

CRUDE OIL - UPSTREAM

Did you know that in the mid-1960s when scientists wanted to determine if there might be any crude oil under the seabed in some areas in the North Sea, a sceptical Norwegian politician said that he would drink every drop of oil they were able to produce! The Norwegian oil adventure started in the 1970s and we all know how significant it has been and still is for boosting the Norwegian economy.

The Origin of Oil

Between 40 and 500 million years ago marine plants and animals fell to the bottom of the sea when they died. Their remains were soon covered with mud. As the years passed, these layers became thicker and thicker and three things happened:

- the pressure increased
- the temperatures increased
- chemical changes occurred

How is the Oil Contained?

Some people believe that crude oil and gas, which are a mixture of many different hydrocarbons, are contained in huge lakes or caves underground. This is not correct; crude oil and gas accumulations are contained in the pores of reservoir rocks such as sandstone and limestone.

These are sedimentary rocks and are called reservoir rocks because crude oil is trapped in the pores, fissures or cracks in these rocks.

These reservoir rocks are most often located thousands of metres under the seabed; you may ask why the hydrocarbons do not just flow to the surface because of the pressure differences. The reason is that each oil trap is covered by layers of cap rock. Cap rock is a non-porous and impermeable rock which will prevent the oil from escaping.

After several stages of scientific exploration, the final one being exploration drilling, petroleum geologists determine whether an oil field is ready for commercial production. It goes without saying that oil production may cause pollution, and environmental issues are significant and must be the concern of all oil companies. The goal is to leave a minimal environmental footprint.

Offshore Production



Oil platform Source

If an oilfield is ready for commercial production, a huge production platform with giant legs is anchored onto the seabed, and the production of hydrocarbons can start. The size of the legs is not only for stability, the huge legs also contain storage compartments for crude oil and gas. For environmental and economic reasons and using modern technology, it is desirable and possible to drill several wells from one location. This also means that while in the past only vertical wells were drilled, wells today are deviated and drilled in different directions. This is called directional drilling.

Having reached the surface, the oil and gas are brought to the gathering centre on the production platform to separate gas, oil and water. It is essential that oil and gas are brought up to refinery specifications concerning salt and water content. Thus, desalination and dehydration processes remove salts and water in order to protect pipelines and valves from corrosion.

The two main methods for transporting oil to a refinery or an onshore terminal are by tankers and pipeline. Crude oil is sold in barrels. One barrel of crude oil equals approximately 160 litres.

Source: <http://ndla.no/en/node/52984?fag=42&meny=265170>