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EOR: Enhanced Oil Recovery

The Three Stages of Oil Field Development

Enhanced Oil Recovery occurs after all possible oil is pumped out of the ground using traditional methods. Primary and secondary steps in the extraction of oil include the traditional methods while the tertiary step includes oil recovery in new, enhanced methods such as CO₂ injection.

Primary Recovery

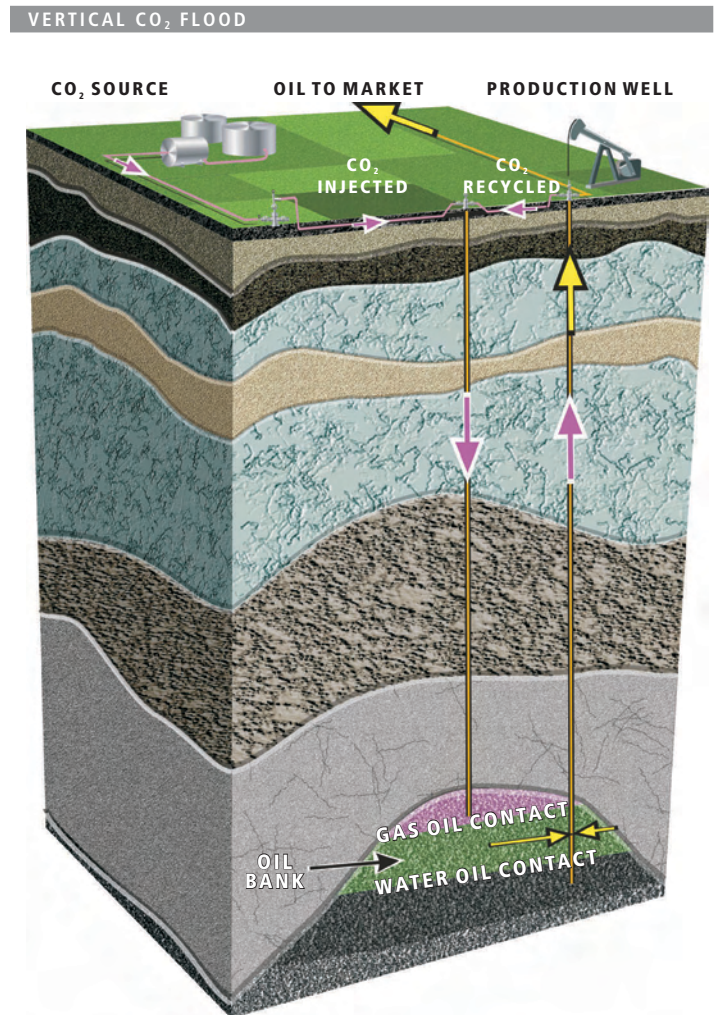
Primary recovery produces oil and gas using the natural pressure of the reservoir as the driving force to push the material to the surface. Wells are often 'stimulated' through the injection of fluids, which fracture the hydrocarbon-bearing formation to improve the flow of oil and gas from the reservoir to the wellhead.

Secondary Recovery

Secondary recovery uses other mechanisms – such as gas re-injection and water flooding – to produce residual oil and gas remaining after the primary recovery phase.

Tertiary Recovery

Tertiary recovery involves injecting other gases (such as carbon dioxide), or heat (steam or hot water) to stimulate oil and gas flow to produce remaining fluids that were not extracted during primary or secondary recovery phases.





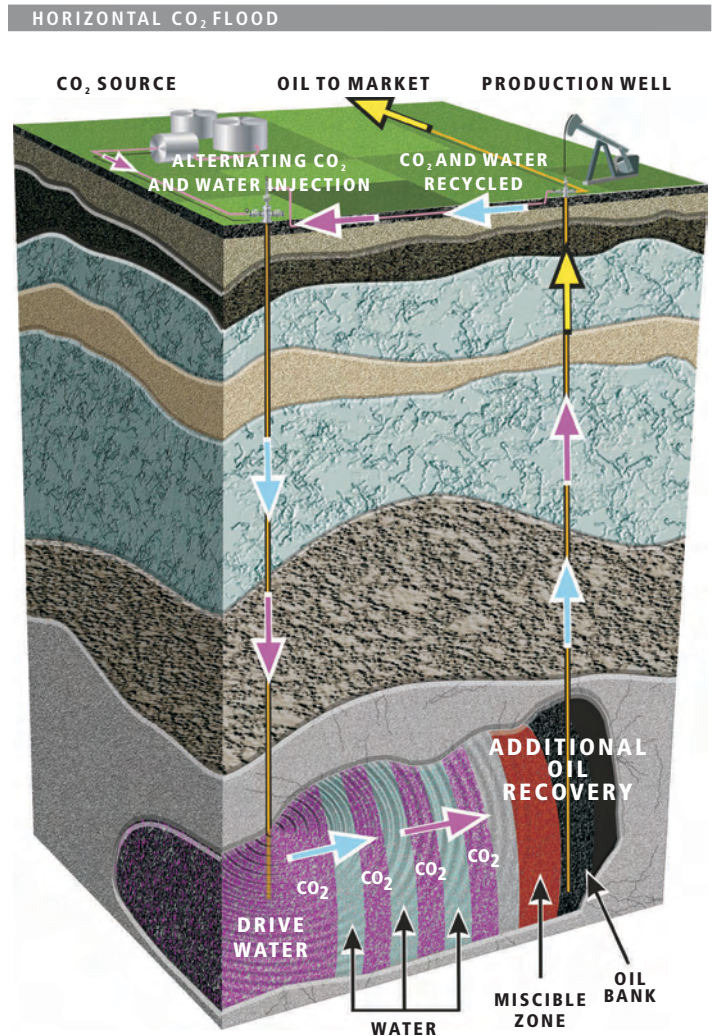
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Tertiary Recovery: The CO₂ process:

- 1 CO₂ is injected into the reservoir via injection wells.
- 2 The CO₂ reduces the viscosity of the trapped oil so it flows more easily.
- 3 Water can be injected in alternating cycles with CO₂ to sweep the oil to the producing wells.
- 4 Production wells pump the oil, along with CO₂, produced water and any associated natural gas to the surface.
- 5 The CO₂ and associated natural gas are separated at the production satellite facility. Natural gas liquids are extracted and sold and the CO₂ is recycled for reinjection.
- 6 The oil and produced water are separated at the central tank battery. The oil is piped to holding tanks where it is metered and sold.
- 7 The produced water is transported to the central water injection station and is pressurized for reinjection.



By applying this new technology to the field, oil wells that may, under previous circumstances, have reached the end of their lives, can now operate for many more years, producing much more oil.

