Biovation®
Environmental Services, LLC

Traditional Treatment Methods	Traditional Treatment Limitations	Bio-Cycle® Treatment Solutions	Bio-Cycle® Benefits/Green Remediation
GROUNDWATER PUMP & TREAT	• Doesn't treat soil contamination. • Doesn't remove contamination adhered to soil below the water table.	• Washes above the water table and provides microbes for soil polishing. • Microbes remove and partially consume both above and below the water table.	• Treatment fluids are derived from the groundwater on-site and are recycled continuously throughout the treatment process. • No water discharge means no discharge permits are required for operation. • Additionally, there are no side streams, wastes, spent catalysts, effluents, air emissions or residues remaining in the treated groundwater or soil, and there are no special analytical requirements for the application. • Microorganisms simply break the hydrocarbon molecules down into H2O and negligible amounts of CO2 and methane gas. • Microbes are naturally occurring, non-pathogenic and non-opportunistic. The microbes, enzymes and nutrients are not flammable and are not toxic. No special personal protective equipment is required when handling these items. • Treatment equipment utilizes small motors minimizing energy usage.
SOIL VAPOR EXTRACTION	• Doesn't work in saturated soil. • Will not remove semi-volatile compounds.	• Injection wells target contaminants in both saturated and unsaturated portions of the aquifer.	
AIR SPARGING	• Creates air channels. • Effective treatments are limited near the sparge well. • Relies on indigenous microbes & nutrients.	• Promotes water flow to move the dissolved oxygen added to the treatment fluids into the aquifer. • Treatment fluids contain microbes/enzymes and nutrients to consume the specific contaminant(s) on-site.	
BIO-TREATMENT INJECTIONS	• Fluids tend to remain in the area around the injection well. • Volume carried to the contaminated sites is insufficient. • Large fluid quantities tend to wash contaminants off-site. • Oxygen available on-site is insufficient for microbiological activity.	• Creates a dynamic water flow which pulls the treatment fluids away from the injection wells. • Treatment fluids are derived form the groundwater on-site, therefore an unlimited amount of fluid is available. • Pumping of the extraction wells creates a capture zone which prevents contaminants from escaping the treatment area.	