COAL SEAM GAS
FACT SHEET 3


# HOW IS COAL SEAM GAS **EXTRACTED?**

Coal Seam Gas (CSG) is extracted from deep below the ground using world-best practice techniques that protect the community and our environment.

## Extraction techniques

There are different ways of extracting CSG from below the ground. They include vertical drilling and horizontal or directional drilling. Hydraulic fracturing is sometimes used to release gas from a coal seam. The well is usually only fracture stimulated once during its lifetime.

## Hydraulic fracturing

Hydraulic fracturing has been used by the oil and gas industry since 1948. In Australia, the practice can be traced back over 40 years where it was used in the production of energy resources including conventional natural gas. Hundreds of natural gas wells in South Australia's Cooper basin have been fracture stimulated since the 1970s.

The process has also been used in NSW to enhance water flows from water bores. However, in CSG production fracturing is becoming less common as companies move towards horizontal drilling to enhance methane production.

In situations where the fracturing process is used, fluid is pumped under pressure into the coal seam to open up fractures.

The fluid is typically a mixture of sand, water and minor additives that open up cracks in the seam to create a path for water to flow back to the surface.

The process depressurises the coal seam, allowing the gas in the pores of the coal to be released and flow to the surface.

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> Fracturing fluid is 97-99% sand and water.

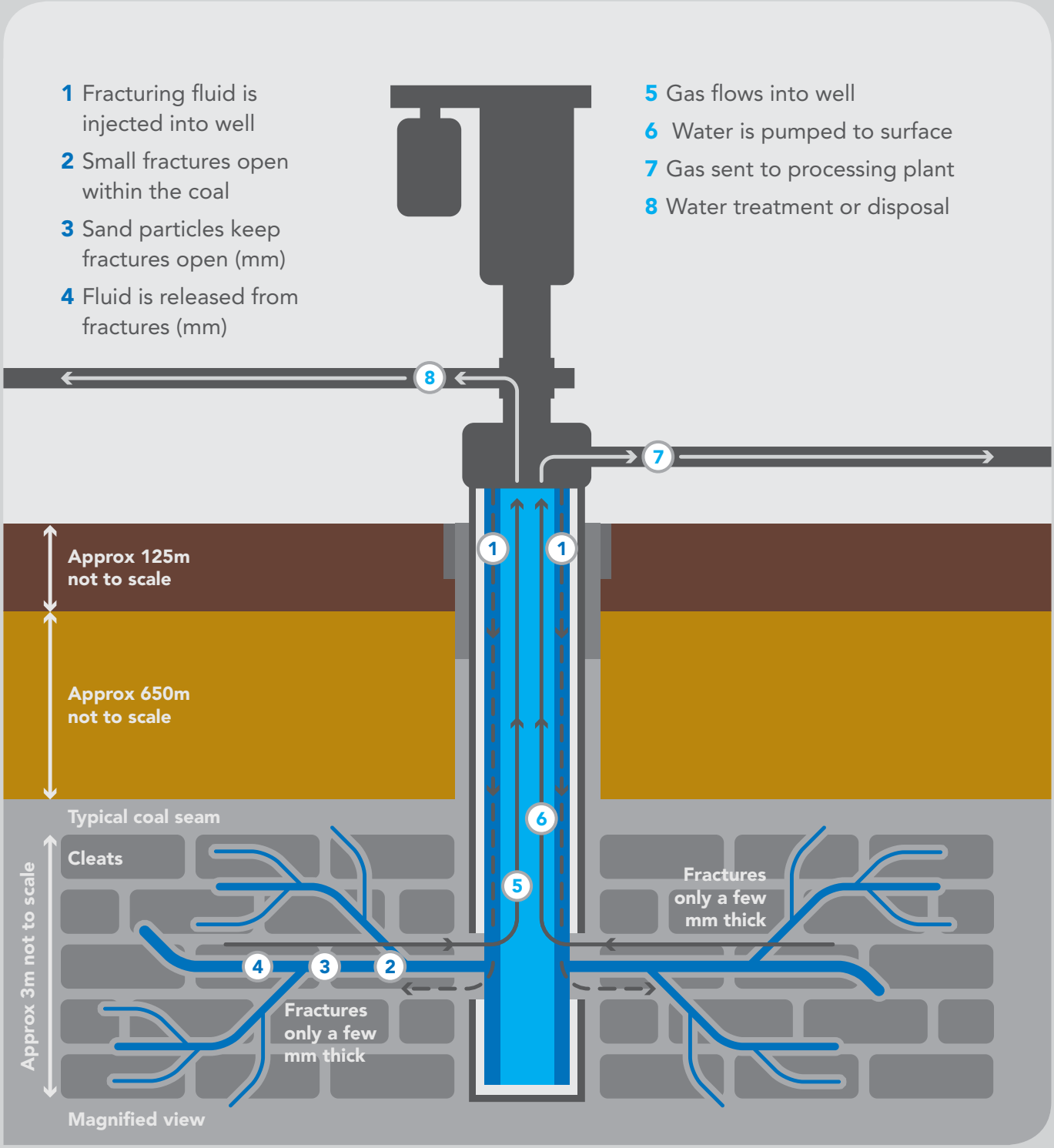
The gas and liquid are brought to the surface via a pipe which is encased in layers of concrete and metal to prevent any leakage into permeable layers, including aquifers. On the surface, the gas is separated from the water.

The produced water is safely disposed of, or treated and recycled for industrial purposes or irrigation.

The gas is sent to a compressor station and may then be used in power stations, or join the natural gas supply for use by households and businesses.

### Banned chemicals

To protect ground water, surface water and the environment, the



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> Harmful chemicals have been banned.

NSW Government has banned the use of harmful chemicals known as BTEX. These chemicals are used in some overseas hydraulic fracturing operations.

Fracturing fluid is 97-99% sand and water[1], with a small amount of commonly-used biodegradable compounds included to prevent bacterial growth and to turn the fluid into a gel so it can be pumped more easily.

The biodegradable compounds include the following household chemicals:

- Guar gum (found in ice-cream);
- Surfactants (in soap and toothpaste);
- Sodium hypochlorite and hydrochloric acid (in swimming pools);
- Acetic acid (in vinegar).

The permitted components, already highly-diluted, are further diluted by the water in the coal seam.

Samples of CSG drilling additives and CSG fracture stimulation additives may be taken at any time by Government inspectors to verify compliance.

Any chemicals used in the extraction of CSG must be disclosed as part of the application process and are published on the NSW Trade & Investment – Division of Resource & Energy's website. Government agencies assessing the application determine whether the use of those chemicals is safe for both the community and environment.

## Horizontal drilling

More recent techniques such as horizontal drilling are emerging as an alternative to hydraulic fracturing and are increasingly used in NSW.

Horizontal drilling occurs at deep levels underground and reduces the number of visible vertical wells located above ground.

Once the coal seam has been located, the well bore is encased and pressure-cemented at ground level. Smaller holes are drilled horizontally into the coal seam to stimulate pathways through which the gas can flow into the well, thereby eliminating the need for hydraulic fracturing.

[1] www.csiro.au


A CSG production well operating on NSW farmland.