

Trusted Technical Expertise.



Natural attenuation, also referred to as intrinsic remediation, has been accepted as a feasible cleanup alternative for sites contaminated with petroleum hydrocarbons and other chemicals. Remediation by natural attenuation relies on the physical, chemical and biological processes that contribute to the decrease of both the contaminant concentration and plume size. Natural attenuation involves the use of the indigenous microorganisms at polluted sites to detoxify and degrade environmental contaminants through their physiological and metabolic capabilities.

### Natural attenuation processes include the following:

- Biodegradation
- Dilution
- Dispersion
- Sorption
- Abiotic (related to nonliving elements such as climate, soil and water reactions)

Columbia Analytical provides analytical testing for monitoring intrinsic remediation/natural attenuation (MNA) at sites contaminated with petroleum hydrocarbons and other chemicals.

Dissolved gases (including fixed O<sub>2</sub>, N<sub>2</sub>, CO, CO<sub>2</sub>, and CH<sub>4</sub>), light hydrocarbons, and hydrogen provide information on the progress of remediation.

Anion and cation changes also reflect the rate of metabolic activity.

The measurement of volatile fatty acids (lactic, the usual treatment stimulant, and its four fermentation products: pyruvic, butyric, propionic and acetic) is another activity monitoring suite.

Total inorganic carbon (TIC) and a measure of the resulting inorganic carbon form CO<sub>2</sub>, soluble organic carbon, and volatile organic compounds may also be performed to assess the reduction in hydrocarbon contamination.

For more information contact us at 800.695.7222.

## Sample Containers

Parameters	Method	Container	Preservative	Holding Time	Detection Limit
RSK 175 (Methane, Ethane, Ethene)	RSK 175	3 x 40 mL Glass Vials	4°C	14 days	<0.01%
RSK 175 (Oxygen, Carbon Dioxide)	RSK 175	3 x 40 mL Glass Vials	4°C	14 days	<0.01%
Volatile Organics	8260B	2 x 40 mL Glass Vials	HCL, 4°C	14 days	5-10 µg/l
Volatile Organics	8021B	2 x 40 mL Glass Vials	HCL, 4°C	14 days	1-2 µg/l
Anions					
Sulfide	376.1	300 mL Glass	ZnAc, NaOH pH>9, 4°C	7 days	1.0 mg/l
Nitrite	353.2	4 oz Plastic	4°C	48 hrs	0.01 mg/l
Chloride, Nitrate, Sulfate	300.0	4 oz Plastic	4°C	28 days	1.0, 0.05, 5.0 mg/l
Alkalinity	310.1	4 oz Plastic	No Headspace, 4°C	14 days	2.0 mg/l
Cations					
Ferrous Iron	SM3500	4 oz Plastic	4°C	Immediate	0.1 mg/l
Total Iron and Manganese	6010B	8 oz Plastic	HNO3	6 months	0.05 & 0.01 mg/l
Soluble Organic Carbon (SOC)	9060	2x40 mL Glass Vials	H <sub>2</sub> SO <sub>4</sub> , 4°C	28 days	0.1 mg/l
Chemical Oxygen Demand (COD)	410.4	4 oz Plastic	H <sub>2</sub> SO <sub>4</sub>	28 days	5.0 mg/l
Biochemical Oxygen Demand (BOD)	405.1	1 L Plastic	4°C	48 hrs	2.0 mg/l
Total Volatile Acids	SM5560C	8 oz Plastic	4°C	NA	3.0 mg/l