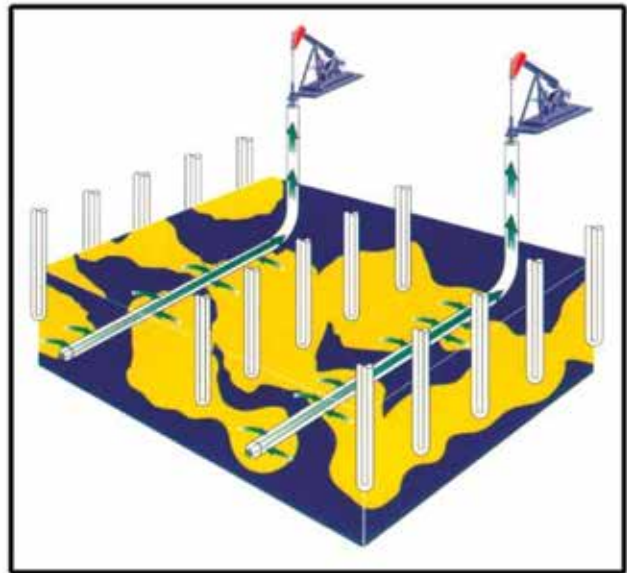
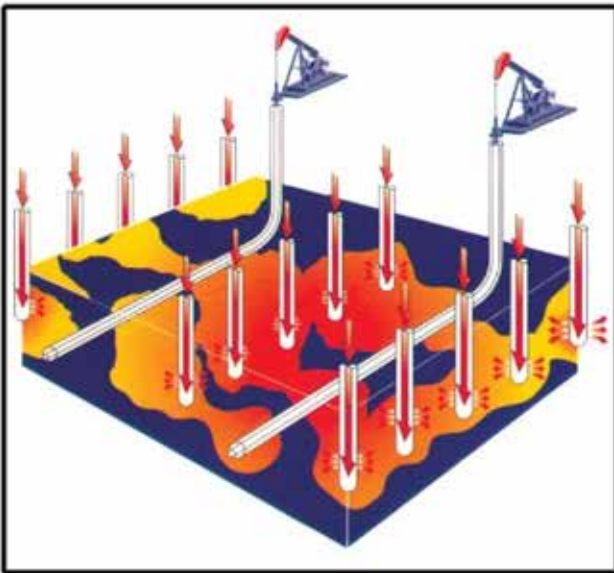


## HIGH TEMPERATURE HEAVY OIL STEAM FLOOD APPLICATIONS

As oil becomes heavier and more viscous, it is more and more difficult to get the oil to flow into the well bore where it can be pumped to the surface. This heavy Canadian oil is often referred to as bitumen and has an API gravity ranging from 8–14. Bitumen has the consistency of thick molasses at room temperature. It is so heavy that it will not flow naturally from the underground formation to the surface without being heated. These oil-bearing formations/sands are often

located several 100 meters below the surface - these deep oil sands can not be surface-mined like the shallow oil sands in the Ft McMurry area.

Instead, production is achieved through wells drilled from the surface. One of the processes used to produce bitumen is a cyclic steam stimulation (informally known as "huff and puff") where steam is injected into the formation to heat and thin the bitumen so that it can be produced by conventional means.



Wells are clustered together in pads consisting of 20-40 wells. Each well is directionally drilled to minimize surface disturbance and is configured to provide access to the largest area of the underground oil-sands formation as possible.

