



Getting gas from Crude

Posted by [Heading Out](#) on March 13, 2006 - 2:19am

Topic: [Supply/Production](#)

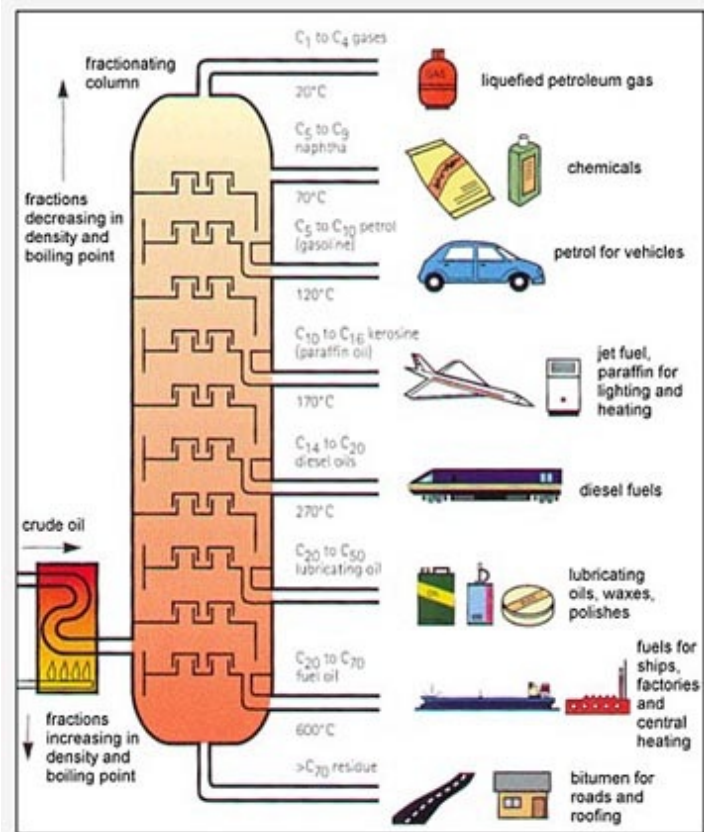
Tags: [crude oil](#), [distillation](#), [fractioning column](#), [oil](#), [refining](#), [tech talk](#) [[list all tags](#)]

Some recent posts have dealt with coal production, so for a change I thought I would return to oil, for a couple of techie talks. It seems particularly relevant since the discussion has returned to the Canadian Oil Sands again, and the oil that is coming from them. But before getting there what I wanted to talk about was the differences that exist in what to some folk is just "crude oil," with the assumption that it is all the same. In writing about coal, it was fairly simple to show that the different stages of coal as it changes from peat to anthracite, mean that you get different amounts of energy from it, and it can be extracted with differing amounts of energy. The fact that there is a fair bit of difference in crude oils is not always as easily understood.

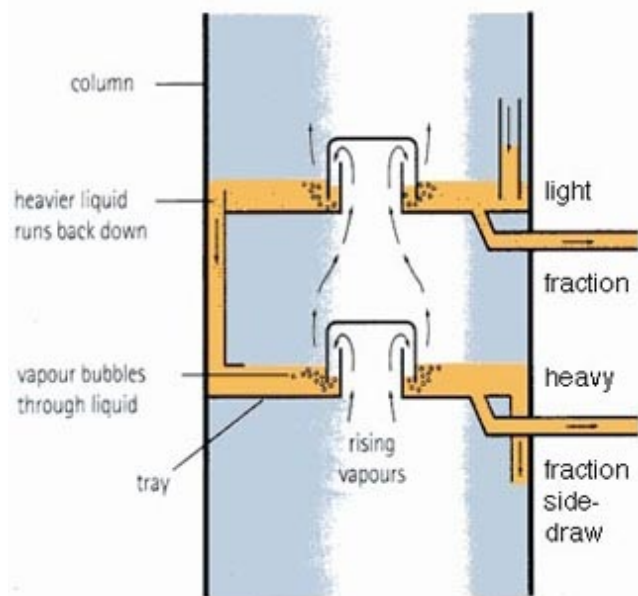
This then will be a relatively simplistic look at the different potential hydrocarbons that might make up a crude oil, and how we can get them apart. I'll post next time on how we can break the separated flows into other products. This, then, is a short techie talk in the oil production series, earlier posts in which are given at the end of the post.

[Crude oil](#) is made up of a mixture of hydro-carbons, which are the different ways in which carbon and hydrogen can combine, starting with such simple compounds as methane (CH₄) and progressing to more complex ones with greater numbers of [carbon atoms](#). Oils from different places have different combinations of the major constituents, for example, this is from [Kuwait](#). Because they are fluids mixed together, it is not very easy to separate out the different valuable parts (known as fractions) by a mechanical means. However if you heat up the crude oil blend, then it will vaporize.

But the different fractions of the oil will boil at different temperatures (or [boiling points](#) b.p.), at which point they turn into gas. And so the first part of the treatment that the oil gets, when it reaches a refinery is that it is heated, so that it will all turn to gas, and then it is cooled in stages, so that the different fractions will condense back out. The total process is known as crude oil distillation and the [UK Schools site](#) has a simple sectional picture of what such a distillation column might look like.

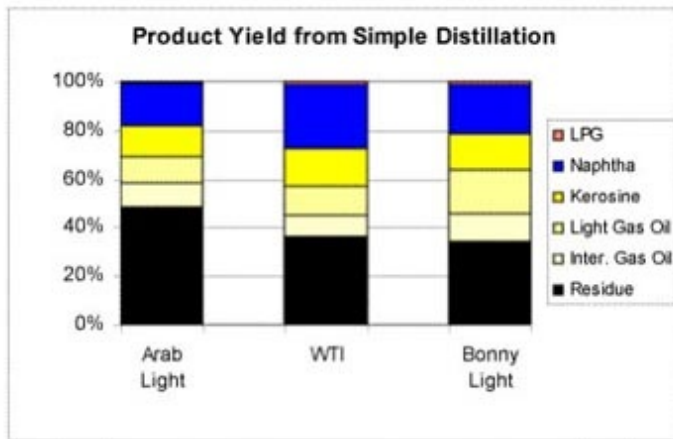


As the combined vapors from the heated crude enter at the bottom of the tall tower (called a column) they pass up through different trays that are placed at set heights up the column. When the gas reaches a tray it passes up through it into a bubble cap, this is a cover over the hole that pushes the gas down so that it has to bubble up through the liquid that has already condensed onto that tray.



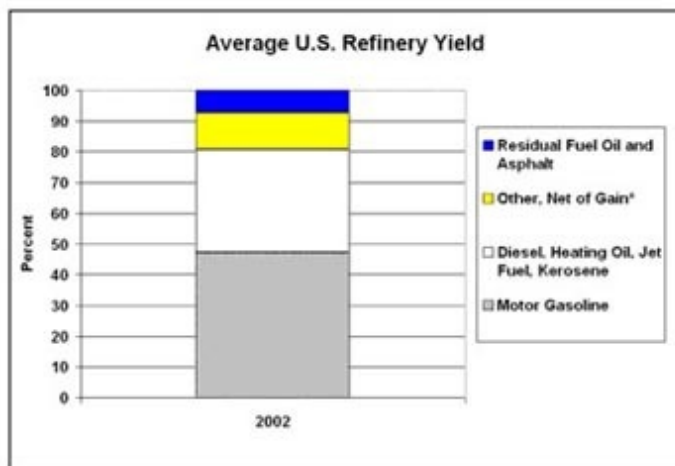
The liquids in each tray, as the vapor rises higher in the column, are kept at lower temperatures, so that the heavier oils, that condense at a higher temperature, will condense lower down the column. As the lighter vapor rises through successive trays, the temperature of the liquids drops,

and lighter fractions of the oil also begin to condense out, until the very lightest are collected at the top, still as gas, and fed on to a cooler. The liquids then drain, either back down to a lower tray, or through a side-draw pipe that taps the fluid from the trays and takes it away for either further division or for storage and sale. A typical initial [distillation](#) might [yield](#)



Each year the EIA publishes its [world distillation capacity](#) which is the necessary part of getting from crude to useful product.

I will continue this next time, talking about the further stages in refining, and cracking of compounds to break them into lighter fractions, so that the next product from a refinery might at the end, look something like this (courtesy of the EIA).



This is part of an ongoing weekend series on technical aspects of oilwell (and natural gas) drilling. Previous posts can be found at:

[the drill](#)

[using mud](#)

[the derrick](#)

[the casing](#)

[pressure control](#)

[completing the well](#)

[flow to the well](#)

[working with carbonates](#)

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As ever, if this is not clear, or if there is disagreement then please feel free to post, and I will try and respond.



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