
THE BASICS OF BITUMEN

Bitumen is a naturally occurring, viscous (like molasses) mixture of hydrocarbons. Bitumen molecules can contain thousands of carbon atoms! This makes bitumen one of the most complex molecules found in nature. In its natural state, it is not recoverable through a well like conventional petroleum. Bitumen cannot be refined into common petroleum products like gasoline, kerosene, or gas oil without first being upgraded to crude oil. The API of bitumen is 8 - 14°

On average, Bitumen is composed of:

Carbon-	83.2%
Hydrogen-	10.4%
Oxygen-	0.94%
Nitrogen-	0.36%
Sulphur-	4.8%

The remaining content is made up of small quantities of methane and hydrogen sulphide, along with traces of nickel, iron and vanadium.

Aboriginal peoples of the Athabasca and Clearwater River regions used bitumen as waterproofing on birch bark canoes and they also made smudge pots to ward off mosquitoes in the summer time.

In 1719, a Cree named Wa-Pa-Su (meaning “the Swan”) presented a sample of bitumen for trade at the Hudson’s Bay Company to Henry Kelsey, who was the first recorded European to see it.

In 1788, Alexander MacKenzie provided the first recorded description of the Athabasca oil sands: “*At about 24 miles from the fork (of the Athabasca and Clearwater Rivers) are some bituminous fountains into which a pole of 20 feet long may be inserted without the least resistance.*”

In 1884, Robert Bell of the Geological Survey of Canada wrote: “*...The banks of the Athabasca would furnish an in exhaustible supply of fuel..[they] have found it to contain from 12-15 per cent of bitumen. Although this proportion may appear small, yet the material occurs in such enormous quantities that a profitable means of extracting oil...may be found.*”

In 1953, Robert Fitsimmons wrote a paper entitled The Alberta Tar Sands. In this report Fitsimmons wrote, “*In the summer of 1922 I went to Fort McMurray...to investigate the possibilities of obtaining oil from the Bituminous sand...I was struck with the richness of the deposit...and decided to purchase the adjoining property..*”

SYNTHETIC CRUDE OIL

Hot water is used to extract (or separate) the bitumen from the oil sand. It is then upgraded to produce “synthetic” crude oil and other petroleum products. This is done by removing carbon and adding hydrogen to remove impurities such as nitrogen and sulphur. The upgraded product is called “synthetic” because it is altered from its naturally occurring state (bitumen) by a chemical process. Synthetic crude oil is not the same as synthetic oil for vehicles. Synthetic crude oil is very similar to conventional oil, there is just more work involved in upgrading the bitumen.

Canada uses oil at the highest per capita rate in the world, with a consumption rate of 1.6 million barrels per day. A family of four consumes an average of 92 barrels of oil per year. Why? Because Canada is a large country with a cold climate, requiring large quantities of energy for transportation and heating.

Two tons of oil sand is needed to produce one barrel of upgraded synthetic crude oil. The synthetic crude oil leaves Fort McMurray by pipeline traveling at 5 km/hr (the rate of a brisk walk). It takes approximately 3 days for synthetic crude to travel from Fort McMurray to refineries in Edmonton via pipeline. It takes 21 days for oil to travel by pipeline from Edmonton to Toronto.

SYNTHETIC CRUDE OIL, Continued:

Most of the petroleum leaving Fort McMurray is refined for use as gasoline, jet fuel or home heating fuels. There are, however, more than 3,500 other products derived at least partly from petroleum. Do any of these surprise you?

Ballpoint pens	Toothpaste	Straws
Plastic dishes	Lipstick	Helmets
Sneakers	Computers	T-Shirts
Velcro	Synthetic fabrics	Elastic bands
Lip balm	Lego	Video games
Frisbees	Bubble gum	Hockey pucks
Perfume	Candy wrappers	Rubber Gloves
	Erasers	