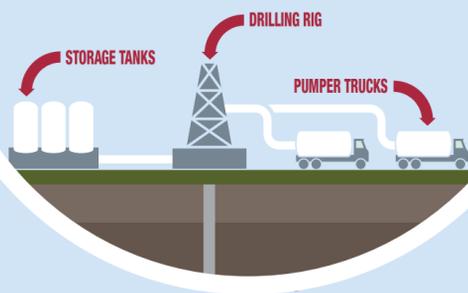


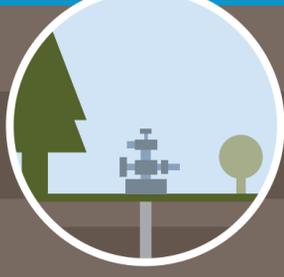
HYDRAULIC FRACTURING

HOW IT WORKS

FRACTURING STAGE SURFACE ACTIVITY



0m



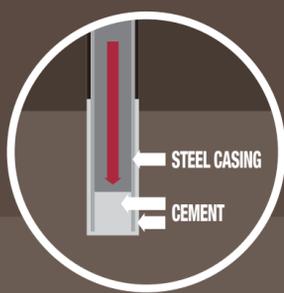
WELLS CAN PRODUCE NATURAL GAS FOR UP TO 30 YEARS WITHOUT HAVING TO BE HYDRAULICALLY FRACTURED AGAIN.

1 DRILLING THE WELL

Unconventional natural gas reserves are typically located between two and three kilometres below the earth's surface and hundreds of metres deeper than the deepest drinkable groundwater.

FRESH WATER

500m



CEMENT IS PUMPED INTO THE WELLBORE WHERE IT SURROUNDS THE CASING. THIS CREATES A SOLID BARRIER AROUND THE WELL.

2 SURFACE CASING

Steel casing is inserted and cemented in place along the way, creating a solid barrier between the well and any underground fresh water sources.

WATER TABLE

2 OR MORE LAYERS OF CEMENT AND STEEL CASING

FRESH WATER

3

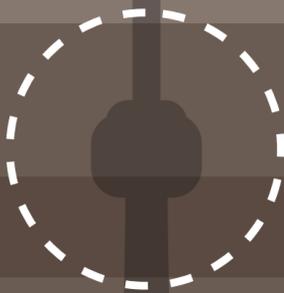
3 INTERMEDIATE CASING

Intermediate casing extends even deeper below any fresh water sources and provides an additional layer to the production casing.

INTERMEDIATE CASING
PRODUCTION CASING

REGULATIONS COMBINED WITH INDUSTRY'S OPERATING PRACTICES ENSURE SAFEGUARDS ARE IN PLACE TO PROTECT PEOPLE AND THE ENVIRONMENT.

1000m



THE DEPTH OF AN AVERAGE HYDRAULICALLY FRACTURED WELL IS ABOUT THE LENGTH OF FOUR CN TOWERS.

4 HORIZONTAL DRILLING

Horizontal drilling techniques extend the well hundreds of metres into the formation to maximize the production zone and allow more natural gas to be extracted from each well.

5

5 PERFORATING THE WELLBORE

Prior to fracturing, the wellbore casing is perforated to provide an entry point for the natural gas to flow.

6 FRACTURING

Fracturing fluid is pumped down the well under pressure, which fractures the shale rock. These fractures extend between 50 and 100 metres from the horizontal leg of the wellbore. The sand in the fracturing fluid props open the rock and provides a pathway for the natural gas to flow to the wellbore.

98.5% WATER & SAND

1.5% ADDITIVES

THE FRACTURING FLUID IS A MIXTURE MADE UP OF 98.5% WATER AND SAND WITH THE REMAINDER COMPRISED OF ADDITIVES, MANY OF WHICH ARE FOUND IN HOUSEHOLD PRODUCTS.

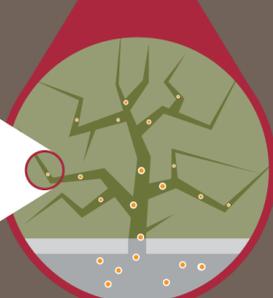
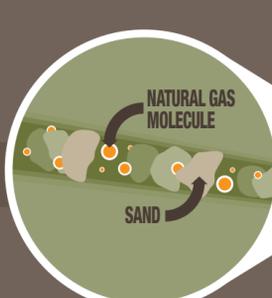
4

5

6

2000m

WHEN FRACTURING IS COMPLETE, THE SAND PROPS OPEN THE FRACTURES TO PROVIDE A PATHWAY FOR THE NATURAL GAS TO FLOW INTO THE WELLBORE MORE EASILY.



PROVEN TECHNOLOGY UNLOCKING CLEANER-BURNING ENERGY

The world will need more energy. According to the International Energy Agency, global demand for energy is expected to increase 30% by 2040. World demand for natural gas is expected to increase 45% by 2040.

Hydraulic fracturing is a safe, proven technology that has opened up abundant sources of the cleanest-burning fossil fuel – natural gas. Through continued innovation and responsible operations, Canada is leading the way in developing this important resource responsibly in order to meet the world's growing energy demand.

TO LEARN MORE, VISIT CAPP.CA AND CANADASNATURALGAS.CA

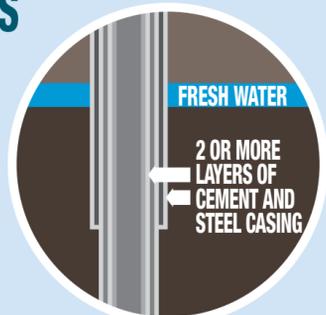
CAPP CANADA'S OIL & NATURAL GAS PRODUCERS

WATER

1

A PROPERLY CONSTRUCTED NATURAL GAS WELL PROTECTS OUR WATER

Canada's natural gas industry supports a safe and responsible approach to hydraulic fracturing and water management. Protecting water during sourcing, use and handling is a priority for the industry. Industry supports and abides by all regulations governing water use and protection. In addition to government regulations, industry's guiding principles and operating practices ensure that water sources are protected. For example, each wellbore includes steel casing that is cemented in place to prevent gas or liquid from migrating into groundwater sources.



SAFETY

2

HYDRAULIC FRACTURING IS A SAFE TECHNOLOGY REGULATED BY GOVERNMENT

Canada's natural gas industry is one of the best regulated in the world. While each province has its own regulations, all jurisdictions have laws to minimize impacts, to protect fresh water aquifers and to ensure safe and responsible development. For example, provincial governments issue water licences or permits for fresh water use by industry and strictly regulate water use and disposal.



CO₂

3

USING NATURAL GAS MEANS LESS GREENHOUSE GAS EMISSIONS

Natural gas, the cleanest-burning hydrocarbon, can be used in a variety of ways to help reduce Canada's GHG emissions, including in the transportation and electricity generation sectors. As the fifth-largest producer of natural gas globally, Canada has enough supply to last at least 300 years, given current domestic consumption. With this abundance of natural gas, opportunities exist to broaden the use of cleaner-burning natural gas, both domestically as well as globally, at the same time as reducing GHG emissions.

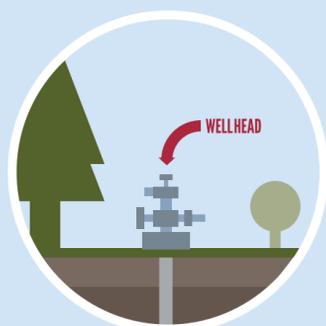
FOOTPRINT

4

ONCE COMPLETED, A SINGLE NATURAL GAS WELL CAN TAKE UP EVEN LESS SPACE THAN A TYPICAL TWO-CAR GARAGE

Canada's natural gas industry is committed to minimizing its footprint and is required, by regulations, to reclaim all land affected by operations and maintain biodiversity. Emerging production technologies allow wells to be drilled more efficiently with less impact on the land than in the past. Advances in horizontal drilling and the use of multi-well drilling pads have greatly reduced the area of land disturbed in drilling operations.

When a well is no longer producing, the surface is reclaimed as required by regulation. Depending on the location, it can take five years or more to complete the reclamation of the land. The process includes plugging and capping the well, removing equipment, cleaning up any residual chemicals, replacing topsoil and re-planting the site with native vegetation. A government reclamation certificate or other approval is issued when the work meets the regulated requirements.

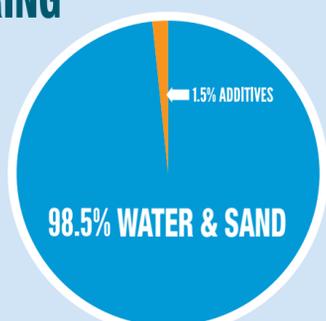


FRACTURING FLUID

5

NATURAL GAS PRODUCERS SUPPORT DISCLOSURE OF ADDITIVES USED IN HYDRAULIC FRACTURING

Canada's natural gas producers fully support the public disclosure of fracturing fluid additives. Public disclosure of hydraulic fracturing fluids via an online registry is mandatory in British Columbia, Alberta and the Northwest Territories. Industry's support of public disclosure of fracturing fluids combined with government regulations demonstrate ongoing efforts to ensure safe development of Canada's natural gas resources. Natural gas can be and is produced responsibly every day in Canada with more than 175,000 wells fractured in Western Canada over the last 60 years without harm to groundwater.

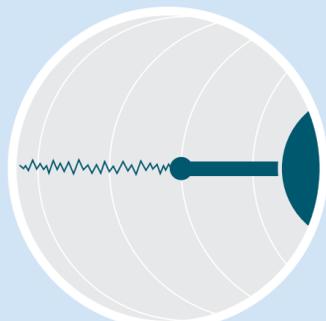


SEISMIC ACTIVITY

6

MICROSEISMIC ACTIVITY INDUCED BY HYDRAULIC FRACTURING IS PLANNED AND MANAGED

Hydraulic fracturing is a controlled process that injects pressurized fluids into the geological formations where natural gas is locked in the rock, such as shale. The pressurized fluid cracks the rock. The energy released in this process causes microseismic activity. Documented scientific evidence indicates that microseismic activity associated with hydraulic fracturing is rarely felt on the surface, and does not cause significant risk to the public or environment.



DIGGING DEEPER

GET THE FACTS ON HYDRAULIC FRACTURING