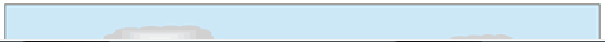
Nearly half of the U.S. population relies on groundwater as their primary source of drinking water. In rural areas, this figure approaches 95%. It is easy to see from these figures that groundwater is an importance source of water that should be protected. But what exactly is groundwater?



Groundwater is the water that is held within the interconnected openings of saturated rock beneath the land surface in much the same way as water would be held in a bowl full of marbles. Although the marbles would fill the bowl, there would be spaces between the marbles. These spaces can hold fluid. As shown in the diagram above, this is how water exists in the subsurface.

On the graphic below, the hydrologic cycle ‡ shows that when rain falls to the ground, some water flows along the land surface to streams or lakes (e) and (g), some water evaporates into the atmosphere, some is taken up by plants, and some seeps into the ground.

As water begins to seep into the ground, it enters a zone (a) that contains both water and air, referred to as the unsaturated zone or vadose zone ‡. The upper part of this zone, known as the root zone



Groundwater Protection

- Hydraulic Fracturing Water Usage
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Groundwater Quality & Testing

The quality of groundwater can affect not only our health, but also society and the economy. Groundwater contamination can adversely affect property values, the image of a community, economic development, and the overall quality of life we all share. Clean water at reasonable cost is essential and in many parts of the country, groundwater is the only economical water source available. Once groundwater has been contaminated, it is us - ually very difficult and costly to clean. Even small contamination sites often cost many thousands of dollars to cleanup. The quality of water from private water supplies, such as those from wells at individual homes, is not regulated. It is the responsibility of the well owner to ensure a safe drinking water supply. Although there are a few requirements for water quality testing and monitoring of private wells (i.e., in some areas, testing is required at the time of property transfer), it is recommended that all well owners have their water tested periodically. While "complete" drinking water analyses can be expensive and are generally unnecessary for the private well owner, it is recommended that private water supplies be tested routinely for common contaminants including total coliform bacteria, nitrates, and lead. These contaminants can occur in well water due to agricultural activity, septic system use, household chemical use/ disposal, age of the plumbing or industrial activity. The frequency of water testing and the contaminants to test for depend on factors such as the potential sources of pollution and the type of well. Another consideration is ensuring that the private well complies with proper well construction standards.


Water Sampling of Monitoring Well

A water's taste, smell, or color is not necessarily an indicator of water quality. Many of the most hazardous contaminants are undetectable to the senses. The only way to detect most pollutants is by testing.

Before hydraulic fracturing operations begin in a new area, American Petroleum Institute guidance (API - HF1) recommends that a baseline assessment program which includes the sampling of nearby water wells be conducted prior to hydraulic

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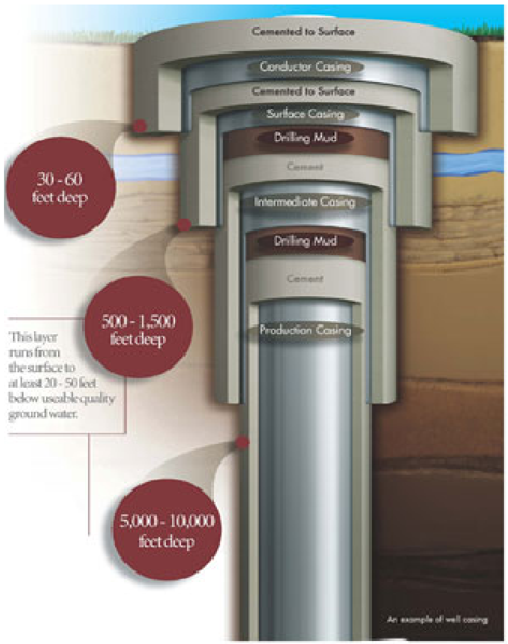
Why casing and cementing are an important part of groundwater protection.

Casing strings are an important element of well completion with respect to the protection of groundwater resources because they provide for the isolation of fresh water zones and groundwater from the inside of the well. Casing is also used to transmit flowback fluids from well treatment. In this regard, surface casing is the first line of defense and production casing provides a second layer of protection for groundwater. As important as casing is, it is the cementation of the casing that adds the most value to the process of groundwater protection.

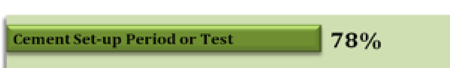


Graphic Courtesy of Texas Oil and Gas Association

Proper sealing of annular spaces with cement creates a hydraulic barrier to both vertical and horizontal fluid migration. Consequently, the quality of the initial cement job is a critical factor in the prevention of fluid movement from deeper zones into groundwater resources. In some states it is common for state personnel to witness the running and cementing of casing strings, while in other states the submission of a completion report which details the amounts and types of casing and cement used in the completion of the well is considered sufficient evidence of proper well construction. In a few states such as Alaska, Michigan and Ohio, an additional verification method using geophysical logs such as Cement Bond Logs (CBL) and Variable Density Logs (VDL) may be required. By measuring the travel time of sound waves through the casing and cement to the formation, the CBL shows the quality of bonding between the casing and the cement. The VDL performs a similar function to measure the bond between the cement and the borehole. By measuring the quality of the cement to casing and cement to formation bond, the sealing quality of the cement in the space between the casing and the borehole (called the annulus)can be evaluated.

State Regulation of Well Construction

In a review of the regulations of twenty-seven state oil and gas agency regulations conducted in 2009 by the GWPC, the following percentage of states had the listed requirement for casing and cementing:



Fluid Flow in the Subsurface (Darcy's Law)

The principle that governs how fluid moves in the subsurface is called Darcy's law. Darcy's law is an equation that defines the ability of a fluid to flow through a porous media such as rock. It relies on the fact that the amount of flow between two points is directly proportional to the difference in pressure between the points and the ability of the media through which it is flowing to impede the flow. This factor of flow impedence is referred to as permeability. Put another way, Darcy's law is a simple, proportional relationship between the instantaneous discharge rate through a porous medium and the pressure drop over a given distance.

In modern format, using a particular sign convention, Darcy's law is usually written as:

$Q = -KA\, dh/dl$

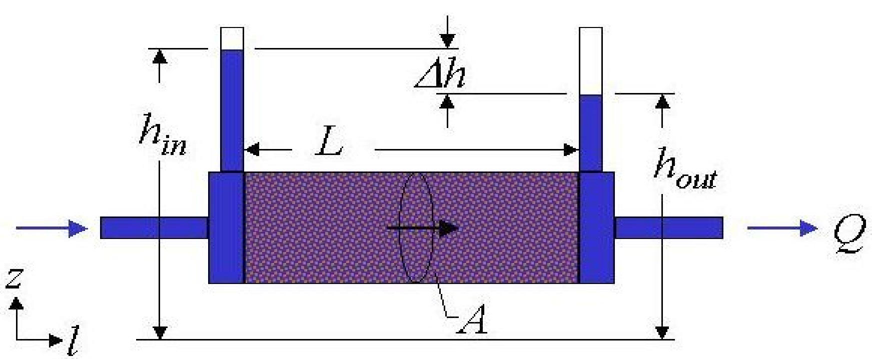
where:

Q = rate of water flow (volume per time)

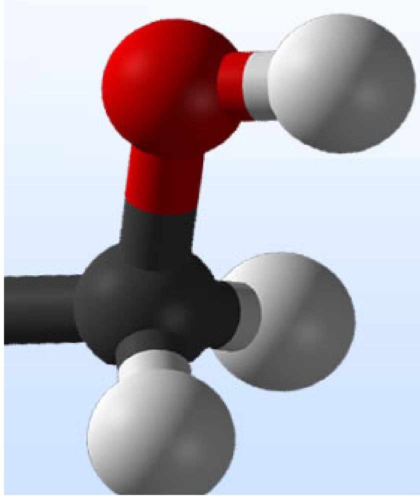
K = hydraulic conductivity

A = column cross sectional area

dh/dl = hydraulic gradient, that is, the change in head over the length of interest.



FracFocus Chemical Disclosure Registry



Chemical USE

Chemicals serve many functions in hydraulic fracturing. From limiting the growth of bacteria to preventing corrosion of the well casing, chemicals are needed to insure that the fracturing job is effective and efficient.

LEARN MORE >

Chemical Use in Hydraulic Fracturing

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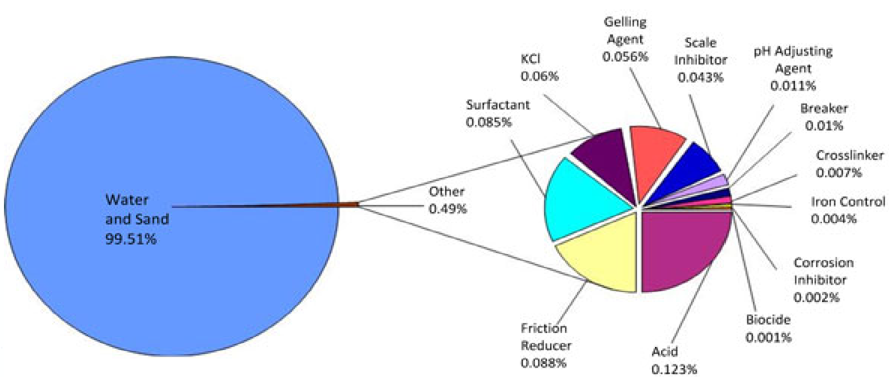
Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

WHY CHEMICALS ARE USED

Given today's technology, chemicals must be used in hydraulic fracturing to ensure the producing formation is effectively treated. The charts shown below depict generic hydraulic fracturing chemical usage including the types of chemicals, their uses in the process, the consequences of not using them and the additive types and amounts which are typically used in the hydraulic fracturing of shales.

WHAT CHEMICALS ARE USED

As previously noted, chemicals perform many functions in a hydraulic fracturing job. Although there are dozens to hundreds of chemicals which could be used as additives, there are a limited number which are routinely used in hydraulic fracturing. The following is a list of the chemicals used most often. This chart is sorted alphabetically by the Product Function to make it easier for you to compare to the fracturing fluids and sand, or other solid materials called proppants, to be pumped to the target zone at a higher rate and reduced pressure than if water alone were used. In addition to friction reducers, other additives include: biocides to prevent microorganism growth and to reduce biofouling of the fractures; oxygen scavengers and other stabilizers to prevent corrosion of metal pipes; and acids that are used to remove drilling mud damage within the near-wellbore area. These fluids are used to create the fractures in the formation and to carry a propping agent (typically silica sand) which is deposited in the induced fractures to keep them from closing up. The chart below taken from Modern Shale Gas Development in the United States: A Primer demonstrates the volumetric percentages of additives that were used for a nine-stage hydraulic fracturing treatment of a Fayetteville Shale horizontal well. The make-up of fracturing fluid varies from one geologic basin or formation to another. Evaluating the relative volumes of the components of a fracturing fluid reveals the relatively small volume of additives that are present. The additives depicted on the right side of the pie chart represent less than 0.5% of the total fluid volume. Overall the concentration of additives in most slickwater fracturing fluids is a relatively consistent 0.5% to 2% with water making up 98% to 99.5%. Because the make-up of each fracturing fluid varies to meet the specific needs of each area, there is no one-size-fits-all formula for the volumes for each additive. In classifying fracturing fluids and their additives it is important to realize that service companies that provide these additives have developed a number of compounds with similar functional properties to be used for the same purpose in different well environments. The difference between additive formulations may be as small as a change in concentration of a specific compound. Although the hydraulic fracturing industry may have a number of compounds that can be used in a hydraulic fracturing fluid, any single fracturing job would only use a few of the available additives. For example, the chart shown below, represents 12 additives used, covering the range of possible functions that could be built into a fracturing fluid.



well site near you?

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Chemicals Commonly Used in Shale Fracturing and consequences of not using the chemical

Chemical	Use	Consequences of not using chemical
Acid	Removes near well damage	Higher treating pressure, slightly more engine emissions.
Biocides	Controls bacterial growth	Increased risk of souring the formation (H_2S gas from sulfate reducing bacteria growth) and increasing corrosion.
Corrosion Inhibitor	Used in the acid to prevent corrosion of pipe	Sharply increased risk of pipe corrosion from acid. Well integrity compromised.
Friction Reducers	Decreases pumping friction	Significantly increases surface pressure and frac pump engine emissions .
Gelling Agents	Improves proppant placement	Increased water use. Natural gas recovery may decrease in some cases by 30 to 50% where frac fluids must be gelled (conventional fracs).
Oxygen scavenger	Prevents corrosion of well tubulars by oxygen	Corrosion sharply increased and well integrity (containment) compromised.

Chart courtesy of George King www.gekengineering.com

How Much Chemical is Used? Examples:

Chemical Use in Hydraulic Fracturing

Introduction to Chemical Use
Why Chemicals Are Used
What Chemicals Are Used
Chemicals & Public Disclosure

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Chemical Name	CAS	Chemical Purpose	Product Function
Hydrochloric Acid	007647-01-0	Helps dissolve minerals and initiate cracks in the rock	Acid
Glutaraldehyde	000111-30-8	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Quaternary Ammonium Chloride	012125-02-9	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Quaternary Ammonium Chloride	061789-71-1	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Tetrakis Hydroxymethyl-Phosphonium Sulfate	055566-30-8	Eliminates bacteria in the water that produces corrosive by-products	Biocide
Ammonium Persulfate	007727-54-0	Allows a delayed break down of the gel	Breaker
Sodium Chloride	007647-14-5	Product Stabilizer	Breaker
Magnesium Peroxide	014452-57-4	Allows a delayed break down the gel	Breaker
Magnesium Oxide	001309-48-4	Allows a delayed break down the gel	Breaker
Calcium Chloride	010043-52-4	Product Stabilizer	Breaker
Choline Chloride	000067-48-1	Prevents clays from swelling or shifting	Clay Stabilizer
Tetramethyl ammonium chloride	000075-57-0	Prevents clays from swelling or shifting	Clay Stabilizer
Sodium Chloride	007647-14-5	Prevents clays from swelling or shifting	Clay Stabilizer

Chemical Use in Hydraulic Fracturing

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Chemicals & Public Disclosure

In 1986, Congress enacted the Emergency Planning and Community Right to Know Act (EPCRA) ‡. EPCRA established requirements for federal, state and local governments, tribes, and industry regarding emergency planning and "community right-to-know" reporting on hazardous and toxic chemicals. The community right-to-know provisions of EPCRA are the most relevant part of the law for shale gas producers. These provisions help i ncrease the public's knowledge and access to information on chemicals at individual facilities, along with their uses and potential releases into the environment. Under Sections 311 and 312 of EPCRA, facilities manufacturing, processing, or storing designated hazardous chemicals must make Material Safety Data Sheets (MSDS), describing the properties and health effects of these chemicals, available to state and local officials and local fire departments. Facilities must also provide state and local officials and local fire departments with inventories of all on-site chemicals for which MSDS exist. Information about chemical inventories at facilities and MSDS must be available to the public. Facilities that store over 10,000 pounds of hazardous chemicals are subject to this requirement. Any hazardous chemicals above the threshold stored at shale gas production and processing sites must be reported in this manner.

> *Facilities meeting the threshold requirements must provide state and local officials and local fire departments with inventories of all on-site chemicals for which MSDS exist.*

Section 313 of EPCRA authorizes EPA's Toxics Release Inventory (TRI) ‡, which is a publicly available database that contains information on toxic chemical releases and waste management activities reported annually by certain industries as well as federal facilities. EPA issues a list of industries that must report releases for the database. To date, EPA has not included oil and gas extraction as an industry that must report under TRI. This is not an exemption in the law. Rather it is a decision by EPA that this industry is not a high priority for reporting under TRI. Part of the rationale for this decision is based on the fact that most of the information required under TRI is already reported by producers to state agencies that make it publicly available. Also, TRI reporting from the hundreds of thousands of oil and gas sites would overwhelm the existing EPA reporting

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Regulations By State | FracFocus Chemical Disclosure Registry - Windows Internet Explorer

http://fracfocus.org/regulations-state

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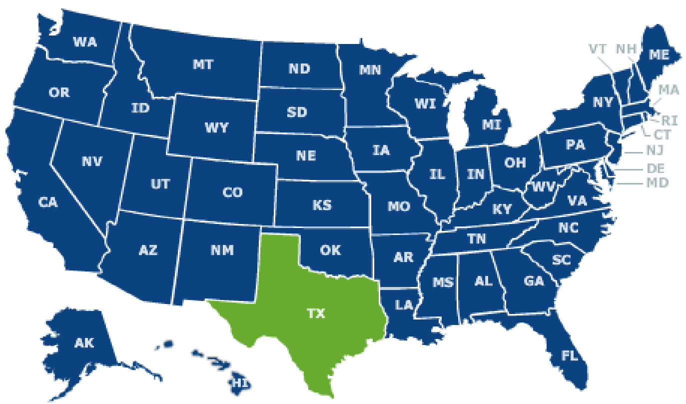
Frac Focus Chemical Disclosure Registry

HYDRAULIC FRACTURING HOW IT WORKS | GROUNDWATER PROTECTION | CHEMICAL USE | REGULATIONS BY STATE | FIND A WELL BY STATE | FREQUENT QUESTIONS

Regulations By State



Texas Contact Information

Oil and Natural Gas Representatives:
Railroad Commission of Texas
Phone: 512.463.7308
Email: leslie.savage@rrc.state.tx.us

Regulations:
Learn More About Texas Regulations ‡
View Texas Regulations ‡

‡ - *When you click links marked with the ‡ symbol, you will leave the FracFocus website and go to websites that are not controlled by or affiliated with this site.*

GROUNDWATER PROTECTION COUNCIL | Interstate Oil & Gas Compact Commission

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Chemical Disclosure - Find - Windows Internet Explorer

https://www.hydraulicfracturingdisclosure.org/fracfocusfind/

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Favorites | Chemical Disclosure - Find

Find a Well

SEARCH OPTIONS

STATE: Choose a State

COUNTY: Choose a State First

WELLS IN COUNTY: Choose a County First

OPERATOR: Choose One

API WELL NUMBER: __-___-_____

WELL NAME:

SEARCH RESET (Note: One search option is required to do a search.)

All FracFocus well site information is voluntarily provided by participating oil and natural gas operators. Wells hydraulically fractured after January 1, 2011 will be added to the database over time.

See the full list of participating production companies ‡.

LATEST WELLS

API Number: 1703125599
Well Name: Atkins 18 #2-Alt
Operator: EXCO Resources, Inc.

API Number: 1703125576
Well Name: Atkins 18 #1-Alt
Operator: EXCO Resources, Inc.

API Number: 1703125679
Well Name: Roe 11 #5-Alt
Operator: EXCO Resources, Inc.

API Number: 4303524627

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	API No.	Job Date	State	County	Operator	WellName	Well Type	Latitude	Longitude	Datum
	05-001-09723	1/8/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 3-9	Gas	39.982340	-104.898600	NAD83
	05-001-09724	1/8/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 5-9	Gas	39.982383	-104.898600	NAD83
	05-001-09721	1/8/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 6-9	Gas	39.982252	-104.898599	NAD83
	05-001-09719	1/14/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 11-9	Gas	39.982210	-104.898599	NAD83
	05-001-09722	1/17/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 12-9	Gas	39.982169	-104.898599	NAD83
	05-001-09725	1/11/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 21-9	Gas	39.982295	-104.898600	NAD83
	05-001-09720	1/20/2011	Colorado	Adams	Anadarko Petroleum Corp...	TALON VIEW 22-9	Gas	39.982129	-104.898598	NAD83
	05-001-08991	4/25/2011	Colorado	Adams	Anadarko Petroleum Corp...	YORK NORTH 13-12 #3	Gas	39.977350	-104.957217	NAD83
	05-001-09111	4/20/2011	Colorado	Adams	Anadarko Petroleum Corp...	DREYER #1	Gas	39.989650	-104.684286	NAD83
	05-045-19038	2/2/2011	Colorado	Garfield	Williams	PA 642-12	Gas	39.458571	-107.944351	NAD83
	05-045-16872	3/12/2011	Colorado	Garfield	Williams	SR 22-9	Gas	39.455631	-107.898954	NAD83
	05-045-16873	3/12/2011	Colorado	Garfield	Williams	SR 322-9	Gas	39.455097	-107.894495	NAD83
	05-045-16881	2/11/2011	Colorado	Garfield	Williams	SR 21-9	Gas	39.455644	-107.899086	NAD83

12:00 PM 7/5/2011

Hydraulic Fracturing Fluid Product Component Information Disclosure

Fracture Date	1/8/2011
State:	CO
County:	ADAMS
API Number:	05-001-09724
Operator Name:	KERR-MCGEE OIL AND GAS ONSHORE LP
Well Name and Number:	TALON VIEW 5-9
Longitude:	-104.8986
Latitude:	39.982383
Long/Lat Projection:	NAD83
Production Type:	Gas
True Vertical Depth (TVD):	8,105
Total Water Volume (gal)*:	180,383

Hydraulic Fracturing Fluid Composition:

Trade Name	Supplier	Purpose	Ingredients	Chemical Abstract Service Number (CAS #)	Maximum Ingredient Concentration in Additive (% by mass)**	Maximum Ingredient Concentration in HF Fluid (% by mass)**	Comments
Claytreat-4390	BJ Services	Clay Stabilization	No MSDS Ingredients	Not Listed	100.00%	0.10824%	
Frac-cide 1000	BJ Services	Bacteriacide	2,2-dibromo-3-nitrilopropionamide	010222-01-2	100.00%	0.02524%	
FR-66	Halliburton	Cationic Friction Reducer	Hydrotreated light distillate	64742-47-8	30.00%	0.01817%	
GASPERM 1100	Halliburton	Surfactant	Citrus, extract	94266-47-4	5.00%	0.00611%	
			Ethanol	64-17-5	60.00%	0.07330%	
Sand (Proppant)	Halliburton	Propping Agent	Crystalline silica (Quartz)	14808-60-7	99.90%	9.04995%	
Resin Coated Sand	Halliburton	Propping Agent	Crystalline silica (Quartz)	14808-60-7	99.90%	0.24059%	
Water	Anadarko	Base Carrier Fluid	Water	Not Listed	100.00%	90.46910%	

* Total Water Volume sources may include fresh water, produced water, and/or recycled water

** Information is based on the maximum potential for concentration and thus the total may be over 100%

All component information listed was obtained from the supplier' s Material Safety Data Sheets (MSDS). As such, the Operator is not responsible for inaccurate and/or incomplete information. Any questions regarding the content of the MSDS should be directed to the supplier who provided it. The Occupational Safety and Health Administration' s (OSHA) regulations govern the criteria for the disclosure of this information. Please note that Federal Law protects "proprietary", "trade secret", and "confidential business information" and the criteria for how this information is reported on an MSDS is subject to 29 CFR 1910.1200(i) and Appendix D.

You have questions.
WE HAVE ANSWERS.

Find out what you'd like to know about hydraulic fracturing. And if you don't find your answer here, drop us a line using our "Ask a Question" section.

HOW HYDRAULIC FRACTURING WORKS >

General

- Are the records from FracFocus available in a digital format such as Excel?
- I know there are wells in my area that have been fractured, but when I search for them I get no results. Why?
- The operator name on the well list does not match the name of the operator on the fracturing record. Can you tell me why?
- Where does the water used in hydraulic fracturing come from?
- A term in the website is unfamiliar to me. Where can I go to get more information?
- When I go to the Regulations by State page, I don't see the map. What's wrong?
- Can hydraulic fracturing fluid migrate into a fresh groundwater zone?
- What chemicals are being disclosed on this website?
- How much water is used in hydraulic fracturing?

Not finding your answer?

ASK A QUESTION.

NAME *

PHONE

EMAIL *

STATE * - Select -

QUESTION *

What code is in the image? *

Enter the characters shown in the image.

ASK

Questions about a particular well should be directed to the company which operates the well.

Publications | FracFocus Chemical Disclosure Registry - Windows Internet Explorer

http://fracfocus.org/publications

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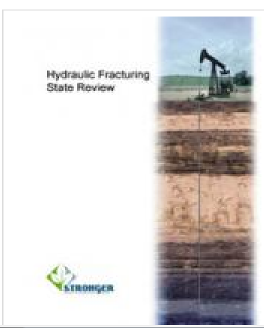
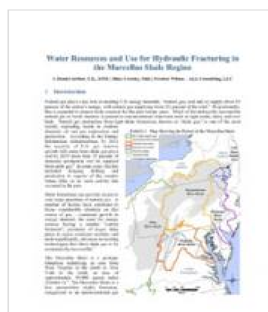
Page ▾ Safety ▾ Tools ▾

Publications

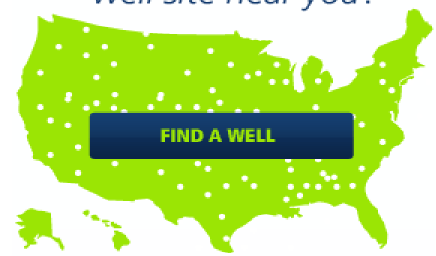
Reasonable and Prudent Practices for Stabilization (RAPPS) of Oil and Gas Construction Sites ‡

EPA Draft Hydraulic Fracturing Study Plan ‡





Looking for information about a *well site near you?*



Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

12:41 PM
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Frac Focus
Chemical Disclosure Registry

News & Updates

FracFocus cited as preferred means of disclosure

Recently the state of Montana issued a hydraulic fracturing chemical disclosure rule that allows operators to meet state reporting requirements by submitting chemical information through the FracFocus site. A similar rule is under review in Louisiana.

In Texas, the state legislature recently passed a law that allows operators to submit their chemical information to FracFocus as a means of meeting regulatory requirements.

Read more

FracFocus Reaches Milestone

In just over two months of operation, participating companies have uploaded more than 1,000 wells into the Fracfocus disclosure registry. The website has been visited more than 30,000 times by people in 89 countries. At present, 42 companies participate in the FracFocus registry system with more companies being added on an almost daily basis.

As the number of participating companies increases and automated uploading systems become more common, we expect the number of wells uploaded to the system to grow substantially over the next six months.

Read more

Operator Site Usage Training

The GWPC and IOGCC have made intentional efforts to inform stakeholders and the interested public in the details of

Looking for information about a *well site near you?*

Search for nearby well sites that have been hydraulically fractured to see what chemicals were used in the process.

Participating Companies

- Anadarko Petroleum Corporation
- Antero Resources Corporation
- Apache Corporation
- BP America Production Company
- BHP Billiton Petroleum (Fayetteville) LLC
- Bill Barrett Corporation
- Cabot Oil & Gas Corporation
- Chesapeake Operating, Inc.
- Chevron USA, Inc.
- Chief Oil & Gas LLC
- Citrus Energy Corporation
- ConocoPhillips Company
- CONSOL Energy, Inc.
- Devon Energy
- El Paso E&P Company
- Encana Oil & Gas (USA) Inc.
- Energen Resources Corporation
- Energy Corporation of America
- EnerVest, Ltd.
- EOG Resources, Incorporated
- EQT Production
- EXCO Resources, Inc. (Joint Venture w/ BG Group plc)
- Forest Oil Corporation
- Hess Corporation
- HighMount Exploration & Production LLC
- J-W Operating Company
- Laredo Petroleum, Inc.
- Marathon Oil Corporation
- Mesa-Energy Partners, LLC
- Newfield Exploration Company
- Noble Energy, Inc.
- Occidental Oil and Gas
- PDC Energy
- Petrohawk Energy Corporation
- Pioneer Natural Resources
- Plains Exploration & Production Company
- Prima Exploration, Inc.
- QEP Resources, Inc.
- Range Resource Corporation
- Samson
- SandRidge energy, Inc.
- Seneca Resources Corporation
- Shell Exploration and Production Company
- SM Energy
- Southwestern Energy Production Company
- Talisman Energy USA Incorporated
- Ward Petroleum
- Williams
- XTO Energy / ExxonMobil

Use Statistics as of 7/11/2011

- Participating companies = 49
- Reporting companies = 38
- Wells reported = 2076
- Site visits = 47,801
- Unique visitors = 34,901
- Countries visited from = 109