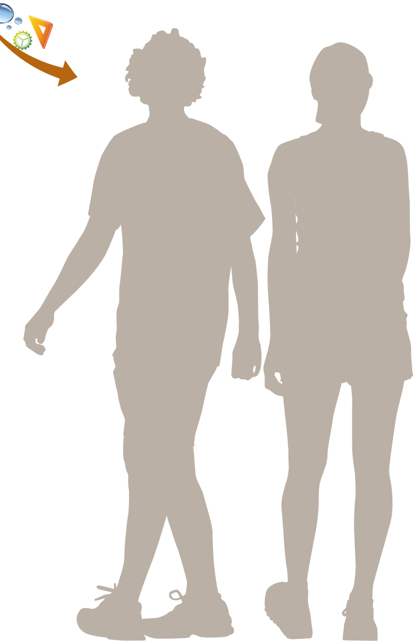
TRICAN

TALKING OIL & GAS



CONTENTS

INTRODUCTION

This booklet is for you, your family and friends.

You've found yourself a good job at Trican and you like the company. But sometimes you hear or see things about our industry that make you wonder if you made the right choice. Could Trican be doing things that hurt the environment or the people you work with? Could the claims made against our industry be true?

There's a lot of concern and much misinformation circulating about our industry, and this booklet is written to answer questions about oil and gas, and the work we do at Trican. It is intended to help you understand the issues, and respond to some of the concerns being expressed by your friends, family, on the news, and sometimes by colleagues.

This booklet is designed help you get in on the discussion about oil and gas, and in particular, hydraulic fracturing. We want you and your family to be proud of the company you work for and the work that we do at Trican. Thank you for being part of the conversation.

We've drawn our facts from credible third party resources with citation at the back of the booklet. We have also posted a pdf version on TricanConnect and have printed copies in Calgary's Communication and Marketing department.

If, after reading this booklet, you still have questions, please send them to us at **info@asktrican.com**. We will answer your questions in one of several ways, whether on the Company intranet, in person, or by updating this booklet with new information. Thank you for taking this opportunity to Talk Oil and Gas.

WHAT IS NATURAL GAS?

CONCERN: Natural gas is good, but Shale gas is bad.

ANSWER: Shale gas and Natural gas are the same thing.

Some definitions:

Natural Gas/Shale Gas/Tight Gas

Natural gas is a naturally-occurring hydrocarbon consisting primarily of methane, but it may also contain small amounts of ethane, propane, butane and pentanes. Natural gas is one of the cleanest burning fossil fuels, and releases 45 percent fewer greenhouse gas emissions than coal.[1]

Natural gas was formed millions of years ago as heat and pressure transformed decaying plant and animal matter buried in sedimentary rock layers. The gas produced is trapped under solid layers of rock that keeps it from flowing to surface.

Both **Shale Gas** and **Tight Gas** are the same gas as **Natural Gas**. The name describes only where the gas is found.

Shale gas can be found in fine-grained, organic-rich, sedimentary rock called shale. The natural gas is tightly locked in small pore spaces in the reservoir rock, requiring advanced technologies to drill, fracture and produce the gas-bearing zones.

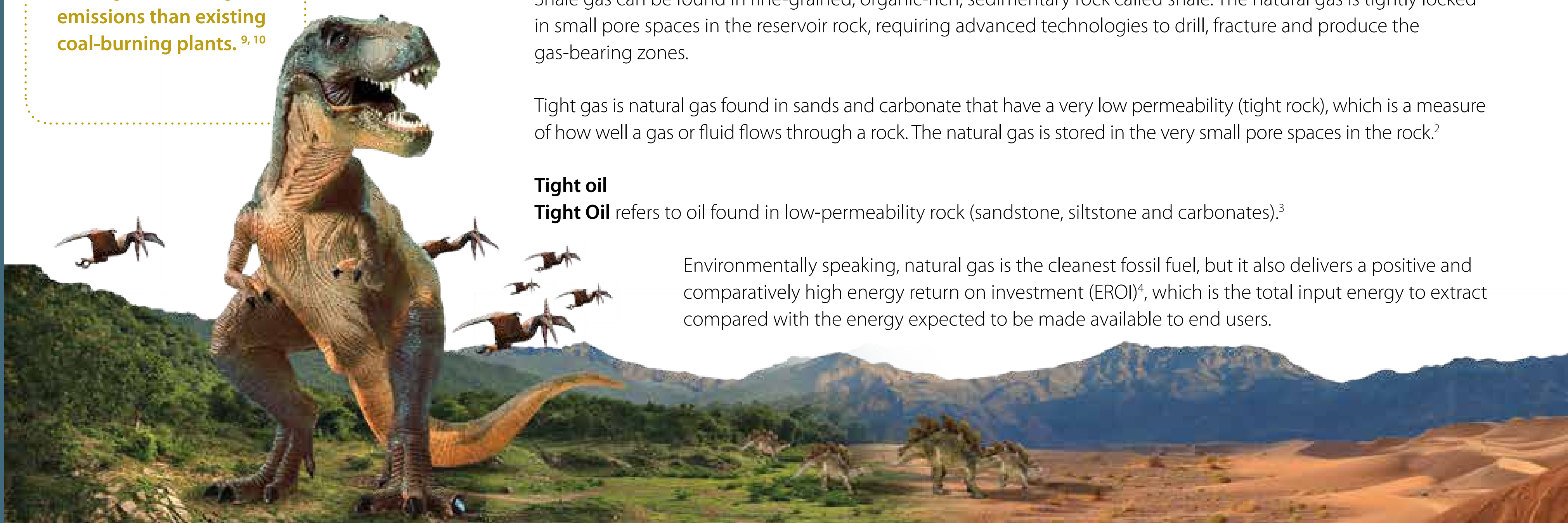
Tight gas is natural gas found in sands and carbonate that have a very low permeability (tight rock), which is a measure of how well a gas or fluid flows through a rock. The natural gas is stored in the very small pore spaces in the rock.[2]

Tight oil

Tight Oil refers to oil found in low-permeability rock (sandstone, siltstone and carbonates).[3]

Environmentally speaking, natural gas is the cleanest fossil fuel, but it also delivers a positive and comparatively high energy return on investment (EROI)[4], which is the total input energy to extract compared with the energy expected to be made available to end users.

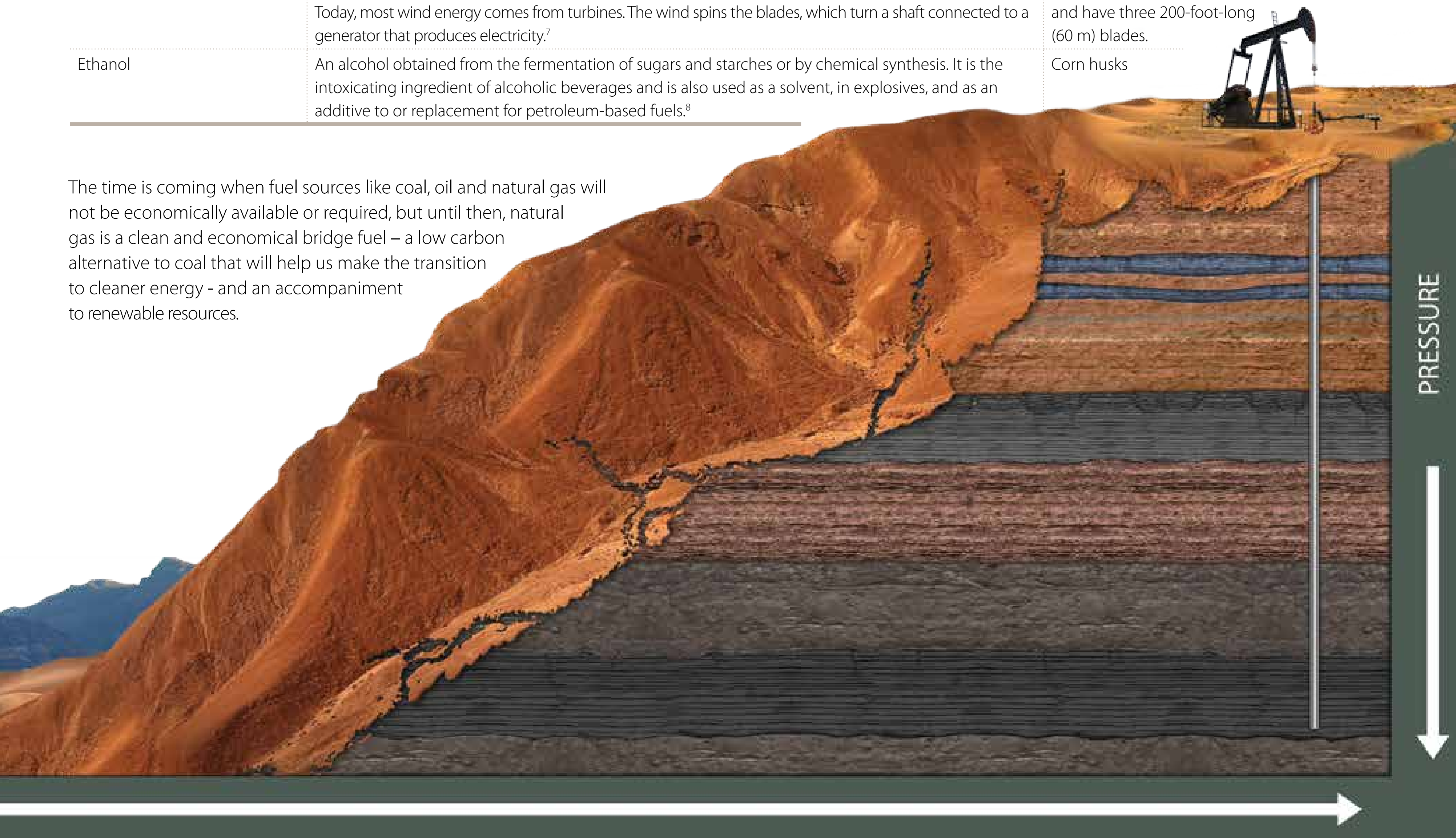
Both oil and natural gas are cheaper, easier to transport and more reliable than renewable resources such as wind and solar. According to US EPA and EIA publications, natural gas also has a lower "levelized" cost (total cost per kilowatt-hour) than coal, while producing less carbon dioxide, sulfur, nitrous oxide and mercury. In fact, gas-fired power stations produce from 45 to 70 per cent fewer greenhouse gas emissions than existing coal-burning plants.[9, 10]



Let's compare the types of fuel and how they meet our energy needs. Fuel is any material that stores energy that can later be extracted to perform mechanical work in a controlled manner[5].

Fuel	Comes from	Examples
Biofuels Biodiesel	Any carbon source that can be replenished rapidly. This energy is carbon neutral – the carbon dioxide released when fuel is burned is first extracted from the atmosphere when the item is grown.	Plants, algae, wood, dung
Fossil fuels	Formed from the fossilized remains of ancient plants and animals. The fuel comes from exposure to high heat and pressure, in the absence of oxygen in the Earth's crust, over hundreds of millions of years.	Hydrocarbons: coal, liquid petroleum, natural gas, and crude oil
Nuclear fuel or atomic energy	Energy released by the nucleus of an atom as the result of nuclear fission, nuclear fusion or radioactive decay.	Uranium
Solar energy	Active solar technology: solar panels, used to harness the energy of the sun. Passive solar technology: orientating a building to the sun, so a building uses light in an efficient way.	Sun
Wind energy	Wind exists because the sun unevenly heats the surface of the earth. The first windmill dates back to 65BC[6] Today, most wind energy comes from turbines. The wind spins the blades, which turn a shaft connected to a generator that produces electricity.[7]	Wind turbines can be as tall as a 20-story building and have three 200-foot-long (60 m) blades.
Ethanol	An alcohol obtained from the fermentation of sugars and starches or by chemical synthesis. It is the intoxicating ingredient of alcoholic beverages and is also used as a solvent, in explosives, and as an additive to or replacement for petroleum-based fuels.[8]	Corn husks

The time is coming when fuel sources like coal, oil and natural gas will not be economically available or required, but until then, natural gas is a clean and economical bridge fuel – a low carbon alternative to coal that will help us make the transition to cleaner energy - and an accompaniment to renewable resources.



LET'S TALK RESOURCE RECOVERY

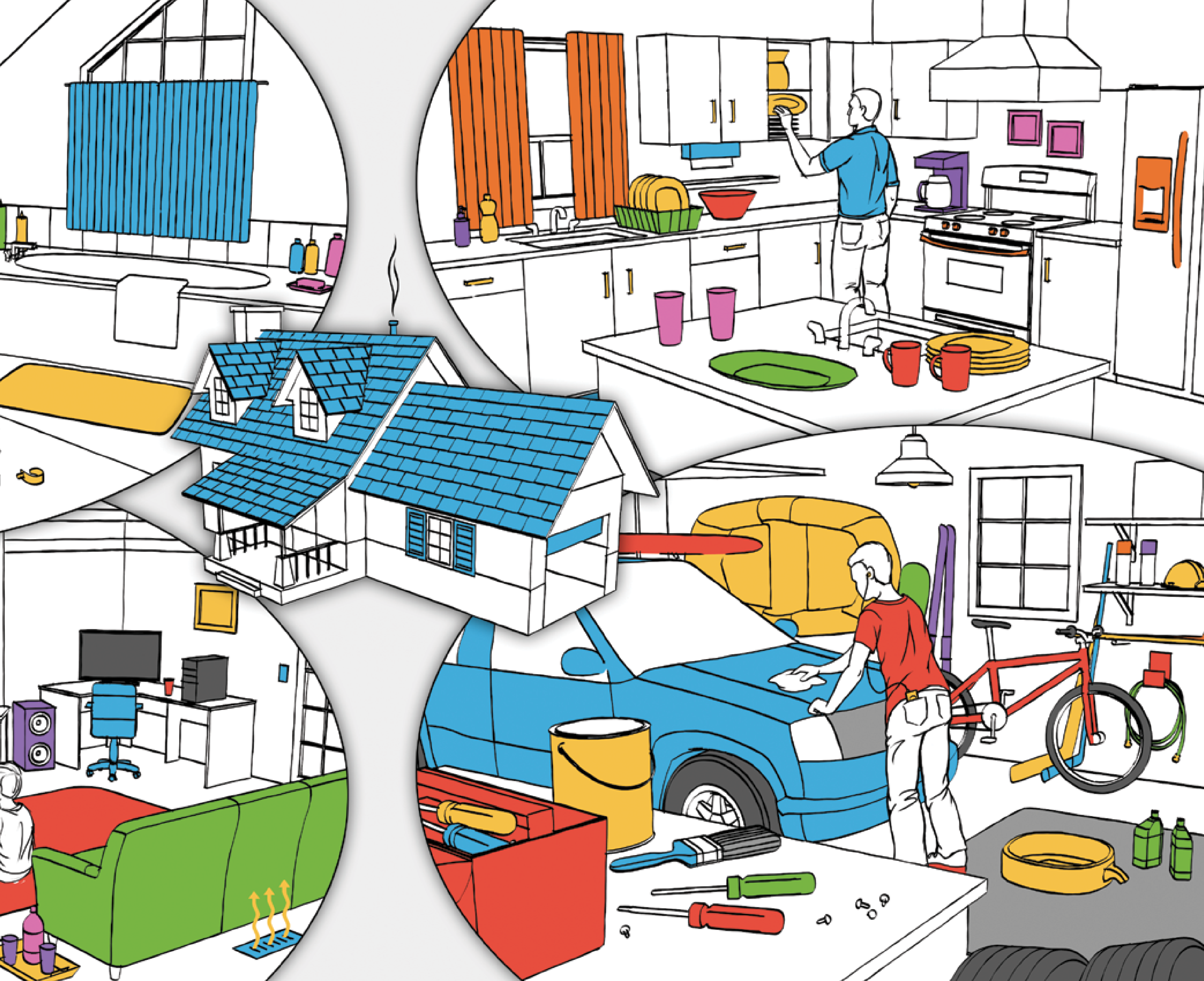
The work we do in our jobs helps provide the energy we need to heat our homes and businesses, generate electricity, drive our vehicles and power our devices, but it doesn't count for much if we harm our planet while doing it. That's why best practices developed over the past 60 years and various levels of regulations are in place: to ensure that any surface effects of oil and gas operations are temporary, and that there are no long term issues above or below ground that we'll live to regret.

Hydraulic fracturing is only one step in the process to extract oil or natural gas from shale and other tight rock formations. We'll briefly cover each of the steps, then talk about hydraulic fracturing in detail, so you know what is – and more importantly, what isn't - part of the fracturing process. Once a well is complete, most of the infrastructure is removed and the landscaping is restored. A well can produce natural gas for 20 to 30 years[11], or oil for 10 to 20 years.

Petroleum is a valuable natural resource because of its many uses:

- **Fuel (gasoline, diesel, jet fuel, heating and cooling, propane, electricity generation, etc.)**
- **Plastics (cars, home building materials, computers, housewares, toys, furniture, etc.)**
- **Other synthetic materials (tires, paint, packaging, film, fabric, upholstery, carpet backing, surfboards, detergents, vitamins, medication, make-up, shampoo, toothpaste, deodorant, perfume, clothing, shoes, ink, chemicals, etc.)**
- **Road construction (asphalt, tar)**
- **Agricultural products (fertilizers, pesticides, herbicides, etc.)**
- **Paraffin wax**
- **Lubricants**
- **Gases (helium, sulfur, etc.)**

Explore the image to the right to see all the ways in which petroleum products are part of our lives. If it's coloured, it's most often petroleum-based.



Shale drill-core sample

STEP 1
THE EXPLORATION PROCESS
1–2 Years

STEP 2
BUILDING THE ACCESS AND WELL PAD
1–2 Weeks

STEP 3
RUCTING THE WELL
D CEMENTING
3–24 Weeks

STEP 4
STIMULATION
Few Days

1. THE EXPLORATION PROCESS

Before Trican trucks drive onto a well site, much has been done by the producer (oil/gas company) to determine the potential of a reservoir. The producer will:

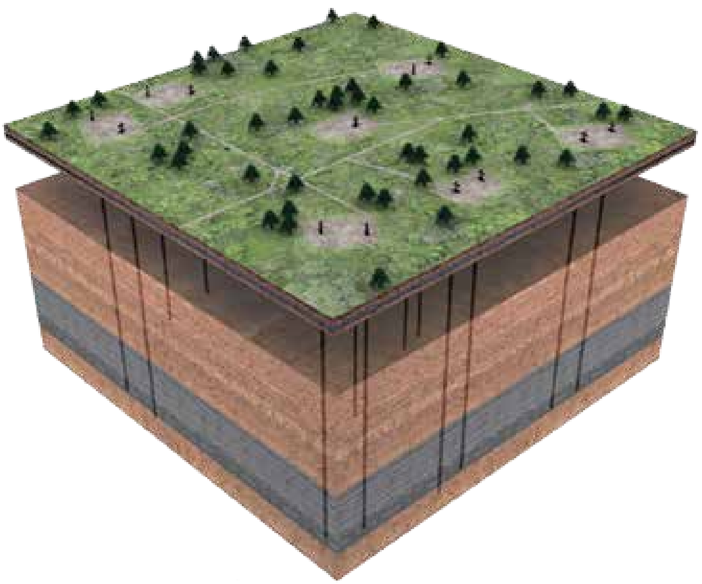
- study the surrounding geology
- purchase mineral rights
- get a licence and permits from the government
- get agreement with the landowner
- plan safety and emergency procedures, and identify environmental requirements
- prepare the location for drilling

Trican Geological Solutions is often involved in helping a producer evaluate the potential of a resource play by studying the rock composition and evaluating its resource-bearing properties. Even if the resource opportunity is high, the producer also needs to know if the financial risks are worth the potential payoff, so they study things like accessibility, ecology, wildlife, water sources and waste disposal facilities. If the location looks promising, then they need to get more permits, sign a lease agreement and plan how they will eventually restore the land to its original condition. Meeting the requirements for permits can sometimes take years.[12]

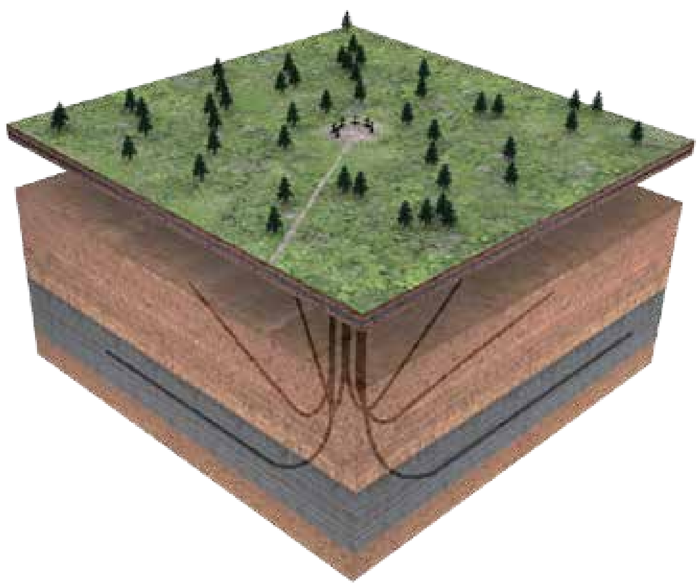
Equipment used to extract and measure the amount of water and oil stored in rock samples.

STEP 5	STEP 6
PRODUCTION AND ONGOING TESTING 10–30 Years	END OF PRODUCTION AND RECLAMATION 5 Years

2. BUILDING THE ACCESS ROAD AND WELL PAD



Vertical well pads



Horizontal well pad

Horizontal drilling uses the flexibility of drilling pipe coupled with a steerable motorized bit to turn a vertical well onto a horizontal plane at a measured depth. This process of intersecting the reservoir horizontally allows the well to have much greater contact with the reservoir and access to natural gas.[16]

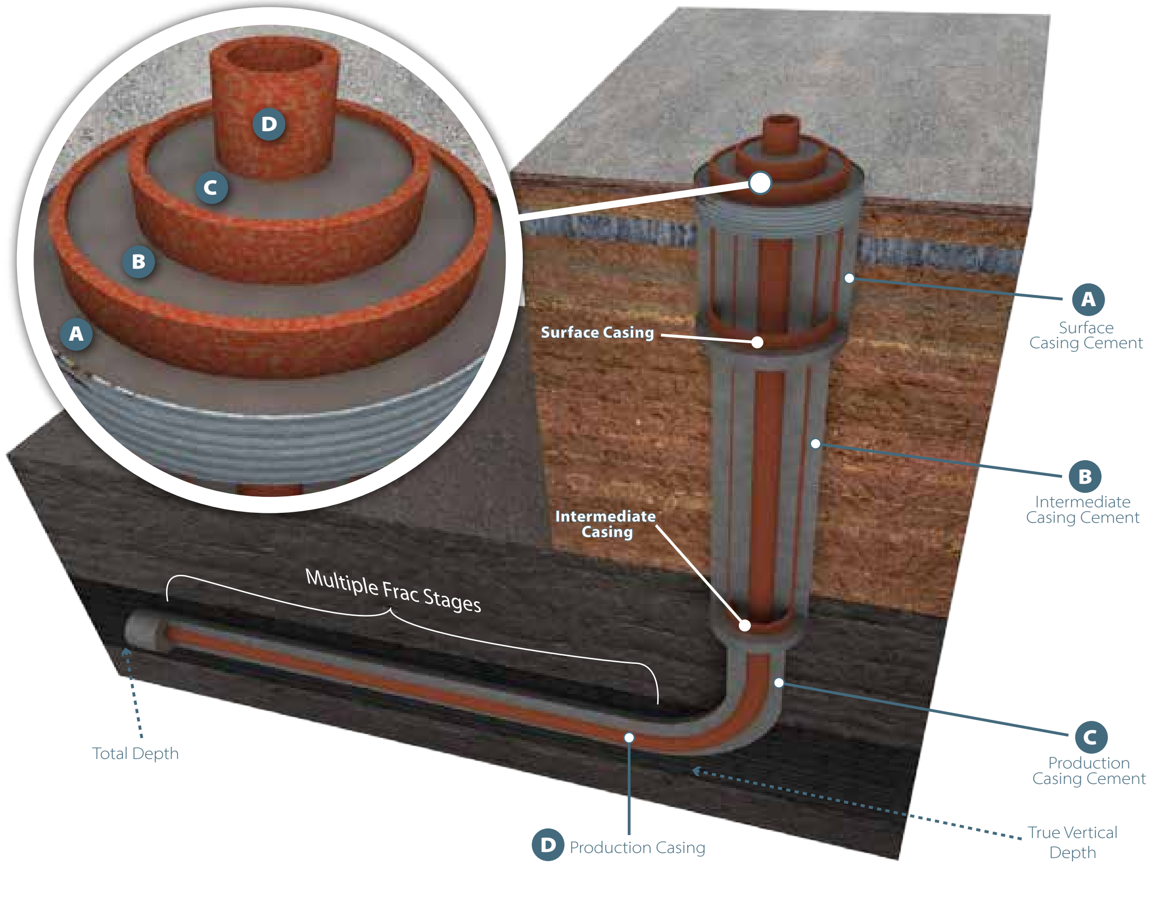
The industry used to drill multiple wells vertically, each on its own site, in order to achieve many contact points with the reservoir. Horizontal drilling allows many wells to be drilled from one pad, enabling the surface footprint for a well to be minimized, meaning less of an impact on the environment.

A single well pad and a road to get to it generally require clearing about 19,425 m^2 (4.8 acres). On a four-well pad, these horizontal wells can drain the equivalent of 10-20 vertical wells, resulting in only one tenth of the land disturbance and protecting all manner of sensitive areas. Building the access road and the well pad generally takes about one week.[13, 14, 15]

Well construction varies depending on the depth and makeup of the formation. For the purposes of this booklet, we will describe practices associated with primarily shale gas.

3. CONSTRUCTING THE WELL AND CEMENTING

Time involved – four to five weeks of drilling rig work, including casing and cementing and moving all equipment off the well site before fracturing operations commence[17]



PLEASE NOTE: casing and borehole width/depth are exaggerated for clarity

Whether drilling a vertical or horizontal well, the initial steps are the same - the initial hole, or wellbore, is drilled straight down.

Interzonal isolation refers to ensuring the integrity of a well and preventing leakage. At least two layers of steel pipe (called casing) are added into the wellbore. A company like Trican will be involved in cementing the surface casing for the well. Surface casing is typically run to a depth of 200 - 300 metres (600 - 1000 feet), and provides protection for groundwater during subsequent drilling. Surface casing also helps keep control of the well when the company drills into deeper rock formations, or if it encounters any pressure changes during the drilling or production of the well.

During the drilling phase, drilling mud is circulated through the drill string (the pipe in the hole) and up the backside (the space between the rock and the pipe). Drilling mud is a term used for mixtures of fluids and solids that keep the drill bit lubricated, remove drill cuttings from the wellbore, and prevent oil or gas from entering the well while it is being drilled.

Logging or wireline tools are then run down hole. These tools are designed to scan the wellbore to identify hydrocarbon-bearing zones. The industry calls this open hole well logging.

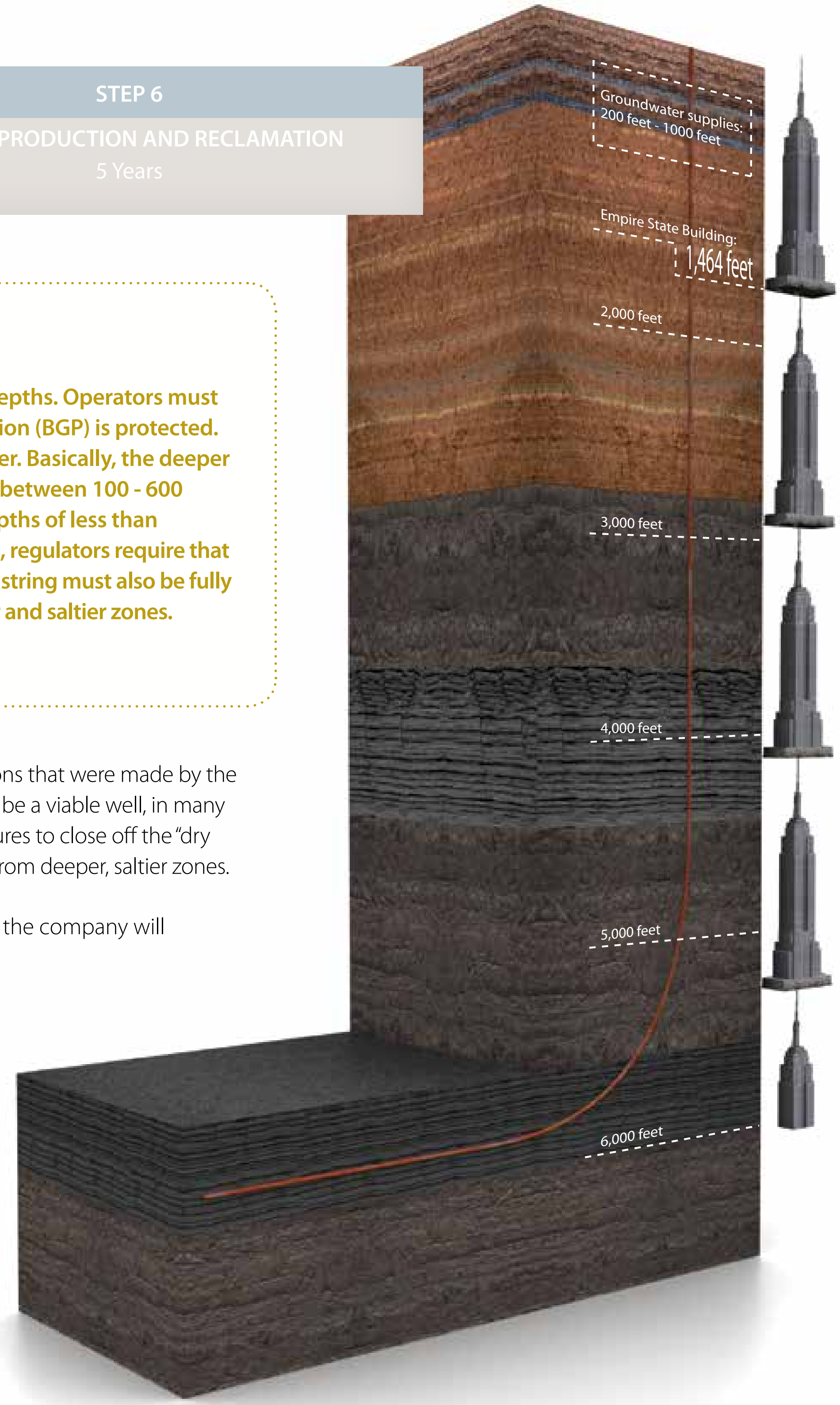
STEP 5	STEP 6
PRODUCTION AND ONGOING TESTING 10–30 Years	END OF PRODUCTION AND RECLAMATION 5 Years

Groundwater that is used for human consumption is found at relatively shallow depths. Operators must always ensure fresh groundwater located above the Base of Groundwater Protection (BGP) is protected. The BGP is characterized not so much by depth, but by the salt content of the water. Basically, the deeper you go, the saltier the water becomes. In Alberta for example, the BGP is found at between 100 - 600 metres (300 - 2000 feet) below surface. Most water wells draw from aquifers at depths of less than 50 metres (164 feet), which is far above the BGP.[18] In Alberta, as in most jurisdictions, regulators require that if surface casing is above the base of ground water protection, then the next casing string must also be fully cemented.[19] The cement isolates the groundwater from contamination from deeper and saltier zones.

At this point, the well is still being assessed for its economic viability. All of the assumptions that were made by the engineers and geologists are now tested. Though they are eager to determine if this will be a viable well, in many cases, it will not prove economical to produce. In that case, the company will take measures to close off the "dry hole". This again involves placing cement in the wellbore to isolate usable groundwater from deeper, saltier zones.

However, if the formations or zones of interest look commercially viable for extraction, the company will complete the well and prepare it for production.

Natural gas wells extend thousands of metres (feet) below the earth's surface and drinking water sources. Many wells are drilled in excess of 1,800 metres (6,000 feet) below ground. That's the equivalent to more than three CN Towers, or over four Empire State buildings![20]



CONCERN: Is cementing an environmental risk?

ANSWER: No. Because cement is designed to be thick and viscous, it does not flow into rock formations. There is very little and only brief contact between the water in a shallow permeable formation (i.e. an aquifer) and the cement before it sets and hardens. Cementing is crucial to isolating formations from one another.

!

The Trican cement engineers have a team of researchers behind them. Trican has R&D labs in Calgary, Alberta; Woodlands, Texas; and Moscow, Russia. The team also comprises full support operations labs in Calgary, Alberta; Longview, Odessa; and Mathis, Texas; and within our Geographic Regions in Russia, Algeria and Australia. At these operations labs, cement blends are mixed and tested following the American Petroleum Institute (API) recommended practices, providing our customers optimal cement performance. A lot of Trican's research has gone into designing lightweight cement blends that also have high compressive strength and good thickening time control.

Preparing a cement blend for testing.

If the well logs look promising, the oil and gas company will likely produce the well. The drilling company will run production casing – a long section of oil field pipe - down the well bore. A company like Trican will cement each casing string as it is placed into the well. Steel casing and cement together create a strong barrier of protection between the well and the rock formations. (See figure on **page 10**.)

Layers of casing and cement serve various purposes, including:

- protecting the groundwater
- anchoring a device called the Blowout Preventer (BOP) to the top of the well. The BOP ensures the well pressure is contained, and ensures the safety of the well, the crew and the equipment during drilling
- providing wellbore stability
- sealing and isolating all zones from one another along the length of the wellbore
- protecting surrounding rock from the high pressure used during stimulation and production[21, 22, 23, 24, 25, 26]

STEP 5	STEP 6
PRODUCTION AND ONGOING TESTING 10–30 Years	END OF PRODUCTION AND RECLAMATION 5 Years

CONCERN: Frac fluids might leak from a well and pollute my drinking water.

ANSWER: Wells have multiple layers of casing and cement to isolate each zone and protect against leaks. The oil and gas company also pressure tests each time there is new casing added to the wellbore, to check for leaks.

Fresh water aquifers are typically 50 metres - 400 metres (160 - 1,300 feet) below surface. At greater depths, any water zones usually contain salt water, unsuitable for drinking. Every attempt is made to isolate any of these salt water zones with cemented casing, as they can interfere with well productivity. Most producing zones are at depths of one to three kilometers (½ mile to 2 miles) below the water table.

Before cementing can begin, engineers will determine the amount of cement needed for the wellbore. They will also consider the type of cement needed, using the information from the logging reports. Trican has various 'blends' that it uses depending on the well's depth, the types of shale present, and the temperatures the cement will encounter as it is pumped into the well. Trican will make a recommendation to our customer, who makes the final decision on which cement is used in the well.

Oil and gas well cement is very different from what you see above ground. Unlike sidewalk or building concrete, well cement has no gravel, and once placed into the warm well, does not experience the above ground freeze and thaw cycle, so the cement does not crack or crumble.

Trican strategically designs and mixes its cement with additives to:

- prevent cementing fluid from migrating into the surrounding rock formations
- prevent gas from migrating through the cement
- ensure the bond between the casing and the formation is sound
- protect the casing from corrosion and collapse
- ensure the cement is strong enough to meet the structural requirements for each well

Once the drilling rig has run casing, the cementing crew will set up to cement the well. As a final check, the production casing and cement are pressure-tested with a mechanical integrity test (MIT) (see sidebar), and the quality of the cement may be verified by cement bond logs. These logs are used to determine whether the bond is solid between the cement and the formation, and between the cement and the casing, so that no gas or fluid can enter aquifers or other zones.

The strength and the condition of the wellbore are essential for the safety of personnel and the environment, and for the economic recovery of the targeted hydrocarbons. For all these reasons, well construction and cementing are very carefully executed and monitored.[27, 28, 29, 30, 31, 32, 33, 34, 35]

Every time there is cement added to an oil well, it is pressure tested on site using a Mechanical Integrity Test (MIT). The MIT is where water is pumped into a well under high pressure to test the casing for leaks. A pressure test occurs after the surface casing is installed, then again when the production casing is added. If there is any production work done to a well during its life cycle, a pressure test will be conducted before the work begins.

STEP 1	STEP 2	STEP 3	STEP 4
THE EXPLORATION PROCESS 1–2 Years	BUILDING THE ACCESS ROAD AND WELL PAD 1–2 Weeks	CONSTRUCTING THE WEL[L] AND CEMENTING 3–24 Weeks	STIMULATION Few Days

4. STIMULATION

There was a time when most oil and gas came from reservoirs that flowed easily to surface. In North America, most of these "easy flow" reservoirs have been produced. Tighter reservoirs that just ten years ago were deemed too expensive to produce have benefitted from advances in technology, allowing them to be drilled and produced for a profit. These technologies also enable companies to explore whole geological formations that were previously unviable to produce economically.

Not all wells need to be stimulated. When the formation holding the hydrocarbons is conductive enough, oil and gas will flow naturally. However, formations being produced today, in most cases, are very dense or tight, and not naturally conductive. In order to release hydrocarbons from these tighter reservoirs, often techniques need to be used to stimulate the flow of oil and gas. Oil or gas will flow more easily from the formation rock to the wellbore when stimulated by:

- hydraulic fracturing (see **page 19**)
- acidizing (see sidebar – **opposite page**)

A company like Trican evaluates any information that the oil and gas company can provide (reservoir data, well logs, rock samples, previous formation analysis) and works with the customer to design a program, outlining our proposed technological solution for the job, and our proposed cost for the service.

Programs will include:

- the pumping schedule (the amount of fluid and sand, and the anticipated schedule of how the job will ramp up)
- an itemized list of ingredients with costs, and an assessment of horsepower required to run the pumps

All of these factors determine the bid price, and an energy company will get several service companies to bid on a job in order to ensure they get what they believe is the best technical solution and the best price.

Once the oil and gas company decides whether to and how to stimulate the reservoir, they will schedule the job with the successful service company.

Hydraulic fracturing, one of the stimulation methods, requires typically just a few days during the whole drilling and production procedure. After stimulating the potential zone(s), the well is ready to be equipped for production.

STEP 5	STEP 6
PRODUCTION AND ONGOING TESTING 10–30 Years	END OF PRODUCTION AND RECLAMATION 5 Years

Frac blender and pumps after rig up.

Acidizing: Acid is used to stimulate production by dissolving damaged rock - usually in carbonate formations - and scale in all types of wells: gas and/or oil producing, injection, and disposal wells.

The difference between what we call 'conventional' reservoirs and the more recent 'unconventional' reservoirs is primarily a function of the reservoir's ability to flow hydrocarbons. Conventional oil and gas reservoirs usually have interconnected pathways within the rock matrix that allow the hydrocarbons to flow to the wellbore, sometimes without stimulation. In unconventional reservoirs, often the grain size of the rock matrix is much smaller and the pores are poorly connected, so there are limited connected pathways allowing the hydrocarbons to flow.[36] Conventional reservoirs are often produced without stimulation required.

STEP 1	STEP 2	STEP 3	STEP 4
THE EXPLORATION PROCESS 1–2 Years	BUILDING THE ACCESS ROAD AND WELL PAD 1–2 Weeks	CONSTRUCTING THE WELL AND CEMENTING 3–24 Weeks	STIMULATION Few Days

5. PRODUCTION AND ONGOING TESTING

After a well has been stimulated and flowed back, it is ready for production. At this point, everything needed for producing and transporting the oil or gas is connected. Putting the well into production is the responsibility of the oil and gas company and can take a few days or weeks. Once the well is in production, it can produce for 10 to 30 years, sometimes more.[37]

At least 40% of the well pad site can be restored to its original condition once a well is brought into production. All waste fluids and solids are removed to licensed treatment facilities, and the reclaimed space is landscaped per local or government requirements.

Most producing wells in North America are visually monitored daily, and periodically inspected for natural gas leaks, per government regulations. If any issues are identified, they can be fixed. If repairs are needed, Trican has the knowhow and the tools to make them, and offers these repair services to our customers. A coiled tubing unit, for example, can be used to convey new cement or clear an obstruction from the tubing.

STEP 5

PRODUCTION AND ONGOING TESTING

10–30 Years

STEP 6

END OF PRODUCTION AND RECLAMATION

5 Years

Trican Hydraulic Fracturing Spread

Reclaimed Site

6. END OF PRODUCTION AND RECLAMATION

Wells that are no longer producing commercially viable amounts of oil or gas, or wells that are unsuccessful, must be properly plugged and sealed. Then, the land must be restored to its natural state by the well owner/company.

A company like Trican places cement plugs* into the wellbore across all porous and fluid-bearing zones, and at the base of freshwater aquifers. This is to prevent fluid movement - or communication - between zones, so freshwater aquifers are protected. The cement plugs also protect soil and surface water, and conserve the oil and gas resources in the rock formations.

The cement plugs must be pressure tested before the well can be considered closed. The well owner must set surface plugs, take off the well head, and weld a steel plate onto the surface casing stub. The last things to be done by the well owner are to empty and fill in all holes, level the ground, and submit for a reclamation certificate with the regulatory authority. The strict process of reclamation and monitoring before well owners can obtain a certificate takes an average five years.

*Cement Plug: a volume of cement (typically a minimum of 150 linear meters [500 linear feet]) placed in a wellbore, which, when set, isolates/plugs the wellbore.

NOW, LET'S TALK FRAC!

Fact
Hydraulic fracturing is a proven technology that is being safely used in North America and in many other parts of the world. This technology has helped meet global energy needs for commercial and personal consumption.

In the pages that follow, these are the key points we will make:

- Fracturing has been practiced for more than 60 years.
- Wells are cased and cemented prior to fracturing. (See Constructing the Well and Cementing on **page 10**)
- Fracturing of shale and other tight formations is done far from aquifers.
- Hydraulic fracturing uses only a small percentage of available fresh water - for a short but intense period of time - and we are increasingly finding ways to reduce, reuse and recycle what we do use. (See Water Usage on **page 22**)
- We're voluntarily disclosing additives used in frac fluids. (See Additives on **page 28**)
- Most additives used in fracturing are found in common household products. (See Additives on **page 29**)
- Trican has developed non-toxic, biodegradable and non-bioaccumulating products for widespread usage. (See Additives on **page 29**)
- Fracturing does cause seismic activity, but these tremors are very small and unnoticeable, and are contained close to the fracture. (See Earthquakes on **page 33**)

Let's define what fracturing is and where it came from. Then we'll talk about why we frac, how we frac, what concerns are being expressed about the process, and what we know about fracturing.

WHAT IS FRACTURING?

Hydraulic fracturing involves pumping a fluid - consisting most often of water and sand - down the wellbore with sufficient pressure to crack the rock, creating a pathway for hydrocarbons to access the wellbore and rise to surface.

Frac pumps and liquid $C0_2$ units rigged in and ready to pump the job.

Fracturing in its simplest form:

- **Creates a very thin crack in the rock**
- **Fills the crack with sand (or proppant)**
- **Props open a pathway to allow hydrocarbons to flow easily to the wellbore**

HOW BIG IS A FRACTURE?

The average fracture, or crack, is less than half a centimetre (¼ inch) in width, and is defined in length by the type of surrounding rock.

Fractures are a bit lazy. They follow the path of least resistance and will only travel up and down to a harder rock that acts as a barrier, and then stop and go sideways (laterally) within the "easy to fracture" rock until the pumps are shut off. The distance has been measured, and it's not very far: 50 – 200 metres (150 – 700 feet) is typical.

WHY DO WE FRAC?

Just like morning rush hour, there is a lot of congestion when the roads aren't wide enough to handle the amount of cars trying to get places. In a formation, the "roads", or spaces, in tight reservoirs are too small for the hydrocarbons to flow outwards. This restriction slows production.

When a formation is fractured, fluids can flow more easily through the fracture and into the wellbore casing. Less restriction causes higher flow rates, which is similar to having freeways, rather than narrow roads, to ease traffic congestion.

More than 175,000 wells have been fractured in Western Canada since the 1950s. 6,000 of these wells were horizontal, where multistage fracturing was used.[40] In the USA, hydraulic fracturing has been performed more than one million times, and it's estimated that 70% of existing wells have been fractured.[41]

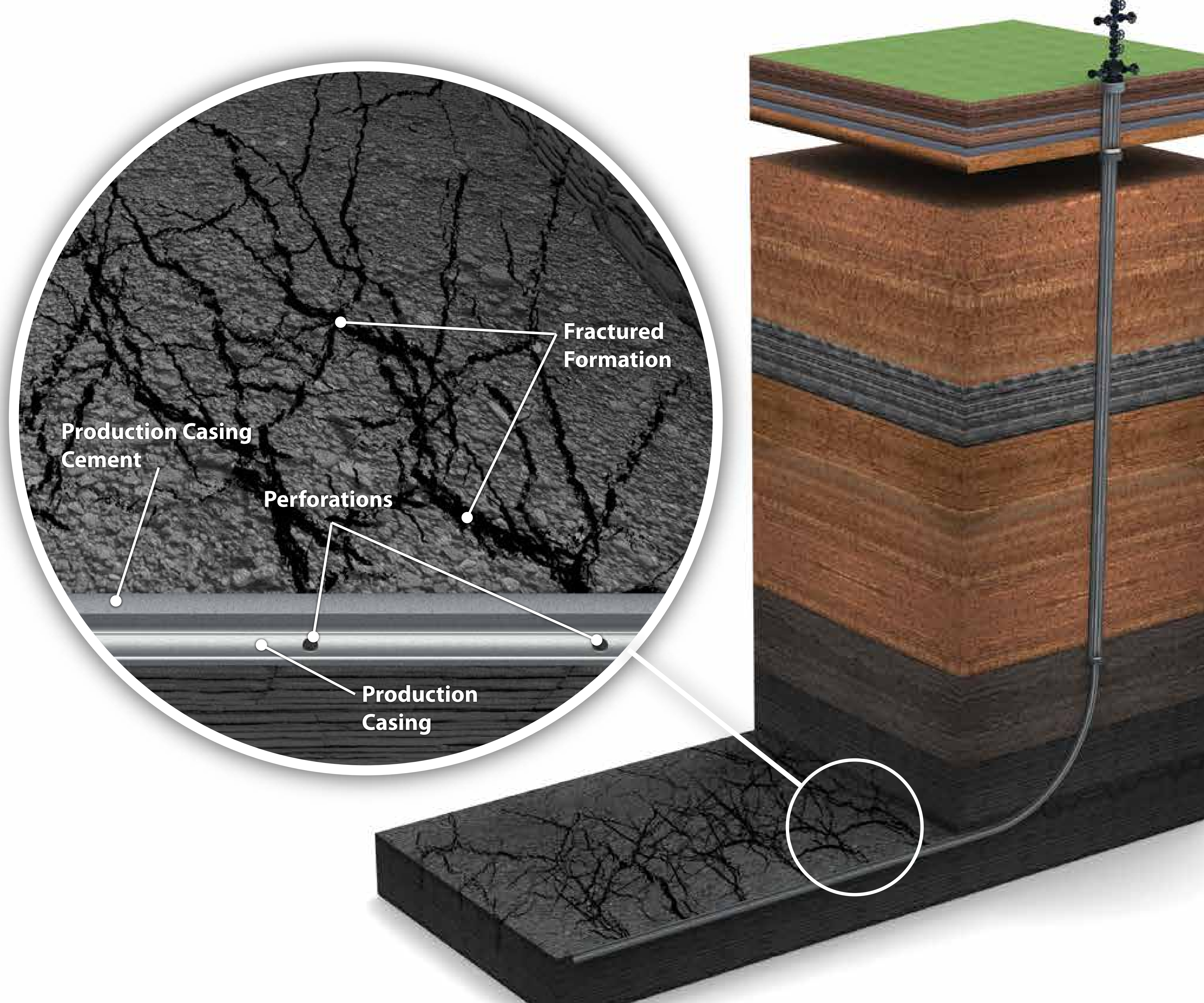
HISTORY

CONCERN: Hydraulic fracturing is a new technology

ANSWER: Hydraulic fracturing is a proven technology used for more than 60 years in more than 2.5 million wells.[38]

Because of increased public awareness, many people believe hydraulic fracturing is new. In fact, the first time it was used was 1949, when Stanolind Oil in Velma, Oklahoma pumped the first hydraulic fracture treatment for oil and gas.

Today, wells are stimulated in some way more often than not. Innovation and technology are playing a major role in helping to unlock otherwise unobtainable hydrocarbons.[39]


Fractured
Formation
Production Casing
Cement
Perforations
Production
Casing

WHAT'S IN A FRAC? WATER USAGE

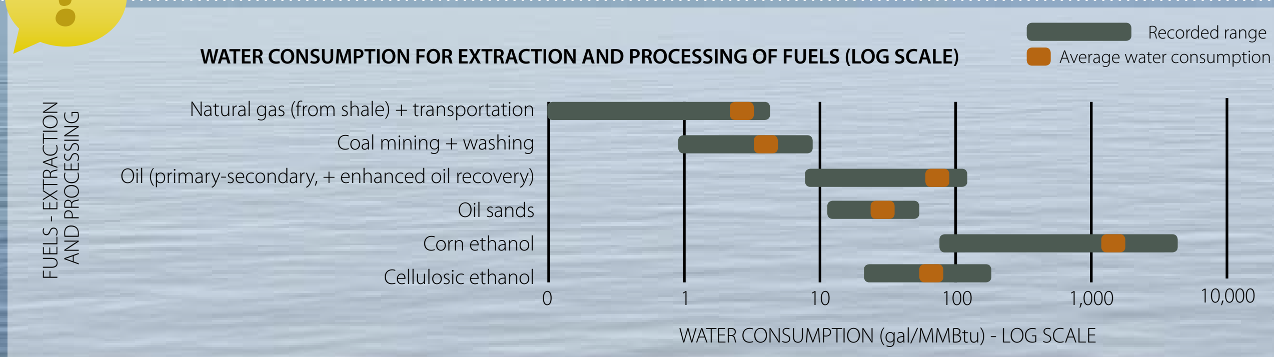
CONCERN: Hydraulic fracturing is using up our fresh water supply.

ANSWER: Hydraulic fracturing does use large amounts of fluid, usually water, for a brief period of time, and we are increasingly finding ways to reduce, reuse and recycle what we do use.

Hydraulic fracturing requires a fluid to carry the proppant (usually sand) into the fracture. Water is used most of the time, but also oil, Carbon Dioxide (CO_2), and Nitrogen (N_2) can be used instead of water, or in addition to the water. Once the rock is cracked, the fluid is brought back to surface, which is called flowing it back, leaving the proppant in place to provide oil and gas a pathway to the wellbore.

Fresh water is often obtained from nearby rivers, lakes and reservoirs, or can be trucked to the well. Often, fresh water is the most environmentally friendly option, given its minimal requirement on additional infrastructure and limited risk. Even so, Trican is constantly looking at new ways to reduce, reuse or recycle water, such as the recent development of TriFrac-MLT™, which enables operators to use 100% flowback or produced water.

Instead of using fresh water, some very large projects are using produced water from a different zone that has a high salt content and is not fit for human consumption. Trican develops products and processes to facilitate brine/saltwater usage.



Natural gas (from all sources, including deep-shale natural gas) is the most water-efficient raw fuel source* per unit of energy produced outside of wind and solar, which require virtually no water, according to a research paper published by Chesapeake Energy (Matthew E. Mantell, P.E.). And when natural gas is burned, it also releases carbon dioxide and water vapour (two things we release when we exhale). [32, 43, 44, 45, 46, 47, 48]

***Fuels include natural gas, coal, nuclear, conventional oil, oil sands, biodiesel, and ethanol.**

In addition to fresh water, industry uses other types of water:

- Flowback - the water that comes back after the frac.
- Produced water - water originating in the formation that comes to surface along with oil and gas.
- Brine water – water from any source that has a salt content higher than potable water (drinking water).

Increasingly, industry is using flowback water or sourcing brine (salt) water (water produced from other oilfield operations) in fracturing. Trican has a line of salt-tolerant additives and salt-tolerant fluid systems that make this possible. Another way Trican reduces water usage is by adding carbon dioxide or nitrogen to the fluid and proppant mixture, which is called "energizing".

Amount of water used:
For a shale well, the demand for large amounts of water usually lasts from one to five days, during the initial fracturing stage. Over the lifetime of the well, about 20 to 30 years, a significant amount of water can be recovered and recycled. Though the oil and gas industry on the whole uses a considerable amount of water, you might be surprised to see how relatively small this amount is in comparison to other uses. (See sidebar below)

In fraturing, the intense demand for water usually lasts less than a week. 17 million litres (4.5 million gallons) of water are needed to drill and fracture a typical deep shale gas or oil well, which is equivalent to the amount of water consumed by:

- **New York City in approximately 7 minutes**
- **A 1,000 megawatt coal-fired power plant in 12 hours**
- **A golf course in 25 days**
- **30,351 metres^2 (7.5 acres) of corn in a season[49]**

Trican environmental water service in Australia.

WATER MANAGEMENT

CONCERN: What happens to water once it's been used?

ANSWER: Industry is finding ways to reduce the need for fresh water and the need for water disposal, such as reusing and recycling. Trican has increased the water management solutions we can offer to our customers.

Trican is eager to reuse and recycle produced water or water that was used for drilling and completion activities wherever possible. Trican works with third parties that treat produced and flowback water for reuse.[50, 51, 52]

Trican has also developed additives that allow produced or flowback water to be reused without requiring further treatment. In some cases, a salt water zone can be used as source water for an entire project, eliminating the need for fresh water altogether. Some examples include TriFrac-MLT™ and our salt-tolerant line of friction reducers.

CONCERN: Once water is used in fracturing, is it gone for good?

ANSWER: No, it's not. The water used in a fracture becomes non-potable (not drinkable), but what returns can still be used for a subsequent treatment. Water vapour is also released when natural gas is burned, so water returns to the cycle, though not necessarily in the same place.

There have been concerns expressed that the water used in hydraulic fracturing is permanently removed from the global ecosystem. Approximately half of the water pumped downhole returns to surface and can be reused for the next frac. What is left behind in the reservoir is replaced when natural gas is burned, since both carbon dioxide and water vapour are produced. These same two compounds are also released when we exhale.

For any chemistry buffs, this formula demonstrates that burning natural gas releases water vapour (H_2O):

$$CH_4 + 2(O_2) \rightarrow CO_2 + 2(H_20)$$

When wastewater or produced water can no longer be used, it must be disposed of safely. Wastewater disposal is highly regulated, and will vary among jurisdictions. Disposal often involves re-injecting the wastewater into a subsurface formation, far from usable groundwater sources.

DRINKING WATER SAFETY

CONCERN: Hydraulic fractures could extend too far up and enter the water table.

ANSWER: Hydraulic fractures do not extend up and down very far before spreading laterally. The many layers of tight rock above prevent the fractures from ever approaching the water table.

Most horizontal fracturing is performed one to three kilometers (1/2 to 2 miles) below freshwater aquifers. Hydrocarbon zones are separated from aquifers far above them by layers upon layers of compact rock. Hydraulic fractures will take the path of least resistance, and will not extend up and down very far before spreading laterally in the "easier to fracture" layer.
(See "How Big is a Fracture" **page 20**)

If fluids from the fracture were to move about, the easiest route would be through the annular space outside the casing. Yet, there is little chance of this happening. With a strong cement bond between the rock formation and the casing, the only path for the fluids is through the perforations (holes created in the casing to allow communication between the reservoir and the wellbore) and into the casing.The cement acts as a barrier, keeping fluids from migrating into other zones or further up the wellbore.

CONCERN: Fracturing can allow methane to enter the water table, as demonstrated in one anti-frac movie, where a resident lights his tap water on fire.

ANSWER: Methane occurs naturally in many aquifers around the world, and people have been able to "light their taps on fire" for decades, with no oil or gas activity anywhere near the aquifer.

A cause of much of the public concern, and even outrage, over the practice of hydraulic fracturing is the movie/documentary Gasland, and the now-iconic flaming faucet scene. In response to that particular scene, Colorado regulators investigated the water from the well in question and determined that the methane was naturally occurring and not caused by oil and gas development. Instead, the homeowner had drilled his groundwater well through four coal seams, which were loaded with flammable methane[55].

Methane is the chief component of natural gas. Even the producer of the anti-frac movie has admitted that naturally-occuring methane has been reportedly allowing people to light their taps on fire since the 1930s. In many jurisdictions, regulators have responded to public concern by implementing hydraulic fracturing operating practices that require member companies to test existing water wells within a specified radius prior to drilling a well. This baseline data is important in responding to any concerns about water quality after drilling and hydraulic fracturing.

Despite more than a million fracture treatments having been performed in the US alone, there is only one known case of hydraulic fracturing causing groundwater contamination (up to time of printing). The incident was due to a perforating gun prematurely firing at a shallow depth, allowing fracturing fluid to be pumped into the formation above the base of groundwater protection.[54] The known water wells were at a shallower depth and were not contaminated.

A report (July 2013) by the US Department of Energy confirmed to the Associated Press that fracturing chemicals did not get into or contaminate drinking water aquifers after a year of monitoring a Pennsylvania drilling site. The additives stayed where they were placed.[53]

WHAT'S IN A FRAC? ADDITIVES

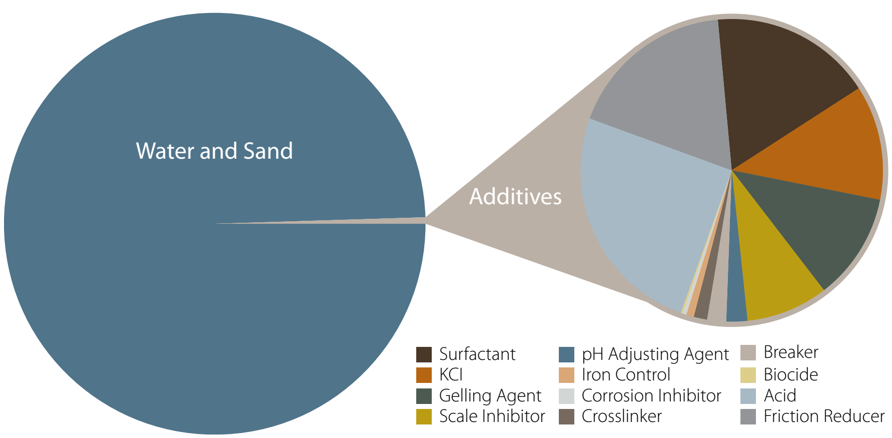
CONCERN: Toxic chemicals in fracturing fluid are contaminating our fresh water supplies.

ANSWER: Most of the additives found in frac fluids are no more toxic than products you use comfortably every day. In addition, Trican and the industry are developing non-toxic, biodegradable and non-bioaccumulating options for widespread usage.

Additives are required in fracturing operations for a variety of reasons:

- To reduce friction
- To prevent scaling or corrosion of metal pipes
- To control the growth of bacteria in saline water
- To thicken the fluid to better carry the proppant

Additives are a very small part of the mixture that gets pumped during the fracturing process. In most slick water fracturing jobs, the amount of additives is less than 1%. The percentage number of additives to fluid will vary, depending on the fluid combination.



Slick water slurry

CONCERN: The chemicals used in fracturing are a secret.

ANSWER: Most chemicals in hydraulic fracturing fluids are quite common and found in household, agricultural and food products. Trican participates in a voluntary public disclosure program where we list our chemicals by well.

The oil and gas industry now lists the chemicals used in hydraulic fracturing on websites in the USA (fracfocus.com) and Canada (fracfocus.ca). Every company has additives that are considered trade secrets, and most of these are non-toxic. Industry is working on ways to improve the disclosure process to include all additives without jeopardizing trade secrets. Although fracturing companies may have a variety of compounds that can be used in a frac fluid, any single job would only use a few of the available additives.[56]

Companies prepare their frac fluids to achieve certain goals. A company like Trican will design a specific "blend" to meet the needs of the job and the customer, considering things like the type of rock, the materials available, and the regulations in that geographic location.

Would you believe that many of Trican's additives score better when submitted to a Microtox® test than hand soap or shampoo?

The Microtox® test is the standard for potable water (drinking water). The test evaluates chemicals and their potential toxicity, comparing the chemicals to fresh water. Chemicals passing a Microtox® test with a high threshold are deemed safe for drinking water and safe to handle, and often meet many other environmental controls.

This table[57] lists most of the additives used in hydraulic fracturing and their main compounds. Only four to six additive types will be used at any one time, in any one job, however the additive might contain more than one component.

Additive Type	Main Compound(s)	Purpose	Common use
Diluted Acid (15%)	Hydrochloric acid or muriatic acid	Helps dissolve minerals and initiate cracks in the rock	Swimming pool chemical and cleaner, stomach acid
Biocide	Gluteraldehyde	Eliminates bacteria in the water that produces corrosive byproducts	Disinfectant; sterilizes medical and dental equipment
Breaker	Ammonium persulfate	Allows a delayed breakdown of the gel polymer chains	Bleaching agent in detergent and hair cosmetics, used in manufacture of household plastics and commercial food processing
Corrosion inhibitor	N,n-dimethyl formamide	Prevents the corrosion of the pipe	Used in pharmaceuticals, acrylic fibers, and plastics
Crosslinker	Borate salts	Maintains fluid viscosity as temperature increases	Laundry detergents, hand soaps and cosmetics
Friction reducer	Polyacrylamide and Mineral oil	Minimizes friction between the fluid and the pipe	Water treatment, soil conditioner
	Mineral oil		Make-up remover, laxatives and candy
Carrier fluid	Mineral oil	Carrier fluid for powdered additives	Make-up remover, laxatives and candy
Gel	Guar gum or hydroxyethyl cellulose	Thickens the water in order to suspen the sand	Cosmetics, toothpaste, sauces, baked goods, ice cream
Iron Control	Citric acid	Prevents precipitation of metal oxides	Food additive, flavouring in food and beverages; Lemon Juice is about 7% citric acid
Clay Control	Potassium chloride	Prevents clay swelling	Low sodium table salt substitute
Oxygen Scavenger	Ammonium bisulfite	Removes oxygen from the water to protect the pipe from corrosion	Cosmetics, food and beverage processing, water treatment
pH Adjusting Agent	Sodium or potassium carbonate	Maintains the effectiveness of other components, such as crosslinkers	Washing soda, detergents, soap, water softener, glass and ceramics
Proppant	Silica, quartz sand	Allows the fractures to remain open so the gas can escape	Drinking water filtration, play sand, concrete, brick mortar and glass
Scale Inhibitor	Ethylene glycol	Prevents scale deposits in the pipe	Automotive antifreeze, household cleansers and de-icing agent
Flowback Enhancer	Isopropanol	Used to lower the surface tension of the fracture fluid	Glass cleaner, antiperspirant, and hair colour

A particularly successful blend might also be considered a competitive advantage. Just like a chef wants to keep his or her recipe a mystery so you'll return to the restaurant, companies will share the list of ingredients, but want to retain the specific combination of additive proportions because it's one of the reasons for our success, and a reason a customer will hire us again.

Many of these additives share the same ingredients found in household, agricultural and food products, and even so, Trican has developed additives that are environmentally friendly. These 'greener' additives reduce the risk in the event of surface spills, and are beneficial in less frequent shallow fracturing closer to aquifers.

Admittedly, some of the chemicals we use still require certain precautions. Trican employees must be cautious and work safely when handling these products, so as to ensure no one, or no part of the environment, is harmed.

Trican has been replacing many of its products and processes with greener alternatives, because we are committed to protecting our environment. In fact, it's one of our core values as a company.

DOES FRACTURING CAUSE ENVIRONMENTAL DAMAGE?

CONCERN: Fracturing uses chemicals that could contaminate the environment of the well site.

ANSWER: The way we handle the chemicals to and on location promotes the safety of the well site.

Trican units parked on drip trays.

Though we are only part of the overall production process, there are a number of ways Trican ensures the land on our worksite is safe:

- Transportation to location is done safely and securely. Our trucks have totes and brackets to securely hold chemicals and prevents spills during transportation.
- New technology has changed the way we mix chemicals at location. We used to mix powders in diesel to create a slurry/mix. We can now add the powders to water, instead of diesel, as needed on-the-fly. This eliminates the need to create a liquid mixture with a hydrocarbon-based fluid, and has reduced the chemicals in the fracturing fluid.
- Even though equipment is well maintained, there are drip trays under our pumping units and often under other equipment on location to prevent any ground contamination.

Trican constantly looks for ways to improve the efficiency and environmental impact of our services, which includes all parts of the fracturing service:

- the fluid ingredients
- the pumping time
- the horsepower requirements

DOES FRACTURING CAUSE AIR POLLUTION?

CONCERN: Emissions from operations and equipment are harmful to human, animal and plant life.

ANSWER: Trican is continually working to reduce emissions. We ensure our vehicles are well maintained, and we equip our fleet with the latest in emission reducing technology.

In any industry, large trucks or heavy pieces of machinery cause emission challenges, and ours is no exception. Trican buys the best equipment available, and as regulations get tougher, emission reducing technology will get better, enabling us to improve as well.

Another air quality concern on a hydraulic fracturing site is the fine silica dust from treated sand. In order to protect employees, Trican requires that all operators wear a full-face respirator within 10 metres of the source of silica dust. Trican goes one step further, and is designing its equipment to filter polymer and silica dusts.

Exhibit 4: Combustion Emissions (Pounds/Billion BTU of Energy Input)

Air Pollutant	Combusted Source		
	Natural Gas	Oil	Coal
Carbon dioxide (CO_2)	117,000	164,000	208,000
Carbon monoxide (CO)	40	33	208
Nitrogen oxides (NO_2)	92	448	457
Sulfur dioxide (SO_2)	0.6	1,122	2,591
Particulates (PM)	7.0	84	2,744
Formaldehyde	0.750	0.220	0.221
Mercury (Hg)	0.000	0.007	0.016

Source: EIA 1998

Natural gas is by far the cleanest burning fossil fuel, according to the EIA's publication: Modern Shale Gas Development in the USA: A Primer (page 5).

CONCERN: Emissions from wells are dangerous.

ANSWER: Though well emissions are rarely related to hydraulic fracturing, flaring or venting occur during some stages of production.

Oil and gas production does result in some emissions entering the atmosphere, mostly through venting or flaring, and both governments and industry are constantly looking for ways to reduce them. As an aside, flaring is actually preferable to venting, as flaring reduces the greenhouse gas potential by 21 times over venting.

Most of these emissions occur after the hydraulic fracturing job has occurred, and are a responsibility of the oil and gas company to monitor, recover and limit.

A report by the US Energy Information Agency for Q1 2012 stated that US energy-related CO2 emissions dropped to 1992 levels, largely due to increased use of natural gas over coal.[58]

Wearing the right PPE for the job.

DOES FRACTURING CAUSE EARTHQUAKES?

CONCERN: Hydraulic fracturing causes earthquakes.

ANSWER: Seismic activity occurs when fracturing; in fact, it's induced by the fracturing process, but at such a low level that it's not felt at surface. Fracture-induced events can only be measured with sophisticated equipment placed underground very close to the seismic activity.

The size of an earthquake is measured by the Richter scale; while the strength (energy) of an earthquake is measured on the Mercalli scale. It's the strength of the earthquake that does the damage and will cause the earth to shake.

It is estimated that there are more than half a million detectable earthquakes in the world every year. 100,000 of these earthquakes can be felt, yet only 100 of them cause damage.[59]

The US Geological Research Center defines an earthquake as: Ground shaking caused by the sudden release of accumulated strain by an abrupt shift of rock along a fracture in the earth or by volcanic or magmatic activity, or other sudden stress changes in the earth.[60]

Hydraulic fracturing creates very small cracks in rocks deep underground, creating a pathway for hydrocarbons to access the wellbore. The cracking created by the fracturing process emits slight vibrations that require highly specialized monitors to detect. These micro-seismic events are not felt by regular monitors or by people, except in rare circumstances.

For the last decade, there has been extensive mapping of hydraulic fracturing using microseismic monitoring. This involves measuring the tiny, or micro, seismic activity near the wellbore during a fracturing event. Sensors are fed down an offset well into the zone of interest, where the resulting data is used to map the location of the cracks and their size. Energy companies use this information to understand the fracturing and make sure it's hitting its target, so that oil or gas can be produced in the most effective way. The width of a crack resulting from hydraulic fracturing is very small, and extends a relatively short distance from the wellbore. It is not the same size as naturally occurring faults that would trigger an earthquake.

On the Richter scale, the majority of fracture-induced seismic events measure from -3 to -1 in size. Of the two occurrences where seismic activity recorded during fracturing measured higher, they were still barely noticeable:

- Horn River, B.C., Canada (2.2-3.8)
- Blackpool, England (1.5-2.3)

The effect would have been only slightly more noticeable than the vibration from a passing garbage truck. When we hear of damaging earthquakes in the news, they are measured on the Richter Scale at 6.0 or higher (6.0+ magnitude), with billions of times more energy than typical microseismic events caused by fracturing. Dam and road building, as well as mining activities, are all man-made activities that also induce seismicity.

Even though the majority of scientists and other experts agree that fracturing does not cause destructive earthquakes, Trican and the well owner will still conduct geological research before fracturing to avoid areas with major faults.

SEISMICITY

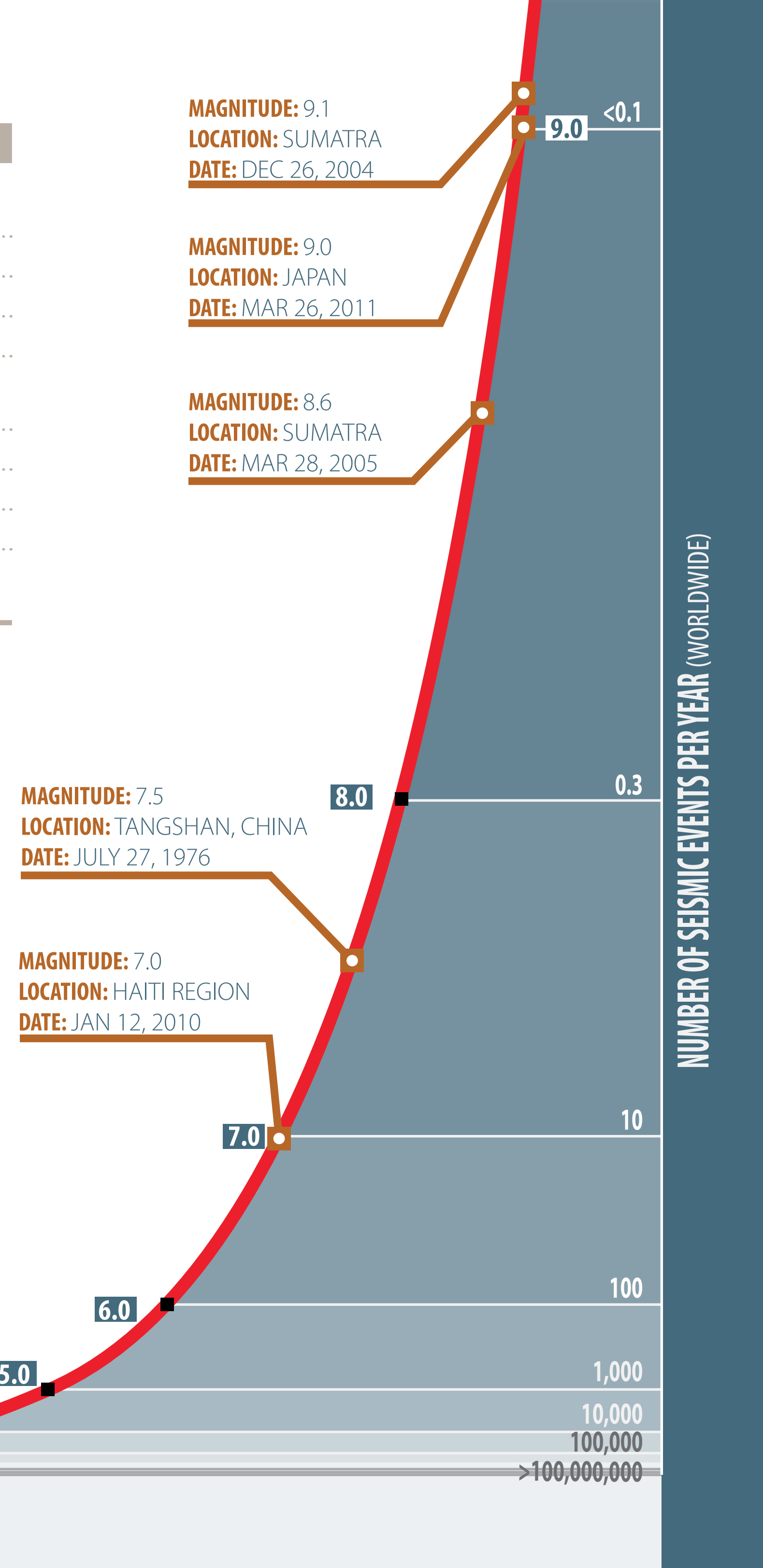
Magnitude	Impact	Global Frequency
9 – 9.9	CATASTROPHIC: can cause irreparable damage and immense loss of life	1 per decade
8 – 8.9	GREAT: can cause severe damage and loss of life	1 per year
7 – 7.9	MAJOR: can cause serious damage over large areas	1 per month
6 – 6.9	STRONG: can be destructive in populated areas	2 per week
5 – 5.9	MODERATE: can cause damage to poorly constructed buildings over small regions	4 per day
4 – 4.9	LIGHT: noticeable shaking but significant damage is unlikely	1 per hour
3 – 3.9	SMALL: often felt but rarely causes damage	15 per hour
2 – 2.9	MINOR: easily recorded at surface but not felt	2 per minute
<2	MICRO: not felt at surface, causes no damage and can only be measured deep underground	Continual

!

Did you know that globally...

- **There are 8000 seismic events per day of a magnitude of 2 or less that are not felt?**
- **There are 1000 seismic events per day of a magnitude of 2 – 2.9 that are not felt but recorded?**
- **There are 49,000 seismic events per year of a magnitude of 3 – 3.9 that are often felt but rarely cause damage?**

TYPICAL MICROSEISMIC EVENTS DURING HYDRAULIC FRACTURING ARE -2




ROAD
TRAIN


Trican environmental water service in Australia.

WATER DISPOSAL

CONCERN: Wastewater disposal causes earthquakes and can leach into groundwater.

ANSWER: Disposal wells are placed in sedimentary basins, where there is no volcanic and very low seismic activity. They are also selected to be removed from geological faults. As for migrating into fresh water zones, fluids in a disposal well move laterally through the porous rock, under the tight cap rock. There are many layers of rock above the disposal zone, preventing fluid from ever approaching the water table.

Industry is eager to reuse and recycle water that was used for drilling and completion activities wherever possible. (See "Water Management" **page 25**) However, when waste or produced water can no longer be used, it must be disposed of safely.

There are three ways for well owners to manage wastewater:

1. The most common method of wastewater disposal is to inject it into specially constructed wells, deep underground. Regulations govern the location and type of formation, and its ability to accept the proposed volume of fluid. The disposal well must be inspected regularly and maintained, and when capacity is reached, it must be sealed and capped. Once decommissioned, liability for the disposal well and other means of disposal remain with the well owner.

Though less common, other forms of disposal include:

2. Wastewater-handling facilities

3. Evaporation ponds

Both offer water reuse options, as well as land application or surface water discharge, however, only when the fluid is made up of non-toxic and biodegradable materials.[61, 62, 63, 64]

YOU AS AN AMBASSADOR

We know many of you are being asked questions about our industry, and we want to give you the facts to answer those questions. By outlining some of the common concerns - which usually prove to be unfounded - and providing you with facts, we hope you will feel comfortable discussing them with your family and friends. That's part of being an ambassador.

We know this is an emotionally-charged subject. We know that facts are debated and people are uncertain about what to believe. We also know that you will not necessarily persuade people to agree with fracturing. That's OK.

Being a terrific ambassador is living Trican's values and representing our Company in a way that shows pride in what we do, and pride in the experience we create on and off the job.

We're not expecting you to embark on a crusade in favour of our industry and hydraulic fracturing. We just want you to feel like you have some of the facts available to you when approached by someone who's only heard the negative, often untrue side.

This section of the booklet will outline what you can and may already be doing when challenged on our industry. As well, there are times we hope you won't engage in a debate or comment on hydraulic fracturing, but direct interested parties to those in the Company who can better handle the tougher questions.

Friends and family

If someone like your mom is concerned about what she is hearing in the media, your opinion may carry more weight than that of our CEO -- and you are the one attending your family dinner. Your family and your friends will trust what you think. You already represent Trican to the people who are close to you.

So, how do you handle the questions and concerns? Listen first, with understanding, as a lot of what is being said out there does sound very negative. Then, provide information about what you know, if you think it is appropriate. Share some of the facts provided in this booklet, your own experience with our Company and our values, or direct them to the many resources available for further information. Here are some tips on how to respond:

DON'T	DO
Don't belittle the concern being expressed. Some of the misconceptions sound frightening.	Respect their right to express their opinion (i.e. the need to protect the environment). Help them learn the facts.
Don't use the economic benefit of oil and gas exclusively as a reason to allow fracturing. That won't help if they believe their water is at risk.	Explain – if people are interested – the whole drilling, casing and cementing process and where fracturing fits in.
Don't let your face or gestures give away that you think their concerns are unfounded. Non verbal communication is often more telling than anything you might say.	Explain that natural gas can be used in conjunction with other renewables – when the wind isn't blowing or the sun isn't shining. The fact that they're asking gives you an opportunity to educate.
Don't be emotional in your response. For example: telling someone they "don't' know what they're talking about" or "have no right to critizice just because they drive a car" isn't going to change their mind about fracturing.	Explain that we welcome regulations to ensure best practices are enforced and being used by all involved.
	Collect any questions that you aren't sure how to answer and submit them to **info@asktrican.com** for answers.
	Pass along this booklet for people to read.

Customers

Customers are facing the same scrutiny as those of us in the service industry, and are as concerned as we are with making the facts available.

If you feel it is appropriate, please share your copy of this booklet, or let us know if a customer is interested in getting a copy.

For another copy of this booklet, contact the Calgary Communication and Marketing department at **info@asktrican.com** or 403.266.0202.

Media

Unless you are one of Trican's official spokespeople, please don't speak to the media on anything related to Trican and our business. If you get a request from the media, ask them to contact our **Communication Manager (mauffray@trican.ca)**, or **Vice President, Communication and Marketing (dbrowne@trican.ca)**, or contact Trican head office reception at 403.266.0202.

Protestors

If you encounter protestors of the oil and gas industry and hydraulic fracturing, our advice is to be careful. These three steps will keep you safe:

1. Do not engage or debate with protestors.

2. If appropriate, contact the police to notify them of the protest.

3. Advise Trican's head office of the protest situation.

You should not hesitate to call law enforcement if you feel threatened in any way.

Social Media

Because of its uncontrolled ability to spread, its permanence once released, and the need to stay responsive once involved, we don't recommend that you engage in debates on the issue of hydraulic fracturing through your social networks.

It could be appropriate for you to share your thoughts and opinions, if they are personal to you. Trican could also produce commentary or material that would be appropriate for sharing among those in your network. Under those circumstances, the multiplyer effect of our Trican ambassadors could be quite impactful.

But be careful. People are three times more likely to spread bad news than good news, and social media creates a transparency between you and the marketplace that you might not wish to establish.

I am unwilling to be an employee advocate

If you don't feel comfortable acting as a Trican ambassador, that's OK. We only want you to engage with this topic if you are willing. Being an ambassador may or may not naturally work for you. We certainly don't want you to feel you are obliged to participate.

If your reluctance is because we haven't answered all of your questions, please let us know what information you are missing. We'd love to hear from you with questions or feedback on this booklet, and the topic in general. Contact us at **info@asktrican.com**, or call a member of the Communication and Marketing department to share your concerns. Should the information help our booklet, we will make updates as we can.

Thank You.

Thank you for continuing the conversation and "Talking Oil and Gas" - especially the services that Trican provides. We appreciate you taking the time to read this booklet and share its content with your family and friends.

If you have any questions or concerns about the booklet or anything covered within the pages, please get in touch with Trican's Communication and Marketing department at 403.266.0202 or **info@asktrican.com** and we will try to help clarify ourselves, or point you in the right direction if we cannot.

We hope we've been able to reassure you that you've made a good choice in working with Trican. We are glad to have you as part of the team.

CONTACTS:

How to contact us:
Email: **info@asktrican.com**	Phone: 403.266.0202

For more information from third parties, contact:
American Petroleum Institute (API)
ANGA
Atlantica Centre for Energy
Canadian Association of Petroleum Producers (CAPP)
Canadian Society for Unconventional Resources (CSUR)
Energy in Depth
Petroleum Services Association of Canada (PSAC)
Shale Resource Centre Canada (SRCC)
Society of Petroleum Engineers (SPE)
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