

Cleanup Technologies

From the U.S. Environmental Protection Agency's "A Citizen's Guide to Cleanup Technologies" <https://clu-in.org/products/citguide/>

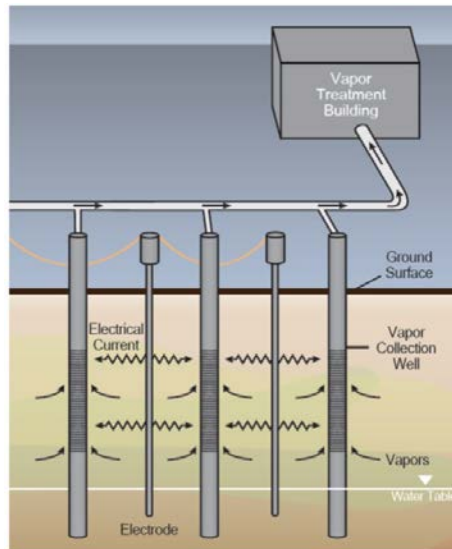
Physical removal

Remove contaminated soil, sediments or groundwater by excavating or extracting.

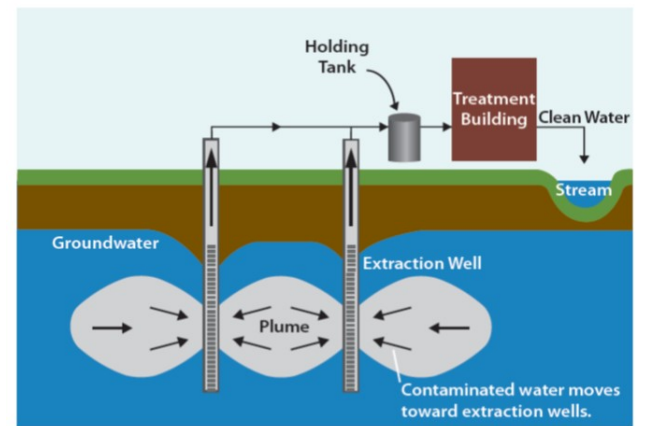
Excavating contaminated soil from a site involves digging it up for above-ground treatment or for disposal in a landfill.



In situ, thermal enhanced extraction "mobilizes" harmful chemicals in soil and groundwater using heat.



Pump and treat methods pump groundwater from wells to an above-ground treatment system. Pump and treat systems also are used to "contain" the contaminant plume.

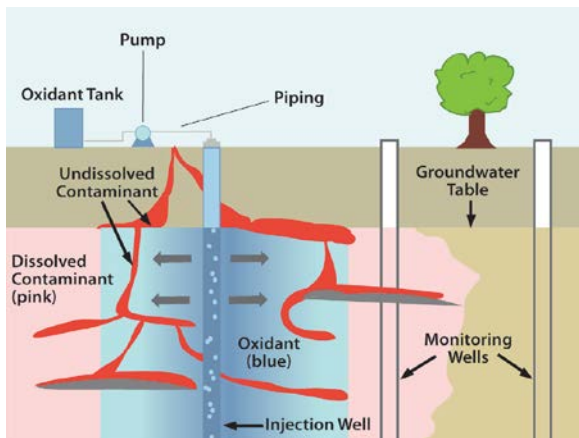


Example of a Pump and Treat System with Two Extraction Wells.

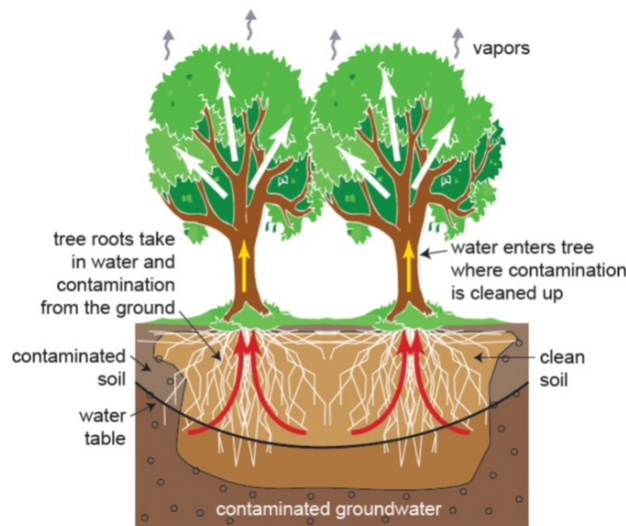
Chemical/biological treatment

Treat contamination to destroy or convert it to less harmful forms.

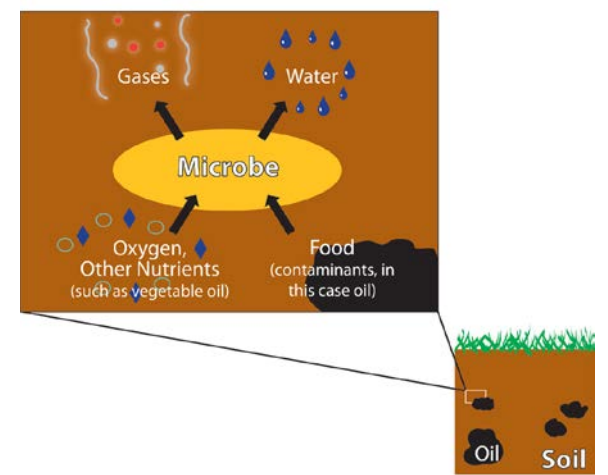
Chemical oxidation uses chemicals called "oxidants" to help change harmful contaminants into less toxic ones.



Phytoremediation uses plants to clean up contamination.



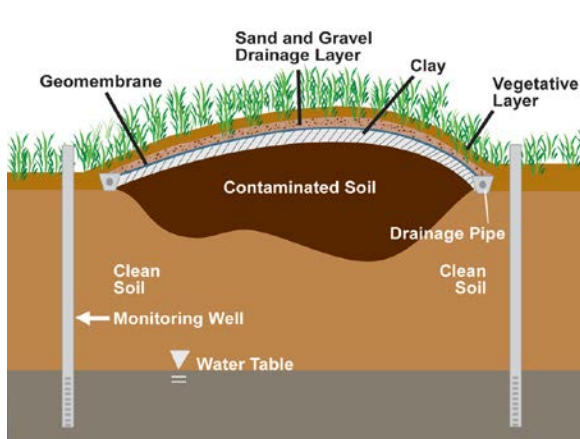
Enhanced bioremediation adds compounds to encourage microbes to clean up contamination.



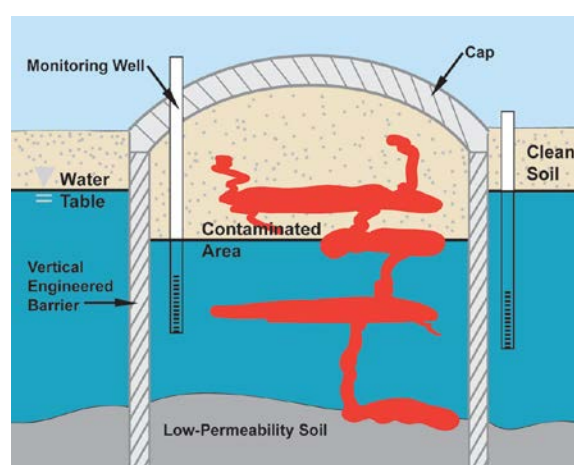
Containment

Use physical barriers or processes to prevent contamination from moving.

Capping involves placing a cover over contaminated material such as landfill waste or contaminated soil.



A vertical engineered barrier is a wall built below ground to control the flow of groundwater.



Solidification binds the waste in a solid block of material (often cement and clay) and traps contamination in place.

