

Table A-19.A. Phytotechnology

Technology	Phytotechnology	Phytotechnologies use plants to remediate or contain contaminants in soil, groundwater, surface water or sediments via phytohydraulics and rhizodegradation. Phytohydraulics generally use phreatophytic trees and plants that have the ability to evapotranspire large volumes of water and therefore affect the existing water balance at the site. Rhizodegradation refers to the breakdown of contaminants within the plant root zone, or rhizosphere.	
Remediation process	Mass control	Yes	Can provide hydraulic control of groundwater and LNAPL.
	Phase change	No	
	In situ destruction	Yes	Plant-enhanced biodegradation of petroleum contaminants in the rhizosphere and phytodegraded if extracted by the plant.
	Stabilization/ binding	Partial	Yes for some PAHs, heavy HC fractions; this is called phytosequestration or phytostabilization.
Objective applicability	LNAPL saturation	Yes	Stops LNAPL migration.
		Example performance metrics	Hydraulic control of groundwater via plant evapotranspiration.
	LNAPL composition	Yes	Reduce soil concentrations
		Example performance metrics	Reduction of soil concentrations; dissolved- phase concentrations meet a regulatory standard at compliance point; reduced volatile or soluble LNAPL constituent mass fraction
Applicable LNAPL type	All LNAPL types		
Geologic factors	Unsaturated and saturated zone	Permeability	Tight formations such as clayey soils, bedrock strata or aquitards with smaller porosity and lower water transmissivity are often more resistant to root penetration than permeable formations such as sandy, silty or gravel strata.
		Grain size	N/A
		Heterogeneity	Rhizodegradation is limited to the influence of the root zone.
		Consolidation	Tight formations such as clayey soils, bedrock strata or aquitards with smaller porosity and lower water transmissivity are often more resistant to root penetration than permeable formations such as sandy, silty or gravel strata.
Cost	Implementing phytotechnologies may result in a cost savings of 50 to 80 percent over traditional technologies.		