

iSOC Recommended Testing Parameters For Petroleum Hydrocarbon Sites

Testing Parameters	Explanation
Dissolved oxygen (DO)	Identify aerobic and anaerobic regions of contaminated site and the chemical, physical and biochemical activities occurring. (Low dissolved oxygen levels can limit the bacterial metabolism of certain organic compounds).
pH	Identify the acidity or alkalinity of water. (or the chemical and environmental transition zones). A change in pH may be associated with microbial activity. The optimum pH for bioremediation is 4-9; Consistent pH suggests aquifer connectivity. Alternatively increased pH regions may indicate that electron acceptors other than oxygen are being utilized;
Temperature	Optimal soil and water temperatures are 10° to 40° C
Conductivity	The volume of water that will move through a medium in a unit of time. Conductivity is a good measure of the total amount of salts in solution (e.g., calcium, magnesium, sodium, potassium, carbonate, bicarbonate, sulphate, chloride, nitrate, and others).
Turbidity	Check for suspended and colloidal matter such as clay, silt, finely divided organic and inorganic matter, and microscopic organisms.
Total Dissolved Solids (TDS)	Define the concentration of dissolved organic and inorganic chemicals. Dissolved solids commonly found are calcium, magnesium, sodium, potassium, bicarbonate, sulfate, chloride and silica (and is used to reflect salinity).
Total Inorganic Carbons (TIC) (Alkalinity)	TIC is the best overall indicator of biological activity (for measuring the waste product of microbial activity to show biodegradation is occurring). Identify site-specific geochemical processes that may regulate the rate/extent of natural attenuation. (extremes of pH or salinity may inhibit microbial activity. An abrupt increase in Fe(II) suggests biodegradation is occurring).
Total Organic Carbons (TOC)	Used to determine if contaminant degrading bacteria are present in sufficient numbers to remediate the site. TOC is a measure of the total amount of the decayed, natural, organic material in a water sample.
Biological Oxygen Demand (BOD)	Measures the amount of oxygen consumed by microorganisms in decomposing organic matter BOD also measures the chemical oxidation of inorganic matter (i.e., the extraction of oxygen from water via chemical reaction).
Ferrous Iron	Identify conditions that facilitate iron reduction driven degradation pathways.
Redox Potential (ORP)	Measures the tendency of the environment to be reducing (donate electrons) or oxidizing (accept electrons). Negative redox potential suggests anaerobic degradation; highly negative redox potentials are required for methanogenesis and PCE/TCE degradation.
Total and Dissolved Manganese	Total manganese might be a better indicator because manganese adsorbed to suspended solids can exceed dissolved manganese in many systems, and the bioavailability of manganese in this form has not been established
Salinity	Elevated salinity may reduce microbial activity.

Nitrate	A measurement of the acid neutralizing capability of water.
Sulfate	Used to evaluate the extent of the dissolved plume; anaerobic degradation is occurring if sulfate is reduced to sulfide.
Heterotrophic Plate Count	Used to determine the number of microbial contaminants found. The result is calculated in Colony Forming Units. It is an excellent way to show that biodegradation is occurring.
Chloride	May be used to estimate extent of chlorinated solvent degradation.

Comparing The iSOC™ To Other Competing Bioremediation Technologies

It is common knowledge now that all the biological processes are oxygen limited. If you add oxygen you will fuel the system and you will increase the metabolism that allows bacteria to grow. The technology that delivers the highest amount of oxygen will over come iron and BOD as well as enhance the molecular dispersion of the super-saturated oxygenated water.