

Fracture stimulation or ‘fracking’: A safe way to extract coal seam gas

What is fracture stimulation or fracking?

Fracture stimulation, hydraulic fracturing or ‘fracking’ is a process used to stimulate or fracture underground coal seams in order to increase the flow of gas and water.

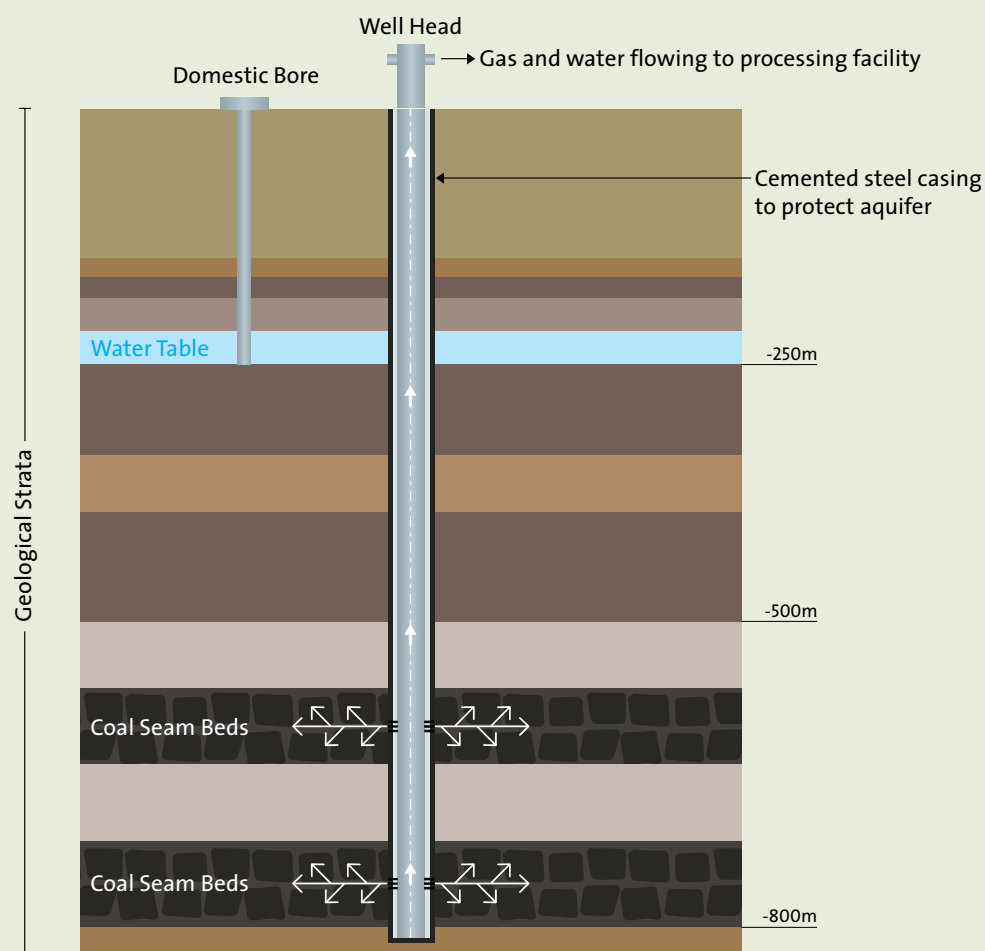
A fluid called ‘fracking fluid’ or ‘frac fluid’, which primarily consists of water and sand, is pumped down the well bore into an isolated section of the well at high pressure to fracture the coal seam. The sand holds the fracture open to provide a pathway for the gas and water to flow to the gas well for extraction.

Why do we use fracking?

Fracking enables a more effective release of gas and water from underground gas reservoirs and also increases the drainage area of the well. With potentially more gas produced from each well through the process, **it means fewer wells need to be drilled** in order to retrieve the same amount of gas, significantly reducing the overall environmental impact of CSG operations.

As the cleanest fossil fuel, natural gas meets a variety of energy needs – from generating electricity and heating homes to powering vehicles. Increasingly, natural gas resources are produced from unconventional sources, such as coal seam gas deposits, with coal seam gas being cleaner and purer than natural gas from conventional sources. Fracture stimulation technology supports the efficient development of coal seam gas reserves.

Fractured well example – Coal seam gas well



What type of fracking do we use?

There are several types of fracking which can be used to release coal seam gas. At Origin we use a combination of two types, namely water fracking and gel fracking.

Water fracking uses only treated water, sand and a small amount of additives. This technique needs large volumes of water to hold the sand in suspension while pumping.

In more recent operations, we have been using gel fracking. This process uses some additives in very low concentrations to make a thick fluid which carries more sand and therefore a fracture can be created and propped open by using less water.

Gel fracking is not new and has been used in Australia and overseas for more than 50 years. The technology continually improves and the additives used are now much cleaner and safer.

What happens to the frac fluids after they are pumped down the well?

The majority of fluids which are pumped underground during the fracking process are removed or recovered after the completion of the fracking job. Any waste we do create on site is removed and disposed of appropriately.

The frac sand is washed and sieved quartz sand. The sand is injected so it stays in the reservoir to keep the fracture open. Much of the remaining fracking fluid, mostly consisting of water, is brought back to the surface during the completion of fracking operations and when the well is in normal production. These fluids are then processed along with the water which is produced as a result of extracting coal seam gas.

How safe is fracking?

At Origin we use an average 97.4% of water and sand and 2.6% of additives (containing 2% Potassium chloride) in our fracking fluids. Please see the graph on the next page.

The small amounts of additives are used to make a thick fluid which carries more sand, thereby increasing the efficiency of the gel fracking process and **decreasing the need for excess water use**. These additives are not considered harmful in the diluted and small amounts in which we use them.

To restrict frac fluids and gas from entering surrounding aquifers, Origin follows rigid design standards and confirms the well integrity prior to fracking. All wells have steel casing and a wellhead system that is designed specifically to manage the fracking process. Fracking is designed to only fracture the coal seam, and the casing is cemented to form a barrier between the coal seams and any other permeable zones to mitigate cross-contamination of the fluids into surrounding aquifers.

What sorts of chemicals are used in gel fracs?

The table on the back page explains the additives used in fracking. It also shows how low the concentrations are and how the additives are used for everyday purposes. Most of these additives are commonly occurring and can be found in many household products.

How safe is the use of these chemicals?

At Origin, **we do not** use fracking fluids that are hazardous in the diluted and small amounts in which we use them, or that persist in the environment. The fracking fluids present a negligible risk due to the amount of water that is added in the process.

Most of the ingredients we use are found within homes, such as breaker (enzymes in washing powder), Potassium chloride (a substitute for table salt), ethanol (drinking alcohol), and surfactants (sweet orange oil, an essential oil). Importantly, Origin does not use BTEX (benzene, toluene, ethylene, xylene) in its fracking fluids.

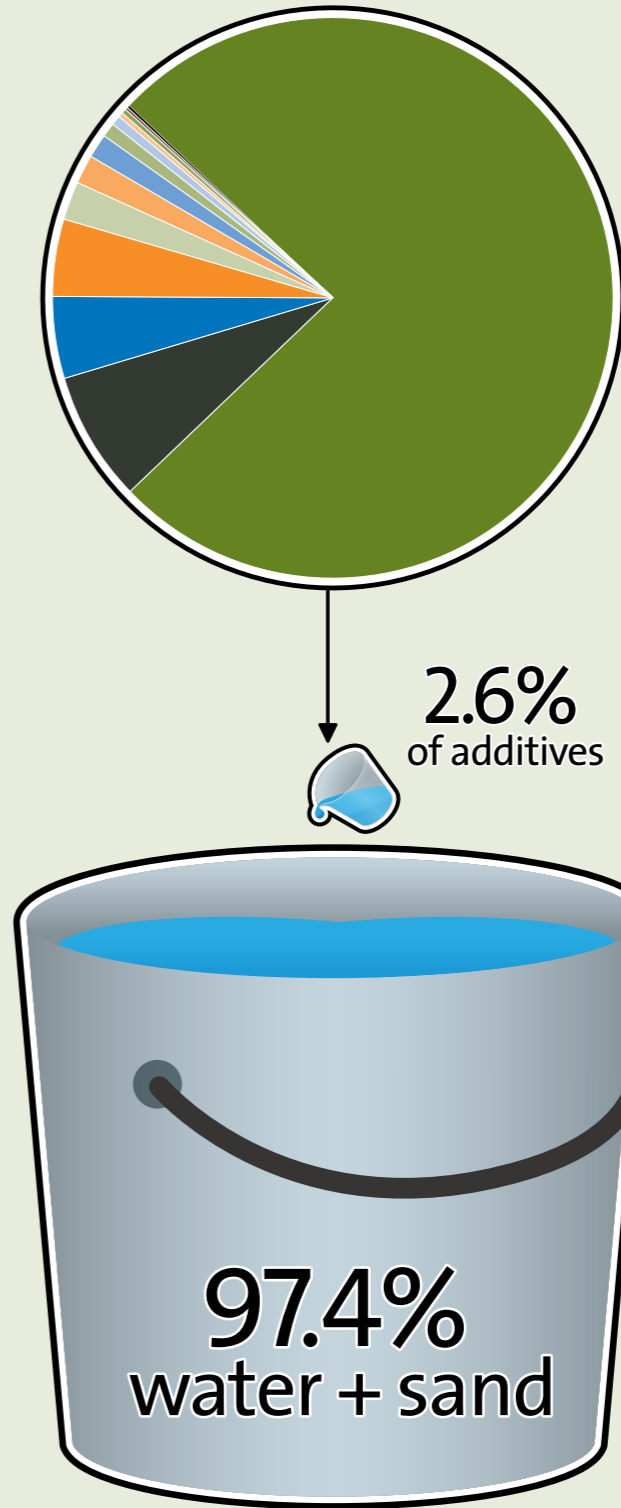
The chemicals are further diluted when injected into the coal seams by the water already present in the seams, so that when they are brought back up to the surface they are barely detectable.

What about groundwater?

Questions have also arisen around the risks of fracking and groundwater contamination.














At Origin we protect shallow aquifers by using a steel casing or liner which is then cemented into place, isolating the surrounding rock and aquifers from the producing coal seams.

Only experienced service contractors are used to pump fracs and their equipment is certified and tested prior to every frac. A frac site is a very controlled and monitored work environment.



Potassium chloride	2%	Sodium Thiosulphate	0.06%	Bleach	0.016%
Guar gum	0.2%	Acetic acid	0.04%	Terpenes / terpenoids / sweet orange oil	0.01%
Alcohol	0.12%	Caustic soda	0.04%	Enzyme	0.005%
Monoethanolamine Borate	0.12%	Ferric chloride	0.02%	Bronopol	0.0018%
				Octoborate	0.0007%

The additives used in the fraccing process

Additive	Common name		Common use	Purpose of use	Average % used by volume
Acids and Bases	Acetic acid		Found in vinegar, inks and paints	pH adjustment of water as a buffer	0.040
	Caustic soda		Used in soap production, chocolate and cocoa processing, soft drink processing, paper pulp manufacturing, fuel production	Helps dissolve minerals pre-fraccing	0.040
Biocides	Bleach		Disinfectant, bleaching agent, water treatment, dental sterilisation	Eliminate bacteria in water	0.016
	Bronopol		Disinfectant, preservatives, household cleaners, water treatment		0.0018
Breaker	Enzyme		Enzyme active, washing powder	Allows a delayed breakdown of the gel polymer	0.005
Potassium chloride	Potassium chloride		Table salt substitute, also used in fertilisers and some medical treatments	Stabilises clays to prevent swelling and maintains effectiveness of other additives	2.000
Crosslinker	Monoethanolamine Borate		Antiseptic, flame retardant	Increase and maintain fluid viscosity	0.12
	Octoborate		Agriculture sprays		0.0007
Surfactants	Alcohol		Alcoholic beverages, fuel	Reduce surface tension to aid in gas flow	0.12
	Terpenes / terpenoids / sweet orange oil		Pharmaceuticals, contributes to flavour of cinnamon, cloves and ginger		0.01
Guar gum / gel	Guar gum		A thickener in cosmetics, baked goods, ice cream, toothpaste, sauces and salad dressing	Thickens fluid (water) to help suspend sand	0.2
Gel Stabilizer	Sodium Thiosulphate		Aquarium and Aquaculture	Removes chlorine	0.06
Flocculant	Ferric chloride		Water treatment	Removes clay	0.02