



Water Treatment – Advanced Oxidation Processes

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PDH: 7

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GLOSSARY

Advanced Oxidation Process (AOP) – a process in which the oxidative capacity of a parent compound is modified to make oxidation-reduction reactions more rapid or complete.

Bromate (BrO_3^-) – a suspected human carcinogen which is a byproduct of ozonating bromide-containing waters.

Closed-loop stripping analysis (CLSA) – an extraction technique useful for the isolation of volatile organic compounds, such as geosmin and MIB.

Collimated beam (CB) – a beam in which the light rays travel parallel to each other, allowing for irradiation of samples under lab conditions without any hydraulic disturbance.

Colorado River water (CRW) – influent water source from Lake Mathews, California, the southern terminus for the Colorado River aqueduct system.

Continuously-mixed batch reactor (CMBR) – a closed-loop reactor whose contents are mixed completely.

Continuously-stirred tank reactor (CSTR) – a steady-state reactor whose contents are completely mixed.

Cryptosporidium – an intestinal protozoan parasite causing diarrhea.

Disinfection byproduct (DBP) – a chemical byproduct of the disinfection process.

Dissolved oxygen (DO) – the concentration of oxygen in aqueous solution.

Gas chromatography (GC) - a technique commonly used in the analysis of organic compounds in water based on their retention time a chromatography column.

Geosmin ($\text{C}_{12}\text{H}_{22}\text{O}$)- common name for *trans*-1,10-dimethyl-*trans*-9-decalol, an earthy smelling chemical produced by certain blue-green algae and *Actinomyces*.

Giardia – the genus name for a group of single-celled, flagellated, pathogenic protozoans. *Giardia lamblia* is a common cause of diarrhea in humans.

Granular activated carbon (GAC) – a form of particulate carbon manufactured with increased surface area per unit mass to enhance adsorption of soluble contaminants.

Groundwater (GW) – the water contained in interconnected pores located in a confined aquifer or below the water table in an unconfined aquifer.

Haloaceto-nitrile (HAN) – ($CX_3\equiv N$, where X = Cl, Br, or H in various combinations) - a class of disinfection byproducts formed primarily during the chlorination of water containing natural organic matter.

Haloketone (HK) – (CX_3COCX_3 , where X = Cl, Br, or H in various combinations) - a class of disinfection byproducts formed primarily during the chlorination of water containing natural organic matter.

Hydroxyl radical (OH) – a strong oxidizing agent that can destroy many organic and inorganic compounds in water.

Ion chromatography (IC) – a technique for separating substances based on ion exchange, which is commonly used for the analysis of anions and cations in water.

Mass spectrometry (MS) – a method of chemical analysis in which compounds emerging from a gas chromatograph are fragmented and ionized by bombardment with a beam of electrons.

Maximum contaminant level (MCL) – a value defined under the Safe Drinking Water Act Section 1401(3) as the maximum permissible concentration of a contaminant in water delivered to any user of a public water system.

Method detection level (MDL) – the minimum concentration of a substance that can be measured and reported with 99 percent confidence that the analyte concentration is greater than zero.

2-methylisoborneol (MIB) - ($C_{11}H_{20}O$) common name for 2-exo-hydroxy-2-methylbornane, a musty-camphor-smelling chemical produced by blue-green algae and *Actinomyces*.

Methyl *tert*-butyl ether (MTBE) – ($((CH_3)_3COCH_3)$) an organic solvent, which is highly soluble in water and a common oxygenated gasoline additive.

Minimum reporting limit (MRL) – the lowest concentration of a given analyte that a laboratory feels confident reporting to data users.

MS-2 coliphage – a ribonucleic acid virus that can replicate only within its bacterial host, *Escherichia coli*.

N-nitrosodimethylamine (NDMA) – ($((CH_3)_2N_2O)$) a by-product of rocket fuel but is also formed as by-product during various manufacturing processes. NDMA is a known animal carcinogen and is classified as a probable human carcinogen.

Not analyzed (NA) – a sample was not collected to be analyzed.

Not detected (ND) – compounds not detected in samples analyzed.

Ozone (O_3) – a strong oxidant and disinfectant in the purification of drinking water.

Perchlorate (ClO_4^-)– used in the manufacturing of solid rocket fuels, explosives, munitions, and fireworks and at high concentrations it can interfere with thyroid gland ability.

PEROXONE – a combination of ozone and hydrogen peroxide.

Photolysis – chemical decomposition that is driven by photons of sunlight or ultraviolet light.

Pulsed UV – ultraviolet light generated in a wave form at a specific frequency.

Simulated distribution system (SDS) test – a type of test in which a treated water is dosed with a typical treatment plant level of disinfectant normally applied and is incubated under conditions that simulate disinfection byproduct production in a distribution system.

State Project water (SPW) – influent water source from Northern California via the California State Water Project.

Taste and odor (T&O) – the combination of sensations perceived by the mouth and nose.

Total dissolved solids (TDS) – the weight per unit volume of solids remaining after a sample has been filtered to remove suspended and colloidal solids.

Total organic carbon (TOC) – a measure of the concentration of organic carbon (all the carbon atoms covalently bonded in organic molecules) in water, determined by oxidation of the organic matter into carbon dioxide

Trihalomethane (THM) – any of numerous organic compounds named as derivatives of methane (CH_4) in which three halogen atoms (Cl, Br or I, singly or in combination) are substituted for three of the hydrogen atoms, which are formed during the disinfection of water with free chlorine.

Ultraviolet (UV) light – radiation having a wavelength between 10 and 390 nanometers, which can be used as a disinfectant or to create hydroxyl radicals.

Volatile organic compound (VOC) – a class of organic compounds that includes gases and volatile liquids.

ACRONYMS

AOP – advanced oxidation process

Br⁻ - bromide ion

BrO⁻ - hypobromate ion

BrO₂⁻ - bromite ion

BrO₃⁻ - bromate

°C – degree Celsius

CARB – California Air Resources Board

CB – collimated beam

CDHS – State of California Department of Health Services

Cl₂ – chlorine

CLSA – closed-loop stripping analysis

ClO₃⁻ – chlorate ion

ClO₄⁰ – perchlorate radical

ClO₄⁻ - perchlorate

cm - centimeter

CMBR – continuously-mixed batch reactor

CRW – Colorado River water

CSTR – continuously-stirred tank reactor

DBP – disinfection byproduct

DNA – deoxyribonucleic acid

DO – dissolved oxygen

ESWTR – Enhanced Surface Water Treatment Rule



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