

List of Technologies the ITC has previously reviewed

Please note that it is the responsibility of the vendor, consultant and/or RP to determine if a suggested technology is already patented. This Table will be updated periodically, so if in doubt you can contact ITC to find out if another specific technology has been recently approved.

<u>Technology</u>	<u>Description of Technology</u>	<u>STF Eligibility</u>
AFVR	Aggressive Fluid Vapor Recovery (AFVR) uses a mobile vacuum truck to remove free product from groundwater.	Yes
Bioremediation using lab-cultured microbes	Using lab cultured microbes to degrade petroleum products insitu (requires injection). This process will also require evaluation and approval from the Underground Injection Control permitting section.	Considered case by case.
Bioremediation by injecting air, oxygenates or nutrients.	Providing oxygen or nutrients to existing microbes in the subsurface. Anything other than air injected into the subsurface will require evaluation and approval from the Underground Injection Control permitting section.	Considered case by case.
Bioventing air injection	Low air flow rates (cfm) are INJECTED into unsaturated subsurface soils (enhances biodegradation)	Yes, only on soil stockpiles (exsitu)
Bioventing air extraction	Low air flow rates (cfm) are EXTRACTED from the unsaturated subsurface soils (volatilizes & biodegrades hydrocarbons)	Yes
Closed loop Bio-Sparge	Uses IAS and SVE technology, vapors recovered by SVE are cycled through a bioreactor/absorption tank and then air is reinjected back into the groundwater.	No
Dual Phase Extraction	Uses a pump to extract groundwater and soil vapors simultaneously from recovery wells. Contaminated water is then treated by conventional methods.	Yes
EAS TM Electron Acceptor Solution	EAS TM is a patented, sulfate-enhanced anaerobic bioremediation process engineered for in situ treatment of petroleum hydrocarbons in the aquifer and capillary zone. An Underground Injection Control permit would be required prior to use.	Yes
Hydraulic Fracturing	Uses high pressure water and sand to cut a disk-shaped cavern into a saturated media to enhance permeability.	Site-specific consideration
Ion Collider Technology	Water is pumped through an ion collider and sprayed on soil stockpiles to enhance oxidation of hydrocarbons.	No
iSOC	iSOC® (in-situ Submerged Oxygen Curtain) is a patented oxygen delivery technology that infuses high levels of oxygen into groundwater when suspended in monitoring wells. The proprietary structured polymer used in iSOC® contains hydrophobic microporous hollow fibers.	Yes

MPE or MMPE	Multi-phase extraction uses a vacuum system to remove various combinations of contaminated groundwater, free product (LNAPL), and vapors from the subsurface. The system lowers the water table around the well, exposing more of the formation. Contaminants in the newly exposed vadose zone are then accessible to vapor extraction. Once above ground, the extracted vapors or liquid-phase organics and ground water are separated and treated. Mobile Multi-Phase Extraction (MMPE) uses a vacuum truck to do this, typically for 96 hours.	Yes
Natural Oil Vanish	Uses composted poultry waste with added microbes to enhance bioremediation of contaminated soil.	Yes, only on soil stockpiles (exsitu)
Oil Gator Bioremediation Product	Mixes modified cellulosic fibers, nitrogen, sulfur, phosphorus and indigenous bacteria with ex-situ contaminated soils	Yes, only on soil stockpiles (exsitu)
Oxygen Releasing Compound (ORC)	Uses a media placed in groundwater wells or open excavations to increase dissolved oxygen in groundwater, thus enhancing natural attenuation.	Considered Case by Case
Ozone Injection	In-situ chemical oxidation using ozone.	Yes
Petroclean Bioremediation System	Uses a bioreactor to pump and treat contaminants from the groundwater. Treated water is then injected into the saturated and unsaturated soil by way of infiltration galleries.	No
Radio Frequency (RF) Heating	Rods driven into contaminated soil emit radio waves that generate heat and volatilize hydrocarbons.	Yes
Recirculating wells	Uses large diameter wells to remove VOCs by recirculating contaminated groundwater while the negative pressure of the SVE volatilizes (strips) VOCs in water & soil.	Considered case by case
Soil bioremediation	Treats contaminated soil exsitu by mixing soil with nutrients and stockpiling (hydrocarbons are biodegraded). Typical of land application.	Yes
Soil Vapor Extraction, SVE	Uses a vacuum pump to extract vapors (VOCs) by volatilization from unsaturated soils, also promotes biodegradation. This technique can also be used to remove free product from the water table.	Yes
SPPRS	Uses water displacement to overcome the head inside a well that forces free product to collect in a skimmer/canister, requires no power source.	Yes
Surfactants	Surfactants are used to reduce surface tension and break down hydrocarbons to enhance biodegradation and accelerate recovery.	Yes
SVE/IAS	Uses vacuum extraction from unsaturated zone & air injection of the saturated zone (volatilizes & biodegrades hydrocarbons)	Yes
Vacuum-Sparge	Uses vacuum to induce a negative pressure on multiple wells	Yes

	while raising the water table to promote bubbling in the groundwater (i.e., soil gas is extracted from the wells).	
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