



# NATURAL GAS DEVELOPMENT

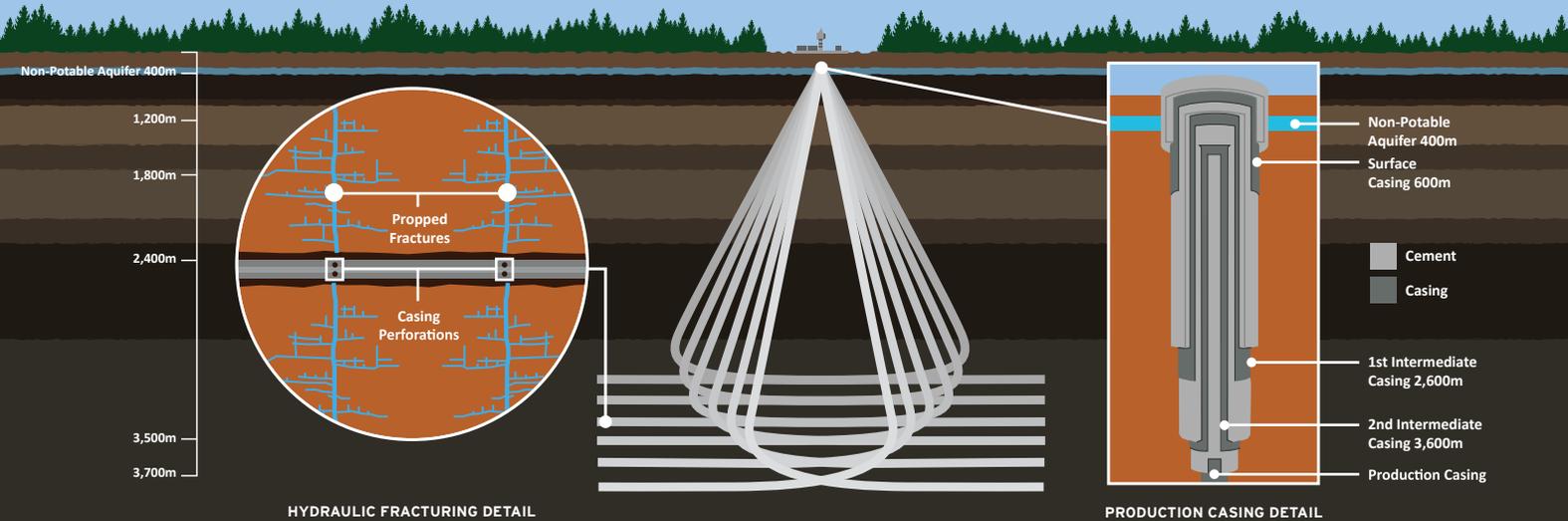
**FACT #1:** Since the 1940s, hydraulic fracturing has been used globally in 2 million+ wells

**FACT #2:** In Western Canada, 215,000+ wells have been hydraulically fractured safely over the past 60 years

**FACT #3:** Hydraulic fracturing provides over 60% of the natural gas moving in northern B.C. pipelines to B.C. homes

**FACT #4:** In British Columbia, companies are required to publicly disclose hydraulic fracturing fluid additives on [FracFocus.ca](http://FracFocus.ca)

Note: Illustrations are not to scale



HYDRAULIC FRACTURING DETAIL

PRODUCTION CASING DETAIL

## WHAT IS HYDRAULIC FRACTURING?



Hydraulic fracturing is a process where water with a small amount of additives and sand are pumped down a well at high pressure



The pressure causes the rock in that formation to fracture and natural gas in the rock formation to be released



The natural gas flows to the surface through the reinforced well where it is processed and shipped by pipelines to customers



Underground vibrations are monitored closely using real-time seismic monitoring equipment. If vibrations exceed a threshold set out by regulators, the hydraulic fracturing operation is immediately suspended



Unconventional natural gas reserves in northeastern B.C. are typically located between 2-4 kilometres underground – significantly deeper than deepest drinkable groundwater



Before any well work can begin, the required permits must first be granted by B.C.'s independent regulator, the BC Oil and Gas Commission



Before hydraulic fracturing begins, and throughout its life, the well is tested for integrity and to ensure that the casings and sealing cement will prevent fluids or gas from migrating



Horizontal drilling techniques extend well length up to 3.5 kilometres horizontally along shale rock formations to maximize production and minimize above ground footprint

## DID YOU KNOW?



On average, the hydraulic fracturing process takes only 3 to 10 days. Once completed, the well will produce natural gas for several decades



Well total depth can range between the equivalent of 5 to 10 CN Towers stacked end-to-end



Actual water use in B.C. for natural gas development in 2012 was less than 0.075 % of mean annual runoff in all rivers and basins



In 2014, Chevron was the first company in the U.S. to receive full certification from the independent Centre for Sustainable Shale Development for protecting water and air

## PROTECTING THE ENVIRONMENT/SAFETY



Chevron wells are developed following industry best practices, rigorous standards and processes to prevent groundwater impact. Technology is in place to manage hydraulic fracturing fluid in a safe and environmentally responsible manner



Chevron strives to recycle and reuse all well flowback and produced water during the development phase. When not feasible, Chevron disposes all flowback and produced water in accordance with government regulations at designated facilities



Industry in B.C. is working closely with the BC Oil and Gas Commission to monitor seismic activity to ensure continued safe development of shale gas