

Appendix 1: Glossary of Terms

This extensive glossary can be a key resource in understanding the terminology, processes, technology and science of wastewater treatment.



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Abatement: Putting an end to an undesirable or unlawful condition affecting the wastewater collection system. A property owner found to have inflow sources connected to the collection system may be issued a “Notice of Abatement.” Such notices will usually describe the violation, suggest corrective measures, and grant a period of time for compliance.

Absorption: The taking in or soaking up of one substance into the body of another by molecular or chemical action (as tree roots absorb dissolved nutrients in the soil).

Acid: A substance that tends to lose a proton, dissolves in water with the formation of hydrogen ions, contains hydrogen which may be replaced by metals to form salts, and is corrosive.

Acidity: The capacity of water or wastewater to neutralize bases. Acidity is expressed in milligrams per liter of equivalent calcium carbonate. Acidity is not the same as pH because water does not have to be strongly acidic (low pH) to have a high acidity. Acidity is a measure of how much base must be added to a liquid to raise the pH to 8.2.

Activated Carbon: Adsorptive particles or granules of carbon usually obtained by heating carbon (such as wood). These particles or granules have a high capacity to selectively remove certain trace and soluble materials from water.

Activated Sludge: Sludge particles produced in raw or settled wastewater (primary effluent) by the growth of organisms (including zoogeal bacteria) in aeration tanks in the presence of dissolved oxygen. The term “activated” comes from the fact that the particles are teeming with bacteria, fungi, and protozoa. Activated sludge is different from primary sludge in that the sludge particles contain many living organisms that can feed on the incoming wastewater.

Activated Sludge Process: A biological wastewater treatment process that speeds up the decomposition of wastes in the wastewater being treated. Activated sludge is added to wastewater and the mixture (mixed liquid) is aerated and agitated. After some time in the aeration tank, the activated sludge is allowed to settle out by sedimentation and is disposed of (wasted) or reused (re-

turned to the aeration tank) as needed. The remaining wastewater then undergoes more treatment.

Adsorption: The gathering of a gas, liquid, or dissolved substance on the surface or interface zone of another substance.

Advanced Waste Treatment: Any process of water renovation that upgrades treated wastewater to meet specific reuse requirements. May include general cleanup of water or removal of specific parts of wastes insufficiently removed by conventional treatment processes. Typical processes include chemical treatment and pressure filtration. Also called “tertiary treatment.”

Aeration: The process of adding air to water. Air can be added to water by either passing air through water or passing water through air. In wastewater treatment, air is added to freshen wastewater and to keep solids in suspension. With mixtures of wastewater and activated sludge, adding air provides mixing and oxygen for the microorganisms treating the wastewater.

Aeration Liquor: Mixed liquor. The contents of the aeration tank including living organisms and material carried into the tank by either untreated wastewater or primary effluent.

Aeration Tank: The tank where raw or settled wastewater is mixed with return sludge and aerated. The same as “aeration bay,” “aerator,” or “reactor.”

Aerobic: A condition in which dissolved oxygen is present in the aquatic (water) environment.

Aerobic Bacteria: Bacteria which will live and reproduce only in an environment containing oxygen which is available for their respiration (breathing), namely atmospheric oxygen or oxygen dissolved in water. Oxygen combined chemically, such as in water molecules (H₂O), cannot be used for respiration by aerobic bacteria.

Aerobic Decomposition: Decomposition and decay of organic material in the presence of “free” or dissolved oxygen.

Aerobic Digestion: The breakdown of wastes by microorganisms in the presence of dissolved oxygen. This digestion process may be used to treat only waste activated sludge, or trickling filter sludge and primary (raw) sludge, or waste sludge from activated sludge treatment

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plants designed without primary settling. The sludge to be treated is placed in a large aerated tank where aerobic microorganisms decompose the organic matter in the sludge. This is an extension of the activated sludge process.

Aerobic Process: A waste treatment process conducted under aerobic (in the presence of “free” or dissolved oxygen) conditions.

AGA: American Gas Association

Agglomeration: The grouping, or coming together of dispersed suspended matter into larger particles, called “floc”, which settle more rapidly.

Air Blower: A device used to ventilate manholes and lift stations.

Air Changes: Expression of the amount of air movement or air leakage into or out of a building in terms of the number of building volumes or room volumes exchanged.

Air Conditioner: Assembly of equipment for the simultaneous control of air temperature, relative humidity, purity, and motion.

Air Conditioning System: Assembly of equipment for air treatment to control simultaneously its temperature, humidity, cleanliness, and distribution to meet the requirements of a conditioned space.

Air Gap: In plumbing, an unobstructed vertical distance through free atmosphere between the opening of a pipe or faucet supplying water to a tank and the water surface of the tank at flood level.

Air Handling Unit: Consists of a fan and one or more coils (heating and/or cooling), filters, mixing boxes, dampers and their associated controls. Typically the fan and the coils are mounted within a single cabinet.

Airlift: A device for raising liquids by injecting air near the bottom of a riser pipe submerged in the liquid.

Air-to-air Heat Exchanger: Exchanger that transfers heat from an exhaust airstream to a separated supply airstream.

Algae: Microscopic plants which contain chlorophyll and live floating or suspended in water. They also may be attached to structures, rocks or other similar substances. Algae produce oxygen during sunlight hours and use oxygen during the night hours. Their biological activities appreciably affect the pH and dissolved oxygen of the water.

Algal Bloom: Sudden, massive growths of microscopic

and macroscopic plant life, such as green or blue-green algae, which develop in lakes and reservoirs.

Algicide: Any substance which will kill algae

Aliquot: Portion of a sample.

Alkali: Any of certain soluble salts, principally of sodium, potassium, magnesium, and calcium, that combine with acids to form neutral salts and may be used in chemical processes such as water or wastewater treatment. Examples include calcium carbonate, sodium hydroxide, and sodium bicarbonate.

Alkaline: The condition of water or soil that contains a sufficient amount of alkali substances to raise the pH above 7.0.

Alkalinity: The capacity of water or wastewater to neutralize acids. This capacity is caused by the water’s content of carbonate, bicarbonate, hydroxide, and occasionally borate, silicate, and phosphate. Alkalinity is expressed in milligrams per liter of equivalent calcium carbonate. Alkalinity is not the same as pH because water does not have to be strongly basic (high pH) to have a high alkalinity. Alkalinity is a measure of how much acid must be added to a liquid to lower the pH to 4.5.

Alternating Current (AC): Electrical current which reverses direction repeatedly and rapidly. The change in current is due to a change in voltage which occurs at the same frequency.

Ambient Air: Surrounding air (usually outdoor air or the air in an enclosure under study).

Ambient Temperature: The temperature of the surrounding area.

American National Standards Institute (ANSI): A private organization that coordinates some US standards setting. It also approves some US standards that are often called ANSI standards. ANSI also represents the United States to the International Standards Organization. See also: International Standards Organization

American Standard Code for Information Interchange (ASCII): A standard character set that (typically) assigns a 7-bit sequence to each letter, number, and selected control character. Erroneously used now to refer to (8-bit) Extended ASCII. The other major encoding standard is EBCDIC.

American Wire Gauge (AWG): A standard used to describe the size of a wire. The larger the AWG number, the smaller (thinner) the described wire.

Amination: Use of ammonia-nitrogen by bacteria to form new bacteria.

Ammonia (NH₃): A chemical combination of hydrogen (H) and nitrogen (N) found extensively in nature. An indicator of fresh pollution.

Ammonification: Conversion of organic nitrogen to ammonia-nitrogen resulting from the biological decomposition of organic matter (i.e., dead plant and animal tissue, fecal matter, etc.)

Ampacity: The amount of current (measured in amperes) that a conductor can carry without overheating

Ampere (or amp): Unit of current measurement The amount of current that will flow through a one ohm resistor when one volt is applied

Ampere-hour: The quantity of electricity equal to the flow of a current of one ampere for one hour.

Amperometric: A method of measurement that records electric current flowing or generated, rather than recording voltage. Amperometric titration is an electro-metric means of measuring concentrations of substances in water.

Anaerobic: A condition in which atmospheric or dissolved molecular oxygen is not present in the aquatic (water) environment.

Anaerobic Bacteria: Bacteria that live and reproduce in an environment containing no "free" or dissolved oxygen. Anaerobic bacteria obtain their oxygen supply by breaking down chemical compounds which contain oxygen, such as sulfate.

Anaerobic Decomposition: Decomposition and decay of organic material in an environment containing no "free" or dissolved oxygen.

Anaerobic Digester: A wastewater solids treatment device in which the solids and water (about 5 percent solids, 95 percent water) are placed in a large tank where bacteria decompose the solids in the absence of dissolved oxygen.

Analog: A format that uses continuous physical variables such as voltage amplitude or frequency variation to represent information. Contrast with digital.

Annunciator: A sound generating device that intercepts and speaks the condition of circuits or circuits operations. A signaling device that gives a visual or audible signal (or both) when energized.

Anoxic: A condition in which the aquatic (water) envi-

ronment does not contain enough dissolved molecular oxygen, which is called an oxygen deficient condition. Generally refers to an environment in which chemically bound oxygen, such as in nitrate, is present.

Approved Ground: A grounding bus or strap in a building that is suitable for connecting to data communication equipment. It includes a grounding subsystem, the building's electrical service conduit and a grounding conductor. See also EIA 607 and the National Electrical Code.

Aquastat: Thermostat for use in water.

Assimilation: Use of ammonia and nitrate-nitrogen by plants for growth.

Autotrophic Bacteria: Bacteria that use inorganic carbon (i.e., carbon dioxide) for energy and cell growth.

Average Power: The average over time of a modulated signal.

AWG: See American Wire Gauge.

Axial Fan: Fan that moves air in the general direction of the axis about which it rotates.

BOD5: Refers to the five-day biochemical oxygen demand. The total amount of oxygen used by microorganisms decomposing organic matter increases each day until the ultimate BOD is reached, usually in 50 to 70 days. BOD usually refers to the five-day BOD or BOD5.

Backflow: A flow condition, caused by differential pressure, resulting in the flow of liquid into the potable water supply system from sources other than those intended; or the backing up of liquid, through a conduit or channel, in a direction opposite to normal flow. Backflow Preventer - any effective device, method or construction used to prevent backflow into a potable water system.

Backwashing: The process of reversing the flow of water back through the filter media to remove the entrapped solids.

Bacteria: Primitive organisms (mostly plants) that are generally free of pigment and reproduce by dividing in one, two, or three planes. They are single-celled, do not require light for their life processes, and can be grown in special cultures out of their native environment.

Anaerobic - bacteria which can grow in the absence of "free" oxygen, deriving their oxygen from breaking down complex substances.

Coliform Group - a group of bacteria, predominantly found in the intestinal tract of warm blooded animals, used as indicators of human pollution. The

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major species are: *Escherichia Coli* (E-Coli), found in the intestines of man and *Aerobacter Aerogenes*/ normally found on grain and plants.

Facultative - bacteria which can adapt themselves to grow in the presence and absence of dissolved oxygen. Bacteria Primitive organisms, mostly plants and generally free of pigment, which reproduce by dividing in one, two or three planes. They are single-celled, do not require light for their life processes, and can be grown in special cultures out of their native environment.

Bacterial Culture: In the case of activated sludge, it; bacterial culture refers to the group of bacteria classed as Aerobes, and facultative organisms, which covers a wide range of organisms. Most treatment processes in the United States grow facultative organisms which utilize the carbonaceous (carbon compounds) BOD. Facultative organisms can live when oxygen resources are low. When "nitrification" is required, the nitrifying organisms are Obligate Aerobes (require oxygen) and must have at least 0.8 mg/L of dissolved oxygen throughout the whole system to function properly.

Ballast: An electrical circuit component used with fluorescent lamps to provide the voltage necessary to strike the mercury arc within the lamp, and then to limit the amount of current that flows through the lamp.

Bandwidth: Technically, the difference, in Hertz (Hz), between the highest and lowest frequencies of a transmission channel. Usually identifies the capacity or amount of data that can be sent through a given circuit.

Barometric Damper: Mechanically balanced damper that rotates from changes in pressure within breeching to bleed air into the breeching to maintain steady draft.

Bar Rack: A screen composed of parallel bars, either vertical or inclined, placed in a sewer or other waterway to catch debris. The screenings may be raked from it.

Base: A substance which takes up or accepts protons. A substance which dissociates (separates) in aqueous solution to yield hydroxyl ions. A substance containing hydroxyl ions which reacts with an acid to form a salt or which may react with metals to form precipitates.

Batch Process: A treatment process in which a tank or reactor is filled, the wastewater (or solution) is treated or a chemical solution is prepared and the tank is emptied. The tank may then be filled and the process repeated. Batch processes are also used to cleanse, stabilize or

condition chemical solutions for use in industrial manufacturing and treatment processes.

Baud: A unit of signaling speed. The speed in Baud is the number of discrete conditions or signal elements per second. If each signal event represents only one bit condition, then Baud is the same as bits per second. Baud rarely equals bits per second.

Baud Rate: The rate at which data is transferred over an asynchronous RS-232 serial connection.

Better Site Design (BSD): The practice of handling stormwater through non-structural and natural approaches to new and redevelopment projects to reduce impacts on watersheds by conserving natural areas, reducing impervious cover and better integrating stormwater treatment. Better Site Design is similar to Low Impact Development (LID) and is one of the principles of Smart Growth.

Bioassay: An assay method using a change in biological activity as a qualitative or quantitative means of analyzing a material's response to biological treatment. A method of determining toxic effects of industrial wastes or other wastes by using live organisms such as fish for test organisms.

Biochemical: Chemical change resulting from biological action.

Biochemical Oxygen Demand (BOD): The rate at which organisms use the oxygen in water or wastewater while stabilizing decomposable organic matter under aerobic conditions. In decomposition, organic matter serves as food for the bacteria and energy results from its oxidation. BOD measurements are used as a measure of the organic strength of wastes in water.

Biodegradation: The breakdown of organic matter by bacteria to more stable forms which will not create a nuisance or give off foul odors.

Bioflocculation: A condition whereby organic material; tend to be transferred from the dispersed form in wastewater to settleable material by mechanical entrapment and assimilation.

Biological Aerated Filter: A biological wastewater treatment process that utilizes fixed film media (i.e., expanded shale, polystyrene beads) for growth and retention of biological microorganisms responsible for BOD removal and nitrification.

Biological Process: A waste treatment process by which

bacteria and other microorganisms break down complex organic materials into simple, nontoxic, more stable substances.

Biomass: A mass or clump of organic material consisting of living organisms feeding on the wastes in wastewater, dead organisms, and other debris.

Biosolids: A primarily organic solid product produced by wastewater treatment processes that can be beneficially recycled. The word “biosolids” is replacing the word “sludge.”

Biostimulation: Stimulation of the growth of algae and other aquatic plants resulting from over-fertilization of lakes, rivers, and estuaries.

Biosurvey: A survey of the types and numbers of organisms naturally present in the receiving waters upstream and downstream from plant effluents. Comparisons are made between the aquatic organisms upstream and those organisms downstream of the discharge.

Blinding Boiler Horsepower (BHp): Media clogging in various types of filters Equal to the evaporation of 34.5 pounds of water at 212°F, having a total heat content of 33,472 BTUs.

Bloodborne Pathogen: A disease causing organism which lives in the blood, and some other types of body fluids, of infected persons.

Blowdown: Discharge of water from a steam boiler or other recirculating system that contains high total dissolved solids.

Blower: A device used to ventilate manholes and lift stations.

BOD: See Biochemical Oxygen Demand.

Boiler: Vessel in which a liquid is heated with or without vaporization; boiling need not occur.

Boiler Feed Pump: Pump which returns condensed steam, makeup water, or both directly to the boiler.

Boiler Feedwater: Water supplied to a boiler by pumping.

Boiler Horsepower: Equivalent to 33,475 Btu/hr.

Bonding: A very-low impedance path accomplished by permanently joining non-current-carrying metal parts. It is done to provide electrical continuity and to offer the capacity to safely conduct any current.

Bonding Jumper: A conductor used to assure the required electrical connection between metal parts of an electrical system.

Bonding Conductor: The conductor that connects the noncurrent-carrying parts of electrical equipment, cable raceways, or other enclosures to the approved system ground conductor

Branch Circuit: Conductors between the last over current device and the outlets

Branch Circuit, General Purpose: A branch circuit that supplies outlets for lighting and power.

Branch Circuit, Individual: A branch circuit that supplies only one piece of equipment.

Branch Circuit, Multiwire: A branch circuit having two or more ungrounded circuit conductors, each having a voltage difference between them, and a grounded circuit conductor (neutral) having an equal voltage difference between it and each ungrounded conductor.

Branch Sewer: A sewer that receives wastewater from a relatively small area and discharges into a main sewer serving more than one branch sewer area.

Break: A fracture or opening in a pipe, manhole or other structure due to structural failure and/or structural defect.

Break Point: That point in time when the effluent contaminant concentration in a controlled air stream (usually an adsorption device) begins to increase as the adsorbing device becomes saturated.

Breakthrough: In an adsorption device, the increase in outlet concentration of the controlled contaminant from the break point, as the adsorbing media reaches saturation.

Breeching: Passage for conducting the products of combustion from a fuel-fired appliance to a vent or chimney.

British Thermal Unit (BTU): The amount of heat required to raise the temperature of one pound of water, one degree Fahrenheit.

Btu: British thermal unit.

Buffer: A solution or liquid whose chemical makeup neutralizes acids or bases without a great change in pH.

Building Sewer: A gravity-flow pipeline connecting a building wastewater collection system to a lateral or branch sewer. The building sewer may begin at the outside of the building's foundation wall or some distance (such as 2 to 10 feet) from the wall, depending on local sewer ordinances. Also called a “house connection” or a “service connection.”

Building Wastewater Collection System: All of the waste-

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water drains pipes and their hardware that connect plumbing fixtures inside or adjacent to a building to the building sewers. This includes traps, vents, and cleanouts.

Bulking: A decrease in the settleability of an activated sludge, as measured by a significant rise in the Sludge Volume Index.

Burner: Part of a fuel-burning device (as a boiler or furnace) where flame is produced.

Bypass: A pipe, valve, gate, weir, trench or other device designed to permit all or part of a wastewater flow to be diverted from usual channels or flow. Sometimes refers to a special line which carries the flow around a facility or device that needs maintenance or repair. In a wastewater treatment plant, overload flows should be bypassed into a holding pond for future treatment.

Cabinet Heater: A heating unit, usually wall mounted, which enclosed in a cabinet. This device usually relies upon convection as the method of heating.

Carbonaceous Oxygen Demand (CBOD): A measure of the amount of dissolved oxygen required for the biological oxidation of compounds containing carbon in the sample. Same as Biochemical Oxygen Demand.

Carbonaceous Stage: A stage of decomposition that occurs in biological treatment processes when aerobic bacteria, using dissolved oxygen, change carbon compounds to carbon dioxide. Sometimes referred to as “first-stage BOD” because the microorganisms consume organic or carbon compounds first and nitrogen compounds later.

Catch Basin: A chamber or well used with storm or combined sewers as a means of removing grit, which might otherwise enter and be deposited in sewers.

Categorical Limits: Industrial wastewater discharge pollutant effluent limits developed by EPA that are applied to the effluent from any industry in any category anywhere in the United States that discharges to a POTW. These are pollutant effluent limits based on the technology available to treat the waste streams from the processes of the specific industrial category and normally are measured at the point of discharge from the regulated process. The pollutant effluent limits are listed in the Code of Federal Regulations.

Cathodic Protection: An electrical system for prevention of rust, corrosion, and pitting of metal surfaces which are in contact with water or soil. A low-voltage current is made to flow through a liquid (water) or a soil in con-

tact with the metal in such a manner that the external electromotive force renders the metal structure cathodic. This concentrates corrosion on auxiliary anodic parts which are deliberately allowed to corrode instead of letting the structure corrode.

Cation: A positively charged ion in an electrolyte solution, attracted to the cathode under the influence of a difference in electrical potential. Sodium ion is a cation.

Cavitation: Vaporization of a pumped fluid resulting in vibration, noise and destruction of equipment. This occurs when the absolute pressure of the system equals the vapor pressure of the fluid pumped. In a centrifugal pump, the impeller usually receives the most damage.

Centrifugal Compressor: Nonpositive displacement compressor which depends for pressure rise, at least in part, on centrifugal forces. A turbocompressor.

Centrifugal Fan: Fan in which the air enters the impeller axially and leaves it substantially in a radial direction.

Centrifuge: A mechanical device in which centrifugal force is used to separate solids-from liquids and/or separate liquids of different densities.

Certification Examination: An examination administered by a state or professional association that operators take to indicate a level of professional competence.

Cfm: Cubic feet per minute.

Chain of Custody: A record of each person involved in the handling and possession of a sample from the person who collected the sample to the person who analyzed the sample in the laboratory and to the person who witnessed disposal of the sample.

Chemical Hygiene Plan: A written plan to identify and control the hazards associated with laboratory work.

Chemical Oxygen Demand (COD): A measure of the oxygen-consuming capacity of organic matter present in wastewater. COD is expressed as the amount of oxygen consumed from a chemical oxidant in mg/L during a specific test. Results are not necessarily related to the biochemical oxygen demand because the chemical oxidant may react with substances that bacteria do not stabilize.

CHEMTREC: Chemical Transportation Emergency Center: A public service of the Manufacturing Chemists Association, which provides immediate advice in the event of a hazardous material emergency. (800) 424-9300.

Chilled Water: Water used as a cooling medium, particularly in air-conditioning systems, which is at below am-

bient temperature.

Chiller: Refrigerating machine used to transfer heat between fluids; complete chiller—an indirect refrigerating system of compressor, condenser, and evaporator with all operating and safety controls.

Chloramines: Compounds of chlorine with organic and inorganic nitrogen.

Chlorination: The application of chlorine to water or wastewater, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical results (aiding coagulation and controlling tastes and odors).

Chlorinator: A metering device which is used to add chlorine to water.

Chlorine (Cl₂): An element existing as a greenish-yellow gas about 2.5 times heavier than air under normal temperatures and pressures. In liquid form it is amber and about 1.5 times heavier than water.

Available - a measure of the oxidizing power of chlorinated lime and hypochlorites.

Contact Tank - a detention tank provided primarily to ensure sufficient time for the disinfection process to take place.

Demand - the difference between the amount of chlorine added and the residual after a specified contact time. The demand may change with dosage, time, temperature, pH and the nature and amount of impurities in the water.

Requirement - the demand plus the residual. The amount of chlorine added to produce the desired result.

Chlorine Contact Unit: A baffled basin that provides sufficient detention time for disinfection to occur.

Chlorine Demand: Chlorine demand is the difference between the amount of chlorine added to wastewater and the amount of residual chlorine remaining after a given contact time. Chlorine demand may change with dosage, time, temperature, pH, nature, and the amount of the impurities in the water.

Chlorine Requirement: The amount of chlorine which must be added to produce the desired result under stated conditions. The result (the purpose of chlorination) may be based on any number of criteria, such as a stipulated coliform density, a specified residual chlorine concentration, the destruction of a chemical constituent, or others. In each case a definite chlorine dosage will be necessary.

This dosage is the chlorine requirement.

Chlororganic: Chlororganic compounds are organic compounds combined with chlorine. These compounds generally originate from or are associated with living or dead organic materials.

Cilia: Hairlike protuberances found on certain protozoans (called ciliates) and multi-celled aquatic invertebrates. They are used for locomotion or to cause flow of liquid.

Ciliates: A class of protozoans distinguished by short hairs on all or part of their bodies.

Circuit Breaker: A device used to open and close a circuit by automatic means when a predetermined level of current flows through it.

Circulating Water: Water that circulates repeatedly around a loop, used in a water-cooled device or in a device that cools or heats water or air.

Clarification: Any process or combination of processes the main purpose of which is to reduce the concentration of suspended matter in a liquid.

Clarifier: A large circular or rectangular tank or basin in which water is held for a period of time during which the heavier suspended solids settle to the bottom. Clarifiers are also called settling basins and sedimentation basins. May also be a tank or basin in which wastewater is held for a period of time during which the heavier solids settle to the bottom and the lighter materials float to the water surface.

Clean Water Act: An act passed by the US Congress to control water pollution. The Federal Water Pollution Control Act passed in 1972 (Public Law [PL] 92-500). It was amended in 1977 (the Clean Water Act, PL 95-217) and again in 1987 (the Water Quality Act, PL 100-4).

Coagulant: A chemical that causes very fine particles to clump (floc) together into larger particles. This makes it easier to separate the solids from the liquids by settling, skimming, draining or filtering.

Coagulation: The clumping together of very fine particles into larger particles (floc) caused by the use of chemicals (coagulants). The chemicals neutralize the electrical charges of the fine particles, allowing them to come closer and form larger clumps. This clumping together makes it easier to separate the solids from the water by settling, skimming, draining or filtering.

COD: See Chemical Oxygen Demand.

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Code of Federal Regulations (CFR): A publication of the United States Government which contains all of the proposed and finalized federal regulations, including environmental regulations.

Coliform: A group of bacteria found in the intestines of warm-blooded animals (including humans) and also in plants, soil, air and water. Fecal coliforms are a specific class of bacteria which only inhabit the intestines of warm-blooded animals. The presence of coliform bacteria is an indication that the water is polluted and may contain pathogenic (disease-causing) organisms.

Collection System: A network of pipes, manholes, cleanouts, traps, siphons, lift stations and other structures used to collect all wastewater and wastewater-carried wastes of an area and transport them to a treatment plant or disposal system. The collection system includes land, wastewater lines and appurtenances, pumping stations and general property.

Colloids: Very small solids (particulate or insoluble material in a finely divided form that remain dispersed in a liquid for a long time due to their small size and electrical charge.

Colorimetric: A means of measuring unknown concentrations of water quality indicators in a sample by comparing the sample's color, after the addition of specific reagents, with the color of known concentrations.

Combined Sewer: A sewer designed to carry both sanitary wastewaters and storm or surface water runoff.

Combined Sewer Overflow (CSO): Wastewater that flows out of a sewer (or lift station) as a result of flows exceeding the hydraulic capacity of the sewer. CSOs usually occur during periods of heavy precipitation or high levels of runoff from snow melt or other runoff sources.

Combined Wastewater: A mixture of storm or surface runoff and other wastewater such as domestic or industrial wastewater.

Combustion: Chemical process of oxidation that occurs at a rate fast enough to produce heat and usually a flame.

Combustion Air: Air required to provide for the complete combustion of fuel, and usually consisting of primary air, secondary air and excess air.

Comminution: A mechanical treatment process which cuts large pieces of wastes into smaller pieces so they won't plug pipes or damage equipment (shredding).

Comminutor: A device used to reduce the size of the solid

chunks in wastewater by shredding (comminuting). The shredding action is like many scissors cutting or chopping to shreds all the large solids material in the wastewater.

Compliance: The act of meeting specified conditions or requirements.

Composite (Proportional) Sample: A composite sample is a collection of individual samples obtained at regular intervals, usually every one or two hours during a 24-hour time span. Each individual sample is combined with the others in proportion to the rate of flow when the sample was collected. The resulting mixture (composite sample) forms a representative sample and is analyzed to determine the average conditions during the sampling period.

Compressor: Device for mechanically increasing the pressure of a refrigerant vapor.

Condensate: Liquid formed by condensation of a vapor. In steam heating, water condensed from steam; in air conditioning, water extracted from air, as by condensation on the cooling coil.

Condensate Return Pump: Pump used to transfer condensate from one point in a system to another receiver; usually installed with a receiver tank and a float valve; the pump being controlled by tank level.

Condensation: Change of state of a vapor into a liquid by extracting heat from the vapor.

Condenser: Heat exchanger in which vapor is liquefied by the rejection of heat to a heat sink.

Condensing Unit: Machine specifically designed to condense refrigerant vapor to a liquid by compressing the vapor in a positive-displacement compressor and rejecting heat to a cooling medium. The unit consists usually of one or more positive displacement compressors, motors, condensers, liquid receivers (when required), and necessary accessories, mounted on a common base.

Conditioned Air: Air treated to control its temperature, relative humidity, purity, pressure, and movement.

Conductor: A substance which offers little resistance to the flow of electrical currents. Insulated copper wire is the most common form of conductor.

Conduit Body: The part of a conduit system, at the junction of two or more sections of the system, that allows access through a removable cover. Most commonly known as conduits, LBs, LLs, and LRs.

Confined Space: Confined space means a space is three-

fold, it is large enough and so configured that an employee can bodily enter and perform assigned work; it has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and it is not designed for continuous employee occupancy.

Confined Space Permit: A written form that assures that actual or potential hazards in a confined space are eliminated or managed prior to entry.

Coning: A condition that may be established in a sludge hopper during sludge withdrawal when part of the sludge moves toward the outlet while the remainder tends to stay in place. Development of a cone or channel of moving liquid surrounded by relatively stationary sludge.

Construction General Permit: The SPDES Permit that regulates construction activities that disturb one or more acres—Coded GP-0-10-001.

Contact Stabilization: Contact stabilization is a modification of the conventional activated sludge process. In contact stabilization, two aeration tanks are used. One tank is for separate reaeration of the return sludge (typically for at least four hours) before it is permitted to flow into the other aeration tank to be mixed with the primary effluent requiring treatment.

Contamination: The introduction into water of microorganisms, chemicals, toxic substances, wastes, or wastewater in a concentration that makes the water unfit for its next intended use.

Continuous Load: A load whose maximum current continues for three hours or more.

Continuous Process: A treatment process in which water is treated continuously (as opposed to batch treatment) in a tank or reactor. The water being treated continuously flows into the tank at one end, is treated as it flows through the tank, and flows out the opposite end as treated water.

Convection: Transfer of heat by a fluid moving by natural variations in density.

Convectector: A heating unit, usually wall mounted, which relies on convection for delivery of heated air.

Conventional Treatment: The common treatment processes such as preliminary treatment, sedimentation, flotation, trickling filter, rotating biological contactor,

activated sludge and chlorination wastewater treatment processes used by POTWs.

Cooling Coil: Coil that uses refrigerant or secondary coolant to provide cooling, or cooling with dehumidification.

Cooling Load: Amount of cooling per unit time required by the conditioned space.

Cooling Tower: Heat transfer device, often tower-like, in which atmospheric air cools warm water, generally by direct contact (evaporation).

Cooling Water: Water used for condensing a refrigerant.

Corrosion: The gradual decomposition or destruction of a material by chemical action, often due to an electrochemical reaction. Corrosion may be caused by (1) stray current electrolysis, (2) galvanic corrosion caused by dissimilar metals, or (3) differential-concentration cells. Corrosion starts at the surface of a material and moves inward.

Corrosion Inhibitors: Substances that slow the rate of corrosion.

Corrosive: A chemical that can cause burns to skin, eyes or the respiratory system

Corrosive Gases: In water, dissolved oxygen reacts readily with metals at the anode of a corrosion cell, accelerating the rate of corrosion until a film of oxidation products such as rust forms. At the cathode where hydrogen gas may form a coating on the cathode and slow the corrosion rate, oxygen reacts rapidly with hydrogen gas forming water, and again increases the rate of corrosion.

Cross Connection: 1. A connection between a storm drain system and a sanitary collection system. 2. Less frequently used to mean a connection between two sections of a collection system to handle anticipated overloads of one system. 3. A connection between drinking (potable) water and an unapproved water supply.

Cryptosporidium: A waterborne intestinal parasite that causes a disease called cryptosporidiosis in infected humans. Symptoms of the disease include diarrhea, cramps, and weight loss. Cryptosporidium contamination is found in most surface waters and some groundwater. Commonly referred to as “crypto.”

CSO: See Combustion Sewer Overflow.

Cubic Feet Per Second (CFS): Rate of flow units of expression.

Current: The flow of electricity in a circuit, measured in amperes.

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Cyclical Aeration: Cycling of air supply to a portion of an aeration tank to promote anoxic conditions suitable for denitrification.

Daisy Chaining: The connection of multiple devices in a serial fashion. Daisy chaining can save on transmission facilities. If a device malfunctions all of the devices daisy chained behind it are disabled.

Damper: Device used to vary the volume of air passing through an outlet, inlet, or duct; or generally through a confined cross section by varying the cross-sectional area.

Damper Actuator: Device (motor) that provides the necessary force to position a damper. Can be electrically, pneumatically or manually operated.

Dateometer: A small calendar disc attached to motors and equipment to indicate the year in which the last maintenance service was performed.

Dissolved Oxygen (DO): DO is the molecular (atmospheric) oxygen dissolved in water or wastewater.

Dechlorination: The deliberate removal of chlorine from water. The partial or complete reduction of residual chlorine by any chemical or physical process.

Decomposition: The breakdown of complex material into simpler substances by biological or chemical action. Also referred to as degradation.

Degradation: The conversion or breakdown of a substance to simpler compounds. For example, the degradation of organic matter to carbon dioxide and water.

Dehumidification: Removal of water vapor from air.

Dehumidifier: Air cooler, or an absorption or adsorption device used for lowering moisture content in air.

Denitrification: An anoxic process that occurs when nitrite or nitrate ions are reduced to nitrogen gas and nitrogen bubbles are formed as a result of this process. The bubbles attach to the biological floc in the activated sludge process and float the floc to the surface of the secondary clarifiers. This condition is often the cause of rising sludge observed in secondary clarifiers or gravity thickeners. Also see “nitrification.”

Density: The weight per unit volume of a substance, which varies with temperature.

Deposition: The process of settling solid material from a fluid suspension.

Desiccant: Absorbent or adsorbent, liquid or solid, that removes water or water vapor from an air stream.

Detention Time: 1. The theoretical (calculated) time required for a small amount of water to pass through a tank at a given rate of flow. 2. The actual time in hours, minutes or seconds that a small amount of water is in a settling basin, flocculating basin or rapid-mix chamber. In storage reservoirs, detention time is the length of time entering water will be held before being drafted for use (several weeks to years, several months being typical).

Detritus: The heavy, coarse material carried by wastewater.

Dewater: To drain or remove water from an enclosure. A structure may be dewatered so that it can be inspected or repaired. Dewater also means draining or removing water from sludge to increase the solids concentration.

Dewaterability: A measure of the ease with which water can be removed from a substance.

Diffused-Air Aeration: A diffused air activated sludge plant takes air, compresses it, and then discharges the air below the water surface of the aerator through some type of air diffusion device.

Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging air in various directions and planes and arranged to promote mixing of primary air with secondary room air.

Digester: A tank in which sludge is placed to allow decomposition by microorganisms. Digestion may occur under anaerobic (more common) or aerobic conditions.

Direct Discharger: A point source that discharges a pollutant(s) to waters of the United States, such as streams, lakes or oceans. These sources are subject to the National Pollutant Discharge Elimination System (NPDES) program regulations.

Direct Current (DC): Electrical current which flows in one direction only.

Direct Filtration: A method of treating water which consists of the addition of coagulant chemicals, flash mixing, coagulation, minimal flocculation, and filtration. The flocculation facilities may be omitted, but the physical-chemical reactions will occur to some extent. The sedimentation process is omitted. Also see “conventional filtration” and “in-line filtration.”

Direct Runoff: Water that flows over the ground surface or through the ground directly into streams, rivers, or

lakes.

Disconnecting Means: A device which disconnects a group of conductors from their source of supply.

Disinfection: The process designed to kill or inactivate most microorganisms in wastewater, including essentially all pathogenic (disease-causing) bacteria. There are several ways to disinfect, with chlorination being the most frequently used in water and wastewater treatment plants.

Disinfection By-Product (DBP): A contaminant formed by the reaction of disinfection chemicals (such as chlorine) with other substances in the water being disinfected.

Dissolved Oxygen Molecular (atmospheric): Oxygen dissolved in water or wastewater, usually abbreviated DO.

Distillate: In the distillation of a sample, a portion is evaporated; the part that is condensed afterwards is the distillate.

Distributor: The rotating mechanism that distributes the wastewater evenly over the surface of a trickling filter or other process unit.

Disturbance: In the context of the stormwater program, the term “disturbance” means construction or demolition activity that results in the exposure of soil.

Diurnal: Having a daily cycle or recurring each day.

Diverting Valve: Three-way valve piped to supply a single source of fluid to either of two outlets.

Domestic: Residential living facilities. A domestic area will be predominantly residential in occupancy and is sometimes referred to as a “bedroom area” or “bedroom community.”

Downstream: The direction of the flow of water. In the lower part of a sewer or collection system or in that direction.

Draft: Pressure difference which causes a current of air or gases to flow through a flue, chimney, heater, or space.

Drop Cable: Cable that provides access to and from a network system. Possibly the cable from a transceiver or an individual line in a multi-drop situation. Also the cable from a wall-mounted faceplate or jack to a user’s system.

Dry-bulb Temperature: Temperature of air indicated by an ordinary thermometer.

Dual-fuel Burner: Burner designed to burn either gas or oil but not both simultaneously.

Duct: Passageway made of suitable material, not neces-

sarily leaktight, used for conveying air or other gas at low pressures.

Ductwork: A system of ducts for distribution and extraction of air.

EPA or United States Environmental Protection Agency: A regulatory agency established by the US Congress to administer the nation’s environmental laws. Also called the US EPA.

Easement: Legal right to use the property of others for a specific purpose. For example, a utility company may have a five-foot easement along the property line of a home. This gives the utility the legal right to install and maintain a sewer line within the easement.

Economizer: Control system that reduces the mechanical heating and cooling requirement. Usually refers to use of outside air.

Economizer Cycle: Cycle logic that uses the economizer mode in conjunction with mechanical cooling, typically based on return and outside air total heat.

Eductor: A device for mixing two fluids, such as air and water.

Efficiency: The ratio of actual performance to the theoretical, or perfect performance, usually expressed as a percent.

Effluent: Water or other liquid—raw (untreated), partially or completely treated—flowing from a reservoir, basin, treatment process, or treatment plant.

Effluent Limits: Pollutant limitations developed by a POTW for industrial plants discharging to the POTW system. At a minimum, all industrial facilities are required to comply with federal prohibited discharge standards. The industries covered by federal categorical standards must also comply with the appropriate discharge limitations. The POTW may also establish local limits more stringent than or in addition to the federal standards for some or all of its industrial users.

Ejector: A device for conveying a liquid by entraining it in a high velocity stream of air or water.

Electromagnetic Interference (EMI): The energy given off by electronic circuits and picked up by other circuits; based on the type of device and operating frequency. EMI effects can be reduced by shielding and other cable designs. Minimum acceptable levels are detailed by the FCC. See also Radio Frequency Interference.

Elutriation: The washing of digested sludge with either

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fresh water, plant effluent or other wastewater. The objective is to remove (wash out) certain soluble organic and inorganic components that consume large amounts of chemicals. This process reduces the demand for conditioning chemicals and improves settling or filtering characteristics of the solids.

EMCS: Energy monitoring and control system.

Emergency Response Plan: A written plan that identifies various types of anticipated emergencies and the pre-planned response to such events.

Emulsion: A mixture of two or more liquids which cannot be combined, therefore one liquid is “suspended” in the other.

End Point: Samples are titrated to the end point. This means that a chemical is added, drop by drop, to a sample until a certain color change (blue to clear, for example) occurs which is called the end point of the titration. In addition to a color change, an end-point may be reached by the formation of a precipitate or the reaching of a specified pH. An end point may be detected by the use of an electronic device such as a pH meter.

Endogenous: A diminished level of respiration in which a micro-organism utilizes previously stored nutrients to sustain life.

Endogenous Respiration: The biological process by which living organisms oxidize some of their own cellular mass instead of new organic matter they adsorb or absorb from their environment.

Enteric: Intestinal.

Enthalpy: Thermodynamic quantity equal to the sum of the internal energy of a system plus the product of the pressure-volume work done on the system.

Enzymes: Organic substances (produced by living organisms) which cause or speed up chemical reactions. Organic catalysts and/or biochemical catalysts.

Equalizing Basin: A holding basin in which variations in flow and composition of a liquid are averaged. Such basins are used to provide a flow of reasonably uniform volume and composition to a treatment unit. Also called a balancing reservoir.

Estuaries: Bodies of water at the lower end of a river that are subject to tidal fluctuations

Ethylene Glycol: Clear, colorless liquid used to depress the freezing point of water for use as a secondary coolant.

Eutrophication: The increase in the nutrient levels of a lake or other body of water; this usually causes an increase in the growth of aquatic animal and plant life.

Evaporative Cooling: Sensible cooling obtained by latent heat exchange from water sprays or jets of water.

Evaporator: Part of a refrigerating system in which the refrigerant is evaporated to absorb heat from the contacting heat source.

Exhaust Air: Air discharged from a space to the outdoors as differentiated from air transferred from one space to an adjacent one.

Exhaust Fan: Fan used to withdraw air from a space by suction.

Expansion Tank: Partially filled tank, operating at atmospheric pressure, at the top of a water system for the accommodation of volume expansion and due to the contraction of water.

Explosimeter: An instrument used to detect explosive atmospheres. When the Lower Explosive Limit (LEL) of an atmosphere is exceeded, an alarm signal on the instrument is activated. Also called a combustible gas detector.

Explosion-proof: Term referring to the construction characteristics of a piece of equipment which will not allow sparks or high temperatures to ignite an explosive mixture of air and fuel.

Exposure Control Plan: A written plan to control work place hazards from bloodborne pathogens.

Fabric Filter: Filter having a textile-based filter medium.

Face and Bypass Damper: A dual damper arrangement at the inlet of a heating or cooling coil which acts to either direct the flow of air through the heating or cooling coil, or acts to divert the air around the coil by the way of a bypass air channel or duct. Usually controlled by a damper actuator which is positioned by a temperature controller.

Facultative: Bacteria that can use either molecular (dissolved) oxygen or oxygen obtained from food materials such as sulfate or nitrate ions. In other words, facultative bacteria can live under aerobic or anaerobic conditions.

Facultative Pond: The most common type of pond in current use. The upper portion (supernatant) is aerobic, while the bottom layer is anaerobic. Algae supply most of the oxygen to the supernatant.

Fan Coil Unit: As the name implies, this unit is composed of a fan and a heat exchange coil mounted within a common cabinet. Fan coil units can be used for both heating

and cooling service.

Feeder: Circuit conductors between the service and the final branch circuit over current device.

Fiber Optics: A technology that uses light as a digital information carrier. Fiber optic cables are direct replacement for conventional cables and wire Pairs. They occupy far less physical space and are immune to electrical interference.

Filamentous: A situation in which organisms grown in a thread-like fashion, intertwining with. One another to form a mat-like structure.

Filamentous Bacteria: Organisms that grow in a thread or filamentous form. Common types are thiothrix and actinomycetes. A common cause of sludge bulking in the activated sludge process.

Filter Press: A mechanically operated device for separating solids from water.

Finned-tube Radiator: Wall-mounted heater with numerous fins bonded to a tube, usually carrying steam or hot water.

Fire Damper: Device that interrupts airflow automatically through part of an air system to restrict passage of flame. Installed in fire rated wall or floor and closes automatically in the event of fire to maintain the integrity of the fire rated separation.

Firebox: Combustion chamber in a furnace.

Fire Stat: A temperature sensing device which is either mounted within a duct or within an air handling unit and which is used to sense a high temperature condition. Typically a firestat will be interlocked with an alarm or an air handling system, such that a shut-down or alarm is initiated if a high temperature is sensed.

Fixed: The addition of chemicals which prevent the variables from changing their form or concentration until the laboratory analyses can be performed.

Fixed Film Process: Biological process where the microbes are attached to medium such as rock or plastic.

Fixed Spray Nozzle: Cone-shaped spray nozzle used to distribute wastewater over the filter media similar to a lawn sprinkling system. A deflector or steel ball is mounted within the cone to spread the flow of wastewater through the cone, causing a spraying action. Also see Distributor.

Flame Polish: Insertion of sharp-edged glass into a flame and rotating it until the glass melts slightly and smoothes

the edge. Routinely done to glassware in the laboratory.

Flame Safeguard Control: System for sensing the presence or absence of flame and for indicating, alarming, or initiating control action.

Flammable Liquids: Liquids with a flash point below 100°F. At that temperature, vapors from the substance can be ignited by a flame, spark or other source of ignition.

Flights: Scrapers, made from redwood or plastic in rectangular tanks and metal in circular tanks, which move the settled sludge to the hopper. In rectangular tanks, these same scrapers return on the surface of the tank and move the accumulated scum to its collection point.

Float (Control): A device used to measure the elevation of the surface of water. The float rests on the surface of the water and rises or falls with it. The elevation of the water surface is measured by a rod, chain, rope, or tape attached to the float.

Floatables: Litter, debris and other larger materials that enter stormwater runoff and are carried by flow to become water pollutants.

Floc: Groups or “clumps” of bacteria that have come together and formed a cluster. Found in aeration tanks and secondary clarifiers.

Flocculated: An action resulting in the gathering of fine particles to form larger particles.

Flocculation: The process of gathering small, colloidal particles together into larger, denser and more readily settleable clusters.

Flow Control Valve: One that shuts automatically when the circulating pump stops, thereby preventing gravity circulation.

Flow Recording: A record of a flow measurement past any selected point. Usually consists of time, velocity and amount (in gallons) with maximum and minimum rates as well as the total amount over a given time period.

Flue: Passage through which flue gases pass from a combustion chamber to the outside atmosphere.

Food to Microorganism (F/M) Ratio: A measure of the organic loading to an aeration tank.

Force Main: A pipe that carries wastewater under pressure from the discharge side of a pump to a point of gravity flow downstream.

Forced-draft Burner: Burner which has a fan capable of supplying all necessary air for proper combustion with

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positive pressure in the firebox.

Forced Draft Venting: When the burner fan provides the pressure required for the combustion gases to overcome the resistance in the boiler, breaching and chimney. The boiler is pressurized.

F/M: See Food to Microorganism (F/M) Ratio.

Free Oxygen: Molecular oxygen available for respiration by organisms. Molecular oxygen is the oxygen molecule that is not combined with another element to form a compound.

Freeboard: The vertical distance between the normal water surface elevation in a tank, channel, etc. and the top of the side walls of the same structure.

Freezestat: A temperature sensing device which is either mounted within a duct or within an air handling unit and which is used to sense a potential freezing condition. Typically a freezestat will be interlocked with an alarm or an air handling system, such that a shut-down or alarm is initiated if a low temperature is sensed.

Frequency: The number of times per second a signal regenerates itself at a peak amplitude. It can be expressed in hertz (Hz), kilohertz (kHz), megahertz (MHz), etc.

Fresh Air Makeup: Volume of outside air introduced into a space.

Fume Hood: fume collection device mounted over a closed table or shelf serving to conduct unwanted gases away from the area enclosed.

Fumes: Very small airborne particle, usually less than one micrometre in size, from burning or melting materials.

Fungi: Small, non-chlorophyll bearing plants, without roots, stems or leaves, which tend to overpower bacteria at low pH and dissolved oxygen concentrations. They generally have a filamentous type structure and are therefore not welcome in a secondary process clarifier.

Furnace: Part of a boiler or warm air heating system in which energy is converted to heat, as by burning fuel, or by converting electrical energy.

Geographic Information System (GIS): A computer program that combines mapping with detailed information about the physical locations of structures such as pipes, valves, and manholes within geographic areas. The system is used to help operators and maintenance personnel locate utility system features or structures and to assist with the scheduling and performance of maintenance activities.

GPD: Initials standing for "Gallons Per Day."

GPM: Initials standing for "Gallons Per Minute."

Giardia: A waterborne intestinal parasite that causes a disease called giardiasis in infected humans. Symptoms of the disease include diarrhea, cramps, and weight loss. Giardia contamination is found in most surface waters and some groundwater.

Gasification: The conversion of soluble and suspended organic materials into gas during anaerobic decomposition. In clarifiers the resulting gas bubbles can become attached to the settled sludge and cause large clumps of sludge to rise and float on the water surface. In anaerobic sludge digesters, this gas is collected for fuel or disposed of using a waste gas burner.

Gate: A movable barrier for the control of liquid flow. There are two types: Sluice gates have a guaranteed maximum leakage rate. Slide gates are not guaranteed to stop the flow of water and are generally used when leakage does not matter or where suspended solids in the liquid would tend to stop the leakage.

Gauge: A device for measuring a variable physical magnitude.

Grab Sample: A single sample of water collected at a particular time and place which represents the composition of the water only at that time and place.

Gravity Flow: Water or wastewater flowing from a higher elevation to a lower elevation due to the force of gravity. The water does not flow due to energy provided by a pump. Wherever possible, wastewater collection systems are designed to use the force of gravity to convey waste liquids and solids.

Grease: In a collection system, grease is considered to be the residues of fats, detergents, waxes, free fatty acids, calcium and magnesium soaps, mineral oils, and certain other nonfatty materials which tend to separate from water and coagulate as floatables or scums.

Grease Trap: A receptacle designed to collect and retain grease and fatty substances usually found in kitchens or from similar wastes. It is installed in the drainage system between the kitchen or other point of production of the waste and the building wastewater collection line. Commonly used to control grease from restaurants.

Green Infrastructure: For the purpose of this document, refers to Best Management Practices that utilize or mimic

natural processes to reduce runoff and/or provide water quality treatment of stormwater. This is accomplished through infiltration of runoff into the soil, uptake and evapotranspiration of water by plants, incorporation of nutrients into plant matter and removal of pollutants by microbial action and filtration within the soil.

Grid: Term used to describe an electrical utility distribution network.

Grille: Louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, or floor.

Grinder: A device for grinding, shredding or comminuting material removed from wastewaters.

Grit: The heavy material present in wastewater, such as sand, coffee grounds, eggshells, gravel and cinders. Grit tends to settle out at flow velocities below 2 ft/sec and accumulate in the invert or bottoms of the pipelines. Also called “detritus.”

Grit Removal: Grit removal is accomplished by providing an enlarged channel or chamber which causes the flow velocity to be reduced and allows the heavier grit to settle to the bottom of the channel where it can be removed.

Ground: An electrical connect (on purpose or accidental) between an item of equipment and the earth.

Groundwater: Sub surface water in the saturation zone from which wells and springs are fed. In a strict sense the term applies only to water below the water table. Also called “phreatic water” and “plerotic water.”

Growth Rate: An experimentally determined constant that expresses the growth rate of bacteria in units of mass of solids produced per mass of matter reduced (i.e., mg VSS/mg BOD5).

HBV: Hepatitis B Virus. A virus which, upon infection, can cause inflammation of the liver and serious health effects

HDT: See Hydraulic Detention Time.

Hazard: An unsafe condition, which, if not eliminated or controlled, may cause injury, illness, or death

Hazardous Chemical: A substance that may harm the worker either physically (eg, fire, explosion) or chemically (eg, toxic, corrosive).

Hazard Communication: Employee “Right-to-Know” legislation requires employers to inform employees (pre-treatment inspectors) of the possible health effects resulting from contact with hazardous substances. At locations where this legislation is in force, employers must

provide employees with information regarding any hazardous substances which they might be exposed to under normal work conditions or reasonably foreseeable emergency conditions resulting from workplace conditions. OSHA’s Hazard Communication Standard (HCS) (Title 29 CFR Part 1910.1200) is the federal regulation and state statutes are called Worker Right-to-Know Laws. Also see “Community Right-to-Know” and “SARA.”

Hazard Communication Program: A written plan to manage the hazards associated with the use of chemicals in the workplace.

Head: Energy per unit weight of liquid at a specified point, expressed in feet of water-column (W.C.) or pounds per square inch (psi).

Dynamic - the head against which a pump works. Friction the head loss by fluid flowing as a result of the disturbances due to the contact between the moving fluid and its container. Loss of the decrease between two points. Static the vertical distance between the free level of the supply and that of the discharge.

Shut Off - the total head at which a centrifugal pump will no longer create flow, though its impeller is still turning in the fluid.

Total Dynamic - the difference between the dynamic head at the pump discharge flange and that at the suction flange, corrected to the same datum plane, plus the velocity head at the discharge flange, minus the velocity head at the suction flange of the pump.

Velocity - the theoretical vertical height to which a liquid may be raised due to its kinetic energy. It is equal to the square of the velocity divided by twice the acceleration due to gravity ($V/2g$).

Head Loss: “Head” is a common term used in discussing pumps. It is a way of expressing pressure in terms of the height of a vertical column of water. In the sketch, the head loss is the height to which the water must build up until there is sufficient pressure to force that particular amount of water through the slots in the comminutor drum.

Headworks: The facilities where wastewater enters a wastewater treatment plant. The headworks may consist of bar screens, comminutors, and a wet well and pumps.

High-Velocity Cleaner: A machine designed to remove grease and debris from the smaller diameter sewer pipes with high-velocity jets of water. Also called a “jet

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cleaner,” “jet rodder,” “hydraulic cleaner,” “highpressure cleaner,” or “hydro jet.”

Heat Exchanger: Device to transfer heat between two physically separated fluids.

Heat Pump: Thermodynamic heating/refrigerating system to transfer heat. The condenser and evaporator may change roles to transfer heat in either direction.

Heat Recovery: Heat utilized which would otherwise be wasted from a heating system.

Heating and Ventilating Unit: Another name for an air handling unit which provides only heating and ventilation capabilities.

Heating Coil: Coil that uses a heat transfer fluid, condensing refrigerant, or direct electrical resistance elements to provide heating.

Heating Load: Heating rate required to replace heat loss from the space being controlled.

Heating Value: Amount of heat produced by the complete combustion of a unit quantity of fuel.

Heavy Metals: Metals which can be precipitated by hydrogen sulfide in an acid solution, including lead, silver, gold, mercury, bismuth and copper.

HEPA filter: High efficiency particulate air filter.

Hepatitis: Hepatitis is an acute viral infection of the liver (yellow jaundice).

Hertz (Hz): International standard unit of frequency. Replaces the identical older “Cycles-per-second”

Heterotrophic Bacteria: Bacteria that utilizes organic carbon for energy and cell growth.

Hot Water Boiler: Boiler completely filled with water that furnishes hot water to be used externally to itself at pressures not exceeding 160 psig or at temperatures not exceeding 250 F at or near the boiler outlet.

Hot Water Storage Tank: Tank used to store water that is heated externally.

Humidifier: Device to add moisture to air or gases.

Humidify: To add water vapor to moisture to any moisture-adsorbing material, including the atmosphere.

Humidistat: Device which responds directly or indirectly to deviation from a desired humidity by actuating a control or initiating a control sequence.

Humidity: Water vapor within a given volume of air.

Hydraulic Cleaning: Cleaning pipe with water under

enough pressure to produce high water velocities.

- Using a ball, kite, or similar sewer cleaning device
- Using a scooter
- Flushing

Hydraulic Detention Time: The amount of time that a wastewater flow is retained in a basin, tank, or reservoir for storage or completion of physical, chemical, or biological reactions.

Hydraulic Loading: Hydraulic loading refers to the flows (MGD or cu m/day) to a treatment plant or treatment process. Detention times, surface loadings and weir overflow rates are directly influenced by flows.

Hydrogen Ion Concentration [H⁺]: The weight of hydrogen ion in moles per liter of solution. Commonly expressed as the pH value, which is the logarithm of the reciprocal of the hydrogen ion concentration.

Hydrogen Sulfide Gas (H₂S): Hydrogen sulfide is a gas with a rotten egg odor. This gas is produced under anaerobic conditions. Hydrogen sulfide gas is particularly dangerous because it dulls the sense of smell so that you don't notice it after you have been around it for a while. In high concentrations, hydrogen sulfide gas is only noticeable for a very short time before it dulls the sense of smell. The gas is very poisonous to the respiratory system, explosive, flammable, colorless, and heavier than air.

Hydrolysis: Conversion of organic nitrogen to ammonia by enzymes secreted by bacteria, plants, and animals in a reaction that adds water.

Hydronic system: A closed loop circulating heating hot water or chilled water system which usually consists of a circulating pump or pumps, piping system, air-water separator, expansion tank and makeup water assembly.

Hygroscopic: Tending to absorb moisture from the atmosphere.

Hypochlorination: The application of hypochlorite compounds to water or wastewater for the purpose of disinfection.

Hypochlorinators: Chlorine pumps, chemical feed pumps or devices used to dispense chlorine solutions made from hypochlorites such as bleach (sodium hypochlorite) or calcium hypochlorite into the water being treated.

Hypochlorite: Chemical compounds containing available chlorine; used for disinfection. They are available as liquids (bleach) or solids (powder, granules, and pellets) in barrels, drums, and cans. Salts of hypochlorous acid.

Hypoxia: The depletion of dissolved oxygen in lakes and reservoirs resulting from excessive growth of algae and other microscopic plants.

Hz: See Hertz.

I/O or Input-Output: Related to the process of getting data into and out of a computer or processor.

IDLH: Immediately Dangerous to Life or Health, an atmosphere that will not support human life.

Illicit Discharge: The flow of substances other than rainwater or snowmelt to a separate storm sewer system whether by direct subsurface connection, overland flow, dumping or other means.

Imhoff Cone: A conically shaped, one-liter graduated vessel used to measure the approximate volume of settleable solids in wastewater during various settling periods.

Impedance: The effects placed upon an alternating current circuit by induction, capacitance, and resistance. Total resistance in an AC circuit.

Impeller: A set of vanes designed to rotate and move a mass of fluid. The prime mover in a centrifugal.

Incineration: The combustion of organic matter in wastewater sludge solids after the evaporation of water from the solids.

Indirect Discharger: A non-domestic discharger introducing pollutants to a POTW. These facilities are subject to the EPA pretreatment regulations.

Inductance: The characteristic of a circuit that determines how much voltage will be induced into it by a change in current of another circuit.

Industrial Wastes: The solid and liquid wastes originating from industrial processes.

Industrial Pretreatment (Waste) Inspector: A person who conducts inspections of industrial pretreatment facilities to ensure protection of the environment and compliance with general and categorical pretreatment regulations. Also called an inspector and a pretreatment inspector.

Industrial Waste Survey: A survey of all companies that discharge to a POTW. The survey identifies the magnitude of the wastewater flows and pollutants in the discharge.

Industrial Wastewater: Liquid wastes originating from industrial processing. Because industries have peculiar liquid waste characteristics requiring special consideration, these sources are usually handled and treated separately before being discharged to a wastewater col-

lection system.

Infiltration: The seepage of groundwater into a sewer system, including service connections. Seepage frequently occurs through defective or cracked pipes, pipe joints and connections, interceptor access risers and covers, or manhole walls.

Infiltration/Inflow: The total quantity of water from both infiltration and inflow without distinguishing the source. Abbreviated I & I or I/I.

Inflow: Water discharged into a sewer system and service connections from such sources as, but not limited to, roof leaders, cellars, yard and area drains, foundation drains, cooling water discharges, drains from springs and swampy areas, around manhole covers or through holes in the covers, cross connections from storm and combined sewer systems, catch basins, storm waters, surface runoff, street wash waters or drainage. Inflow differs from infiltration in that it is a direct discharge into the sewer rather than a leak in the sewer itself. See “internal inflow.”

Influent: Water, wastewater, or other liquid—raw (untreated) or partially treated—flowing into an interceptor, reservoir, basin, treatment process, or treatment plant.

Inhibitory Substances: Materials that kill or restrict the ability of organisms to treat wastes.

Inlet: 1. A surface connection to a drain pipe. 2. A chamber for collecting storm water with no well below the outlet pipe for collecting grit. Often connected to a catch basin or a “basin manhole” (“cleanout manhole”) with a grit chamber.

Inoculate: To introduce a seed culture into a system.

Inorganic: Material such as sand, salt, iron, calcium salts and other mineral materials. Inorganic substances are of mineral origin, whereas organic substances are usually of animal or plant origin. Also see “organic.”

Inorganic Waste: Waste material such as sand, salt, iron, calcium, and other mineral materials which are only slightly affected by the action of organisms. Inorganic wastes are chemical substances of mineral origin; whereas organic wastes are chemical substances of an animal or plant origin.

Instantaneous Settling Velocity (ISV): A record of the vertical displacement down ward of the sludge solids in a sample. The readings are taken each minute.

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Interceptor Sewer: A large sewer that receives flow from a number of sewers and conducts the wastewater to a treatment plant. Often called an interceptor. The term interceptor is sometimes used in small communities to describe a septic tank or other holding tank which serves as a temporary wastewater storage reservoir for a Septic Tank Effluent Pump (STEP) system.

Ion: An atom, or molecule, that has lost or gained one or more electrons.

Ionization: The process of adding electrons to, or removing electrons from, atoms or molecules, creating ions. High temperatures, electrical charges, nuclear radiation or dissolution in a liquid are some causes.

Interconnect: (1) The arrangement that allows the connection of customer's communications equipment to a common carrier network. (2) The generic term for a circuit administration point that allows routing and rerouting of signal traffic.

Isolation Transformer: A one to one transformer that is used to isolate the equipment at the secondary from earth ground.

Junction Box: A box, usually metal, that encloses cable connections for their protection.

Lateral Sewer: A sewer that discharges into a branch or other sewer and has no other common sewer tributary to it. Sometimes called a "street sewer" because it collects wastewater from individual homes.

Launders: Clarifier effluent troughs.

LEL: Lower Explosive Limit: The lowest concentration of vapors, expressed in %, that will ignite in the presence of a flame, spark or other source of ignition. Also known as the LFL, lower flammable limit.

Lift Station: A wastewater pumping station that lifts the wastewater to a higher elevation when continuing the sewer at reasonable slopes would involve excessive depths of trench. Also, an installation of pumps that raise wastewater from areas too low to drain into available sewers. These stations may be equipped with air-operated ejectors or centrifugal pumps. Sometimes called a "pump station," but this term is usually reserved for a similar type of facility that is discharging into a long force main, while a lift station has a discharge line or force main only up to the downstream gravity sewer. Throughout this manual when we refer to lift stations, we intend to include pump stations.

Lime: Any of several compounds consisting of calcium hydroxide ($\text{Ca}(\text{OH})_2$) or calciumoxide (CaO).

Limit Control: Control device used to limit the desired maximum or minimum state of the controlled variable, or to provide an alarm if those limits are exceeded.

Lineal: The length in one direction of a line. For example, a board 12 feet long has 12 lineal feet in its length.

Liquefaction: Liquefaction as applied to sludge digestion means the transformation of large solid particles of sludge into either a soluble or a finely dispersed state.

Load: The amount of electric power used by any electrical unit or appliance at any given moment.

Loading: Quantity of material applied to a device at one time.

Location, damp (damp location): Partially protected locations, such as under canopies, roofed open porches, etc. Also, interior locations that are subject only to moderate degrees of moisture, such as basements, barns, etc.

Location, dry (dry location): Areas that are not normally subject to water or dampness.

Location, wet (wet location): Locations underground, in concrete slabs, where saturation occurs, or outdoors.

Lockout/Tagout: A systematic approach to controlling hazardous energy so it cannot harm someone who is working on a process component. DANGER: Never operate a control that has been locked or tagged by someone else.

Louver: Assembly of sloping vanes intended to permit air to pass through and to inhibit transfer of water droplets.

Low-water Cutoff: In a boiler system, a device to automatically cut off the fuel supply when the surface of the water falls to the lowest safe waterline.

Lower Explosive Limit (LEL): The lowest concentration of gas or vapor (percent by volume in air) that explodes if an ignition source is present at ambient temperature. At temperatures above 250°F the LEL decreases because explosibility increases with higher temperature.

Lower Flammable Limit (LFL): The lowest concentration of a gas or vapor (percent by volume in air) that burns if an ignition source is present.

MBH: One thousand Btu per hour (also Mbtuh).

MG: Initials for "Million Gallons."

MGD: Initials for "Million Gallons Per Day."

mg/L: See "milligrams per liter," mg/L.

MLSS: See Mixed Liquor Suspended Solids.

MLVSS: See Mixed Liquor Volatile Suspended Solids.

MPN: MPN is the Most Probable Number of coliform-group organisms per unit volume of sample water. Expressed as a density or population of organisms per 100 mL of sample water.

MS4: Municipal Separate Storm Sewer System. A sewer collection and conveyance system designed and intended to handle solely rainwater and snowmelt, in contrast to sanitary and combined sewers.

MS4 General Permit: The SPDES Permit that regulates discharges from MS4s serving a populated area totaling 50,000 or more people and having a population density of at least 1,000 people per square mile—Coded GP-0-10-002.

MS4 Operator: The person, persons or legal entity that is responsible for the small MS4, as indicated by signing the NOI to gain coverage for the MS4 under the General MS4 SPDES Permit.

MSDS: Material Safety Data Sheet: printed information which describes the properties of a hazardous chemical and ways to control its hazards.

Main Line: Branch or lateral sewers that collect wastewater from building sewers and service lines.

Main Sewer: A sewer line that receives wastewater from many tributary branches and sewer lines and serves as an outlet for a large territory or is used to feed an intercepting sewer.

Makeup Water: Water supplied to replenish the water of a system.

Manhole: An opening in a sewer provided for the purpose of permitting operators or equipment to enter or leave a sewer. Sometimes called an “access hole” or a “maintenance hole.”

Manometer: Instrument for measuring head or pressure; basically a U-tube partially filled with a liquid, so constructed that the difference in level of the liquid leg indicates the pressure exerted on the instrument.

Masking Agents: Substances used to cover up or disguise unpleasant odors. Liquid masking agents are dripped into the wastewater, sprayed into the air, or evaporated (using heat) with the unpleasant fumes or odors and then discharged into the air by blowers to make an undesirable odor less noticeable.

Material Safety Data Sheet (MSDS): A document which

provides pertinent information and a profile of a particular hazardous substance or mixture. An MSDS is normally developed by the manufacturer or formulator of the hazardous substance or mixture. The MSDS is required to be made available to employees and operators whenever there is the likelihood of the hazardous substance or mixture being introduced into the workplace. Some manufacturers are preparing MSDSs for products that are not considered to be hazardous to show that the product or substance is not hazardous.

Mean Cell Residence Time (MCRT): See Solids Retention Time.

Measured Flow: A flow which has been physically measured.

Mechanical Aeration: The use of machinery to mix air and water so that oxygen can be absorbed in to the water. Some examples are: paddle wheels, mixers, or rotating brushes to agitate the surface of an aeration tank; pumps to create fountains; and pumps to discharge water down a series of steps forming falls or cascades.

Media: The material in a trickling filter on which slime accumulates and organisms grow. As settled wastewater trickles over the media, organisms in the slime remove certain types of wastes thereby partially treating the wastewater. Also the material in a rotating biological contactor or in a gravity or pressure filter.

Median: The middle measurement or value. When several measurements are ranked by magnitude (largest to smallest), half of the measurements will be larger than the median value and half will be smaller.

Meniscus: The curved top of a column of liquid (water, oil, mercury, etc.) in a small tube.

Mesophilic Bacteria: A group of bacteria that grow and thrive in a moderate temperature range between 68 F. (20 C) and 113 F (45 C). The optimum temperature range for these bacteria in anaerobic digestion is 85 F (30 C) to 100 F (38 C).

Microbes: Micro-biological Organisms: Tiny, one celled organisms, like bacteria and viruses.

Microorganisms: Very small organisms that can be seen only through a microscope. Some microorganisms use the wastes in wastewater for food and thus remove or alter much of the undesirable matter.

Milligrams Per Liter, mg/L: A measure of the concentration by weight of a substance per unit volume in water or

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wastewater. In reporting the results of water and wastewater analysis, mg/L is preferred to the unit parts per million (ppm), to which it is approximately equivalent.

Million Gallons: A unit of measurement used in wastewater treatment plant design and collection system capacities or performances.

Mixed Liquor: When the activated sludge in an aeration tank is mixed with primary effluent or the raw wastewater and return sludge, this mixture is then referred to as mixed liquor as long as it is in the aeration tank. Mixed liquor also may refer to the contents of mixed aerobic or anaerobic digesters.

Mixed Liquor Suspended Solids (MLSS): Suspended solids in the mixed liquor of an aeration tank.

Mixed Liquor Volatile Suspended Solids (MLVSS): The organic or volatile suspended solids in the mixed liquor of an aeration tank. The volatile portion is used as a measure or indication of the microorganisms present.

Mixing Box: Compartment into which two air supplies are mixed together before being discharged.

Mixing Valve: Three-way valve to mix two fluids.

Modulating Control Valve: Valve capable of increasing or decreasing by increments the fluid flow according to deviation from the set control value.

Molar (M): A solution of one gram molecular weight of a compound dissolved in enough water to make one liter of solution.

Molecular Oxygen: The oxygen molecule, O₂, that is not combined with another element to form a compound.

Molecular Weight: The sum of the atomic weights of the elements in the compound.

Molecule: The smallest part of an element or compound which still has all the properties of the element or compound.

Most Probable Number (MPN): A density of coliform organisms per one hundred millimeters. The results of the multiple-tube fermentation technique for the analysis for coliform group bacteria are reported as a most probable number. The test procedures are given in Part 908 of "Standard Methods" and Table 908.11 on Page 924, lists most probable numbers for various combinations of positive tube results.

Motile: Capable of self-propelled movement. A term that is sometimes used to distinguish between certain types of organisms found in water.

Motor Efficiency: The ratio of energy delivered by a motor to the energy supplied to it during a fixed period or cycle. Motor efficiency ratings will vary depending upon motor manufacturer and usually will be near 90.0 percent.

Muffle Furnace: A small oven capable of reaching temperatures up to about 600°C. It is used in laboratories to determine the volatile content of a sample.

Multi-Stage Pump: A pump that has more than one impeller. A single-stage pump has one impeller.

Muriatic Acid: Another name for hydrochloric acid (HCl).

NEC: National Electrical Code, which contains safety guidelines for all types of electrical installations.

NIOSH: The National Institute of Occupational Safety and Health is an organization that tests and approves safety equipment for particular applications. NIOSH is the primary federal agency engaged in research in the national effort to eliminate on-the-job hazards to the health and safety of working people. The NIOSH Publications Catalog contains a listing of NIOSH publications concerning industrial hygiene and occupational health. To obtain a copy of the catalog, write to National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161. NTIS Stock No. PB-86-116-787.

NPDES: National Pollutant Discharge Elimination System. The national system for the issuance of wastewater and stormwater permits under the Federal Water Pollution Control Act (Clean Water Act).

NPDES Permit: National Pollutant Discharge Elimination System permit is the regulatory agency document issued by either a federal or state agency which is designed to control all discharges of pollutants from point sources and storm water runoff into US waterways. NPDES permits regulate discharges into navigable waters from all point sources of pollution, including industries, municipal wastewater treatment plants, sanitary landfills, large agricultural feedlots, and return irrigation flows.

NOI: Notice of Intent. A document filed by a permittee under the Construction General Permit or MS4 General Permit describing the nature of stormwater discharges, in order to gain coverage under the appropriate General Permit.

NOT: Notice of Termination. A document filed by a permittee to close coverage under the Construction General Permit once site work is concluded and final stabilization

tion is complete.

National Response Center: A federal agency who must be contacted when a significant spill of oil or chemical occurs. (800) 424-8802.

Natural Draft Burner: Burner which depends primarily on the natural draft created in the chimney or venting system to induce the air required for combustion into the burner.

Neutralization: Addition of an acid or alkali (base) to a liquid to cause the pH of the liquid to move toward a neutral pH of 7.0.

Nitrification: An aerobic process in which bacteria change the ammonia and organic nitrogen in wastewater into oxidized nitrogen (usually nitrate). The second-stage BOD is sometimes referred to as the “nitrification stage” (first-stage BOD is called the “carbonaceous stage”).

Nitrification Stage: A stage of decomposition that occurs in biological treatment processes when aerobic bacteria, using dissolved oxygen, change nitrogen compounds (ammonia and organic nitrogen) into oxidized nitrogen (usually nitrate). The second-stage BOD is sometimes referred to as the “nitrification stage” (first-stage BOD is called the “carbonaceous stage”).

Nitrifying Bacteria: Bacteria that change the ammonia and organic nitrogen in wastewater into oxidized nitrogen (usually nitrate).

Nitrobacteria: Principal genera of autotrophic bacteria responsible for the second step of biological nitrification: conversion (oxidation) of nitrite to nitrate.

Nitrogen Fixation: The conversion of nitrogen gas to organic nitrogen, ammonia or nitrate. Nitrogen fixation can occur biologically (i.e., conversion of nitrogen gas to organic nitrogen by certain photosynthetic blue-green algae), by natural physical processes (i.e., conversion of nitrogen gas to nitrate by lightning), or by industrial processes (manufacture of fertilizers and explosives).

Nitrogenous: A term used to describe chemical compounds (usually organic) containing nitrogen in combined forms. Proteins and nitrates are nitrogenous compounds.

Nitrosomonas: Principal genera of autotrophic bacteria responsible for the first step of biological nitrification: conversion (oxidation) of ammonia to nitrite.

Nomogram: A chart or diagram containing three or more scales used to solve problems with three or more vari-

ables instead of using mathematical formulas.

Noncompatible Pollutants: Those pollutants which are normally not removed by the POTW treatment system. These pollutants may be a toxic waste and may pass through the POTW untreated or interfere with the treatment system. Examples of noncompatible pollutants include heavy metals such as copper, nickel, lead, and zinc; organics such as methylene chloride, 1,1,1-trichloroethylene, methyl ethyl ketone, acetone, and gasoline; or sludges containing toxic organics or metals.

Non-Point Sources: Sources of water pollution that are not associated with a discharge pipe or channel. The term is often associated with water pollution resulting from storm water runoff from urban and rural agricultural lands.

Nonpotable: Water that may contain objectionable pollution, contamination, minerals, or infective agents and is considered unsafe and/or unpalatable for drinking.

Nonsparking Tools: These tools will not produce a spark during use.

Normal (N): A solution containing one gram equivalent weight of compound dissolved in enough water to make one liter of solution. The equivalent weight of an acid is that weight which contains one gram atom of ionizable hydrogen, or its equivalent. For example, sulfuric acid (H₂SO₄) has a gram molecular weight of 98 and a gram equivalent weight of 49; while the gram molecular and gram equivalent weights of hydrochloric acid (HCl) are the same (36.5).

Notch: An opening in a dam, spillway or weir for the passage of fluid. Weir notches are available in a variety of shapes and formulae are available for accurately determining the flow through them.

Nutrient: Any substance that is assimilated (taken in) by organisms and promotes growth. Nitrogen and phosphorus are nutrients which promote the growth of algae. There are other essential and trace elements which are also considered nutrients.

Nutrient Cycle: The transformation or change of a nutrient from one form to another until the nutrient has returned to the original form, thus completing the cycle.

O&M Manual: Operation and Maintenance Manual. A manual that describes detailed procedures for operators to follow to operate and maintain specific water or wastewater treatment or pretreatment plants and the equipment of the plants.

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OSHA: The Williams-Steiger Occupational Safety and Health Act of 1970 (OSHA) is a federal law designed to protect the health and safety of industrial workers, including the operators of water supply and treatment systems and wastewater treatment plants. The Act regulates the design, construction, operation, and maintenance of water supply systems, water treatment plants, wastewater collection systems, and wastewater treatment plants. OSHA also refers to the federal and state agencies which administer the OSHA regulations.

Obligate Aerobes: Bacteria that must have molecular (dissolved) oxygen (DO) to reproduce.

Odor: Quality of gases, liquids, or particulates that stimulates the olfactory organ.

Ohm: The unit of measurement of electrical resistance. One ohm of resistance will allow one ampere of current to flow through a pressure of one volt.

Open Circuit Voltage: The maximum voltage produced by a photovoltaic cell, module, or array without a load applied.

Operating Pressure: Pressure indicated by a gage when the system is in normal operation (working pressure).

Organic: Substances that come from animal or plant sources. Organic substances always contain carbon. (Inorganic materials are chemical substances of mineral origin.) Also see “inorganic.”

Organic Loading: The pounds of BOD per day applied to a unit process.

Organic Waste: Waste material which comes mainly from animal or plant sources. Organic wastes generally can be consumed by bacteria and other microscopic organisms. Inorganic wastes are chemical substances of mineral origin.

Organics: 1. A term used to refer to chemical compounds made from carbon molecules. These compounds may be natural materials (such as animal or plant sources) or manmade materials (such as synthetic organics). Also see “organic.” 2. Any form of animal or plant life. Also see “bacteria.”

Organism: Any form of animal or plant life. Also see “bacteria.”

Orifice: An opening in wall or plate used to control the rate of flow into, or out of a tank or pipe.

Orthophosphate: An acid or salt containing phosphorus (PO₄)

Orthotolidine: A colorimetric indicator of chlorine residual in which a yellow colored compound is produced.

Outfall: 1. The point, location or structure where wastewater or drainage discharges from a sewer, drain, or other conduit. 2. The conduit leading to the final disposal point or area.

Outfall Sewer: A sewer that receives wastewater from a collection system or from a wastewater treatment plant and carries it to a point of ultimate or final discharge in the environment. See “outfall.”

Outlet: Downstream opening or discharge end of a pipe, culvert, or canal.

Overflow Rate: A criteria for the design of settling tanks in treatment plants. It is stated as the settling velocity of particles that are removed in an ideal basin if they enter at the surface. (volume of flow per unit water surface area of the tank.)

Oxidation: Oxidation is the addition of oxygen, removal of hydrogen, or the removal of electrons from an element or compound. In the environment, organic matter is oxidized to more stable substances. The opposite of reduction.

Oxidation Ditch: The oxidation ditch is a modified form of the activated sludge process. The ditch consists of two channels placed side by side and connected at the ends to produce one continuous loop of wastewater flow and a brush rotator assembly placed across the channel to provide aeration and circulation.

Oxidation-Reduction Potential (ORP): The electrical potential required to transfer electrons from one compound or element (the oxidant) to another compound or element (the reductant); used as a qualitative measure of the state of oxidation in wastewater treatment systems. ORP is measured in millivolts, with negative values indicating a tendency to reduce compounds or elements and positive values indicating a tendency to oxidize compounds or elements.

Oxidizing Agent: Any substance, such as oxygen (O₂) or chlorine (Cl₂), that will readily add (take on) electrons. The opposite is a reducing agent.

Oxygen (O): A chemical element used by all known life forms for respiration.

Available - the amount of free oxygen in the water.

Balance - the relation between the BOD of a treatment plant effluent and the available oxygen in the receiving body.

Deficiency - the additional quantity of oxygen required to satisfy the BOD in a sample.

Oxygen deficient: An atmosphere that has less than 19.5% oxygen. Such an environment puts a worker at risk of asphyxiation.

Oxygen Uptake Rate Ozone: The amount of oxygen used by an activated sludge system per unit time. A molecular form of oxygen composed of three atoms (O_3). Also a strong disinfecting agent which leaves no residual.

POTW—Publicly Owned Treatment Works: A treatment works which is owned by a state, municipality, city, town, special sewer district or other publicly owned and financed entity as opposed to a privately (industrial) owned treatment facility. This definition includes any devices and systems used in the storage, treatment, recycling and reclamation of municipal sewage (wastewater) or industrial wastes of a liquid nature. It also includes sewers, pipes and other conveyances only if they carry wastewater to a POTW treatment plant. The term also means the municipality (public entity) which has jurisdiction over the indirect discharges to and the discharges from such a treatment works.

Pounds per Square Inch Gage pressure (PSIG): The pressure within a closed container or pipe measured with a gage in pounds per square inch.

PTAC: Packaged terminal air-conditioning system.

Packaged Air Conditioner: Complete air-conditioning unit including refrigeration compressor, cooling coils, fans, filter, automatic controls, etc. assembled into one casing.

Packaged Boiler: Boiler shipped complete with heating equipment, mechanical draft equipment, automatic controls, and accessories; usually shipped in one or more major sections.

Packed Bed Scrubber: Vertical or horizontal vessels, partially filled with packing or devices of large surface area, used for the continuous contact of liquid and gas such that absorption can take place. Frequently the scrubber liquid or liquor has had chemicals added to react with the absorbed gas.

Package Treatment Plant: A small wastewater treatment plant often fabricated at the manufacturer's factory, hauled to the site, and installed as one facility. The package may be either a small primary or a secondary wastewater treatment plant.

Parallel Operation: Wastewater being treated is split and a portion flows to one treatment unit while the remainder flows to another similar treatment unit.

Parasitic Bacteria: Parasitic bacteria are those bacteria which normally live off another living organism, known as the "host."

Particulate: State of matter in which solid or liquid substances exist in the form of aggregated molecules or particles.

Parts Per Million (PPM): A measurement of concentration on a weight or volume basis. This term is equivalent to milligrams per liter (mg/L) which is the preferred term.

Pass-Through: The passage of untreated pollutants through a publicly owned treatment works (POTW) which could violate applicable water quality standards or National Pollutant Discharge Elimination System (NPDES) effluent limitations.

Pathogenic: Disease causing or harmful to man.

Pathogenic Organisms: Organisms, including bacteria, viruses or cysts, capable of causing diseases (giardiasis, cryptosporidiosis, typhoid, cholera, dysentery) in a host (such as a person). There are many types of organisms which do not cause disease. These organisms are called non-pathogenic.

Peak Demand: The maximum momentary load placed on a water treatment plant, pumping station or distribution system. This demand is usually the maximum average load in one hour or less, but may be specified as the instantaneous load or the load during some other short time period.

Peaking Factor: Ratio of a maximum flow to the average flow, such as maximum hourly flow or maximum daily flow to the average daily flow.

Percent Saturation: The amount of a substance that is dissolved in a solution compared with the amount that could be dissolved in solution, expressed as a percent.

Percolation: The flow of liquid through a filtering medium.

Permissible Exposure Limit (PEL): The maximum 8-hour time weighted average of any airborne contaminant (such as dust, mist, vapor, gas, noise) to which an operator may be exposed. At no time may the exposure level exceed the ceiling concentration for that contaminant. Ceiling levels of regulated contaminants are listed in the Code of Federal Regulations (CFR) Title 29 Part 1910,

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Subparts G and Z. Also see “Time Weighted Average (TWA).”

Permit-Required Confined Space: A confined space which has the potential for some sort of serious hazard, like a hazardous atmosphere, electrical hazard or drowning danger, that may cause serious injury or death.

Personal Hygiene: Personal health habits, like hand washing, which prevent infection.

Personal Protective Equipment (PPE): Clothing, like hard hats, safety glasses, gloves, etc., that are designed to protect workers from hazards.

pH: pH is an expression of the intensity of the basic or acidic condition of a liquid. The pH may range from 0 to 14, where 0 is most acidic, 14 most basic, and 7 neutral. Natural waters usually have a pH between 6.5 and 8.5.

Phase Converter: A device that derives three phase power from single phase power. Used extensively in areas (often rural areas) where only single phase power is available to run three phase equipment.

Phosphorus: A nutrient that exists in both dissolved and solid form that when present in excess, leads to poor water quality, including algal blooms and poor aquatic habitat.

Photosynthesis: A process in which chlorophyll containing organisms convert carbon dioxide (CO₂) and inorganic matter to oxygen (O₂) and new cell material, utilizing sunlight as energy.

Physical Waste Treatment Process: Physical waste treatment processes include use of racks, screens, comminutors, clarifiers (sedimentation and flotation) and filtration. Chemical or biological reactions are important treatment processes, but not part of a physical treatment process.

Pickup Load: Actual load for heating the system following setback.

Pig: Refers to a poly pig which is a bullet-shaped device made of hard rubber or similar material. This device is used to clean pipes. It is inserted in one end of a pipe, moves through the pipe under pressure, and is removed from the other end of the pipe.

Pilot Scale Study: A method of studying different ways of treating wastewater and solids or to obtain design criteria on a small scale in the field.

Pipe Capacity: In a gravity-flow sewer system, pipe capacity is the total amount in gallons a pipe is able to pass

in a specific time period.

Pipe Cleaning: Removing grease, grit, roots and other debris from a pipe run by means of one of the hydraulic cleaning methods. See “balling,” “hydraulic cleaning,” and “kite.”

Pipe Diameter: The nominal or commercially designated inside diameter of a pipe, unless otherwise stated.

Pipe Joint: A place where two sections of pipe are coupled or joined together.

Pipe Section: A single length of pipe between two joints or couplers.

Plan View: A diagram or photo showing a facility as it would appear when looking down on top of it.

Pitot Tube: Small bore tube inserted perpendicular to a flowing stream with its orifice facing the stream to measure total pressure.

Plant Hydraulic Capacity: The flow or load, in millions of gallons per day (or portion thereof), that a treatment plant is designed to handle.

Plate Heat Exchanger: Fixed plates which separate and keep separate the hot and cold fluids.

Plenum: In an air distribution system, that part of the casing to or from which the air duct system delivers conditioned air.

Plug Flow: A type of flow that occurs in tanks, basins or reactors when a slug of wastewater moves through a tank without ever dispersing or mixing with the rest of the wastewater flowing through the tank.

Point Sources: Sources of water pollution that may be traced to a single point such as a discharge pipe or channel.

Pollutant: Any substance which causes impairment (reduction) of water quality to a degree that has an adverse effect on any beneficial use of the water.

Pollution: The impairment (reduction) of water quality by agricultural, domestic or industrial wastes (including thermal and radioactive wastes) to a degree that the natural water quality is changed to hinder any beneficial use of the water or render it offensive to the senses of sight, taste, or smell or when sufficient amounts of wastes create or pose a potential threat to human health or the environment.

Polyelectrolyte: A high-molecular-weight (relatively heavy) substance having points of positive or negative electrical charges that is formed by either natural or

manmade processes. Natural polyelectrolytes may be of biological origin or derived from starch products and cellulose derivatives. Manmade polyelectrolytes consist of simple substances that have been made into complex, high-molecular-weight substances. Used with other chemical coagulants to aid in binding small suspended particles to larger chemical flocs for their removal from water. Often called a “polymer.”

Polymer: A long chain molecule formed by the union of many monomers (molecules of lower molecular weight). Polymers are used with other chemical coagulants to aid in binding small suspended particles to larger chemical flocs for their removal from water.

Ponding: A condition occurring on trickling filters when the hollow spaces (voids) become plugged to the extent that water passage through the filter is inadequate. Ponding may be the result of excessive slime growths, trash, or media breakdown.

Population Equivalent: A means of expressing the strength of organic material in wastewater. Domestic wastewater consumes, on an average, approximately 0.2 lbs of oxygen per person per day, as measured by the standard BOD test.

Positive Pressure: In a building, pressure greater than the pressure outside.

Post-Denitrification: Biological wastewater treatment process for nitrogen removal that utilizes an anoxic zone located at the effluent end of an aeration tank. Due to lack of organic carbon, methanol addition is typically required.

Postchlorination: The addition of chlorine to the plant effluent, following plant treatment, for disinfection purposes.

Potable Water: Water that does not contain objectionable pollution, contamination, minerals, or infective agents and is considered satisfactory for drinking.

Pre-Aeration: The addition of air at the initial stages of treatment to freshen the wastewater, removes gases, add oxygen, and promote flotation of grease, and aid coagulation.

Pre-Denitrification: Biological wastewater treatment process for nitrogen removal that utilizes an anoxic zone located at the influent end of an aeration tank. Organic matter present in the wastewater serves as a carbon source for denitrifying bacteria.

Prechlorination (wastewater): The addition of chlorine in the collection system serving the plant or at the headworks of the plant prior to other treatment processes mainly for odor and corrosion control. Also applied to aid disinfection, to reduce plant BOD load, to aid in settling, to control foaming in Imhoff units and to help remove oil.

Precipitation: When a substance dissolved in a liquid passes out of solution and into solid form.

Precursor,THM: Natural organic compounds found in all surface and groundwater. These compounds may react with halogens (such as chlorine) to form trihalomethanes (THMs); they must be present in order for THMs to form.

Preheat Coil: A coil within an air handling unit which preheats incoming air up to a minimum temperature. This coil is usually followed by a second heating coil.

Preliminary Treatment: The removal of metal, rocks, rags, sand, eggshells, and similar materials which may hinder the operation of a wastewater treatment plant. Preliminary treatment is accomplished by using equipment such as racks, bar screens, comminutors, and grit removal systems.

Pressure: The total load or force acting on a surface, per unit area.

Atmospheric - the pressure exerted by the atmosphere on a given point. It decreases as the elevation above sea level increases.

Hydrostatic - the pressure, volume per unit area, exerted by a body of water at rest.

Negative - a pressure less than atmospheric.

Pressure Reducing Valve: Valve used to reduce a high supply pressure to a usable level.

Pretreatment Facility: Industrial wastewater treatment plant consisting of one or more treatment devices designed to remove sufficient pollutants from wastewaters to allow an industry to comply with effluent limits established by the US EPA General and Categorical Pretreatment Regulations or locally derived prohibited discharge requirements and local effluent limits. Compliance with effluent limits allows for a legal discharge to a POTW.

Pretreatment Inspector: A person who conducts inspections of industrial pretreatment facilities to ensure protection of the environment and compliance with general and categorical pretreatment regulations. Also called an “industrial pretreatment (waste) inspector” and an “in-

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spector.”

Preventive Maintenance: Regularly scheduled servicing of machinery or other equipment using appropriate tools, tests and lubricants. This type of maintenance can prolong the useful life of equipment and machinery and increase its efficiency by detecting and correcting problems before they cause a breakdown of the equipment.

Primary Clarifier: A wastewater treatment device which consists of a rectangular or circular tank that allows those substances in wastewater that readily settle or float to be separated from the wastewater being treated.

Primary Treatment: A wastewater treatment process that takes place in a rectangular or circular tank and allows those substances in wastewater that readily settle or float to be separated from the water being treated.

Priority Pollutants: The EPA has proposed a list of 126 priority toxic pollutants. These substances are an environmental hazard and may be present in water. Because of the known or suspected hazards of these pollutants, industrial users of the substances are subject to regulation. The toxicity to humans may be substantiated by human epidemiological studies or based on effects on laboratory animals related to carcinogenicity, mutagenicity, teratogenicity, or reproduction. Toxicity to fish and wildlife may be related to either acute or chronic effects on the organisms themselves or to humans by bioaccumulation in food fish. Persistence (including mobility and degradability) and treatability are also important factors.

Process Variable: A physical or chemical quantity that is usually measured and controlled in the operation of a wastewater treatment plant or an industrial plant.

Propeller Fan: Fan in which the air enters and leaves the impeller in a direction substantially parallel to its axis.

Protozoa: A group of motile microscopic animals (usually single-celled and aerobic) that sometime cluster in colonies and often consume bacteria as an energy source.

Prussian Blue: A paste or liquid used to show a contact area.

Psychrophilic Bacteria: A group of bacteria that grow and thrive in temperatures below 68°F (20°C).

Pump: A mechanical device used to create flow. There are two types:

Centrifugal - a pump which creates movement by centrifugal force. Flow variation in this type of pump is easily accomplished by throttling the discharge

valve. If the valve is shut, the pump will reach its “shut-off head”, generally causing no damage.

Positive Displacement - a pump which creates movement by drawing in a given volume and physically pushing it out the discharge pipe - Flow rate from this type of pump is relatively constant, regardless of head, and if it is operated against a closed discharge valve, something will break.

Pump Station: Installation of pumps to lift wastewater to a higher elevation in places where flat land would require excessively deep sewer trenches. Also used to raise wastewater from areas too low to drain into available collection lines. These stations may be equipped with air-operated ejectors or centrifugal pumps. See “lift station.”

Purge: Removal of unburned gases from a combustion chamber.

Purification: The removal, by natural or other methods, of pollution from a given medium.

Putrefaction: Biological decomposition of organic matter resulting in the production of foul-smelling products associated with anaerobic conditions.

Putrescible: Putrescible material will decompose under anaerobic conditions and produce nuisance odors.

Qualified Professional: A person that is knowledgeable in the principles and practices of stormwater management and treatment, such as a licensed Professional Engineer, licensed Landscape Architect or other NYSDEC endorsed individual(s). Individuals preparing SWPPPs that require the post-construction stormwater management practice component must have an understanding of the principles of hydrology, water quality management practice design, water quantity control design, and the principles of hydraulics in order to prepare a SWPPP that conforms to the NYSDEC technical standards. All components of the SWPPP that involve the practice of engineering, as defined by the NYS Education Law, must be prepared by, or under the direct supervision of, a licensed Professional Engineer.

Quicklime: A granular material, composed primarily of calcium oxide (CaO) or calcium and magnesium oxide (MgO) and capable of slaking with water.

Rack: Evenly spaced parallel metal bars or rods located in the influent channel to remove rags, rocks, and cans from wastewater.

Radiation: Transmission of energy by means of electro-

magnetic waves emitted due to temperature.

Radiator: Terminal unit used in hot water or steam systems to deliver heat to a space (but primarily by convection and not radiation).

Raw Wastewater: Plant influent or wastewater before any treatment.

Reagent: A substance which takes part in a chemical reaction and is used to detect and measure another substance.

Recalcination: A lime-recovery process in which the calcium carbonate in sludge is converted to lime by heating to 1,800°F (980°C).

Recarbonation: A process in which carbon dioxide is bubbled into the water being treated to lower the pH.

Receiving Body: A stream, lake or other waterway into which treated or untreated waste is discharged.

Receiving Water: A stream, river, lake, ocean, or other surface or groundwater into which treated or untreated wastewater is discharged.

Recirculated Air: Air taken from a space and returned to that space, usually after being passed through a conditioning system.

Recirculation: The return of part of the effluent from a treatment process to the incoming flow.

Reducing Agent: Any substance, such as base metal (iron) or the sulfide ion, that will readily donate (give up) electrons. The opposite is an oxidizing agent.

Reduction: Reduction is the addition of hydrogen, removal of oxygen, or the addition of electrons to an element or compound. Under anaerobic conditions (no dissolved oxygen present), sulfur compounds are reduced to odor-producing hydrogen sulfide (H₂S) and other compounds.

Refractory: A material having the ability to retain its shape and chemical composition when subjected to high temperatures, or the area of an incinerator or similar equipment which contains the high temperatures.

Refrigerant: In a refrigerating system, the medium of heat transfer which picks up heat by evaporating at a low temperature and pressure, and gives up heat on condensing at a higher temperature and pressure.

Refrigerant Compressor: Component of a refrigerating system which increases the pressure of a compressible refrigerant fluid and simultaneously reduces its volume, while moving fluid through the device.

Refrigerating System: System which, in operation between a heat source (evaporator), and a heat sink (condenser), at two different temperatures, is able to absorb heat from the heat source at the lower temperature and reject heat to the heat sink at the higher temperature.

Regulator: A device used in combined sewers to control or regulate the diversion of flow.

Reheat Coil: Heating coil installed downstream of cooling coil.

Representative Sample: A sample portion of material, water, or waste stream that is as nearly identical in content and consistency as possible to that in the larger body of material or water being sampled.

Reset Control: Control method using a remote or external signal to modify the set point of a controller.

Residual Chlorine: The amount of free and/or available chlorine remaining after a given contact time under specified conditions.

Respiration: The process in which an organism uses oxygen for its life processes and gives off carbon dioxide.

Respirator: A device designed to protect the wearer from a hazardous atmosphere

Retention Time: The time water, sludge or solids are retained or held in a clarifier or sedimentation tank. See “detention time.”

Return Air: Air entering a space from an air-conditioning, heating, or ventilating apparatus.

Return Sludge: The recycled sludge in a POTW that is pumped from a secondary clarifier sludge hopper to the aeration tank.

Return Sludge Ratio (R/Q): The ratio of the return sludge flow to the wastewater flow.

Reuse: The use of water or wastewater after it has been discharged and then withdrawn by another user. Also see “recycle.”

Right-to-Know Laws: Employee “Right-to-Know” legislation requires employers to inform employees (operators) of the possible health effects resulting from contact with hazardous substances. At locations where this legislation is in force, employers must provide employees with information regarding any hazardous substances which they might be exposed to under normal work conditions or reasonably foreseeable emergency conditions resulting from workplace conditions. OSHA’s Hazard Communication Standard (HCS) (Title 29 CFR Part

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1910.1200) is the federal regulation and state statutes are called Worker Right-to-Know Laws.

Rising Sludge: Rising sludge occurs in the secondary clarifiers of activated sludge plants when the sludge settles to the bottom of the clarifier, is compacted, and then starts to rise to the surface, usually as a result of denitrification.

Rotary Pump: A type of displacement pump consisting essentially of elements rotating in a pump case which they closely fit. The rotation of these elements alternately draws in and discharges the water being pumped. Such pumps act with neither suction nor discharge valves, operate at almost any speed, and do not depend on centrifugal forces to lift the water.

Rotifer: Microscopic multi-celled animal characterized by short cilia on the front end.

Rotor: The portion of an electrical motor or generator which rotates.

Runoff: That part of rain or other precipitation that runs off the surface of a drainage area and does not enter the soil or the sewer system as inflow.

Runoff Reduction: The process whereby practices are implemented to minimize the quantity of stormwater runoff generated, and/or attenuate runoff near its source using storage, infiltration and/or uptake by vegetation.

SARA: Superfund Amendments and Reauthorization Act of 1986. The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, has enacted in 1980. The Superfund Amendments increase Superfund revenues to \$8.5 billion and strengthen the EPA's authority to conduct short-term (removal), long-term (remedial) and enforcement actions. The Amendments also strengthen state involvements in the cleanup process and the Agency's commitments to research and development, training, health assessments, and public participation. A number of new statutory authorities, such as Community Right-to-Know, are also established.

SCADA System: Supervisory Control and Data Acquisition System. Computer-monitored alarms, response, control and data acquisition systems used by operators to monitor and adjust their treatment processes and monitor their operations.

SCBA: Self-Contained Breathing Apparatus. A respirator including an air cylinder which supplies breathing air to the wearer.

SIC Code: Standard Industrial Classification Code. A code number system used to identify various types of industries. In 1997, the United States and Canada replaced the SIC code system with the North American Industry Classification System (NAICS); Mexico adopted the NAICS in 1998.

SPDES: State Pollutant Discharge Elimination System. The system established pursuant to Article 17 of the Environmental Conservation Law and 6 NYCRR Part 750 for issuance of permits authorizing discharges to the waters of the state.

SVI: See Sludge Volume Index.

SWMP: Stormwater Management Program. Development of a Stormwater Management Program plan summarizing and documenting all aspects of the MS4 program and providing a runoff history of all progress and compliance efforts is a requirement of the MS4 permit.

SWPPP: Stormwater Pollution Prevention Plan. A set of documents that describes the scope of a proposed construction or development project, bodies of water and natural resources to be protected, and erosion and sediment control and stormwater practices that will be utilized to protect the resources during the project. Consists of narrative, maps, construction drawings and permit documents.

Safety Valve: Pressure relief valve actuated by inlet pressure, and characterized by rapid opening or pop action. Sample: A portion of a larger quantity used as representative of the whole.

Composite - small samples, regulated by time and/or flow rate, combined into a single volume and used to represent the average conditions over that time.

Grab - a single instantaneous sample used to represent the conditions at that moment only.

Sanitary Collection System: The pipe system for collecting and carrying liquid and liquid-carried wastes from domestic sources to a wastewater treatment plant. Also see "wastewater collection system."

Sanitary Sewer: A pipe or conduit (sewer) intended to carry wastewater or waterborne wastes from homes, businesses, and industries to the POTW (Publicly Owned Treatment Works). Storm water runoff or unpolluted water should be collected and transported in a separate system of pipes or conduits (storm sewers) to natural watercourses.

Saprophytes: Organisms living on dead or decaying or-

organic matter. They help natural decomposition of the organic solids in wastewater.

Saprophytic: Living on dead or decaying organic matter.

Saprophytic Organisms: Organisms living on dead or decaying organic matter. They help natural decomposition of the organic solids in wastewater.

Scale: A combination of mineral salts and bacterial accumulation that sticks to the inside of a collection pipe under certain conditions. Scale, in extreme growth circumstances, creates additional friction loss to the flow of water. Scale may also accumulate on surfaces other than pipes.

Schedule, (pipe): A sizing system of numbers that specifies the ID (inside diameter) and OD (outside diameter) for each diameter pipe. The schedule number is the ratio of internal pressure in psi divided by the allowable fiber stress multiplied by 1,000. Typical schedules of iron and steel pipe are schedules 40, 80, and 160. Other forms of piping are divided into various classes with their own schedule schemes.

Schmutzdecke: A layer of trapped matter at the surface of a slow sand filter in which a dense population of microorganisms develops. These microorganisms within the film or mat feed on and break down incoming organic material trapped in the mat. In doing so the microorganisms both remove organic matter and add mass to the mat, further developing the mat and increasing the physical straining action of the mat.

Scooter: A sewer cleaning tool whose cleansing action depends on the development of high water velocity around the outside edge of a circular shield. The metal shield is rimmed with a rubber coating and is attached to a framework on wheels (like a child's scooter). The angle of the shield is controlled by a chain-spring system which regulates the head of water behind the scooter and thus the cleansing velocity of the water flowing around the shield.

Screen: A device used to retain or remove suspended or floating objects in wastewater. The screen has openings that are generally uniform in size. It retains or removes objects larger than the openings. A screen may consist of bars, rods, wires, gratings, wire mesh, or perforated plates.

Scrubber: System to reduce noxious substances from a flowing stream of air, usually filled with plates or packing, through which scrubbing fluid flows countercurrent or cross-current to the path of the contaminated air.

Scum: A layer or film of foreign matter (such as grease, oil) that has risen to the surface of water or wastewater; a residue deposited on the ledge of a sewer, channel, or wet well at the water surface; a mass of solid matter that floats on the surface.

Secchi Disc: A flat, white disc that is used to measure the clarity or transparency of water. The disc is lowered into the water by a rope until it is just barely visible. At this point, the depth of the disc from the water surface is the recorded secchi disc transparency.

Secondary Clarifier: A wastewater treatment device which consists of a rectangular or circular tank that allows those substances not removed by previous treatment processes that settle or float to be separated from the wastewater being treated.

Secondary Element: The secondary measuring device or flow meter used with a primary measuring device (element) to measure the rate of liquid flow. In open channels bubblers and floats are secondary elements. Differential pressure measuring devices are the secondary elements in pipes or pressure conduits. The purpose of the secondary measuring device is to (1) measure the liquid level in open channels or the differential pressure in pipes, and (2) convert this measurement into an appropriate flow rate according to the known liquid level or differential pressure and flow rate relationship of the primary measuring device. This flow rate may be integrated (added up) to obtain a totalized volume, transmitted to a recording device, and/or used to pace an automatic sampler.

Secondary Treatment: A wastewater treatment process used to convert dissolved or suspended materials into a form more readily separated from the water being treated. Usually the process follows primary treatment by sedimentation. The process commonly is a type of biological treatment process followed by secondary clarifiers that allow the solids to settle out from the water being treated.

Sediment: Soil that has washed or eroded from a land surface.

Sedimentation (wastewater): The process of settling and depositing of suspended matter carried by wastewater. Sedimentation usually occurs by gravity when the velocity of the wastewater is reduced below the point at which it can transport the suspended material.

Sedimentation Basin: Clarifier; Settling Tank. A tank or

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basin in which wastewater is held for a period of time during which the heavier solids settle to the bottom and the lighter materials float to the water surface.

Seed Sludge: In wastewater treatment, seed, seed culture or seed sludge refers to a mass of sludge which contains populations of microorganisms. When a seed sludge is mixed with wastewater or sludge being treated, the process of biological decomposition takes place more rapidly.

Separately Derived System: A system whose power is derived (or taken) from a generator, transformer or converter.

Septage: The sludge produced in septic tanks.

Septic (wastewater): A condition produced by anaerobic bacteria. If severe, the wastewater produces hydrogen sulfide, turns black, gives off foul odors, contains little or no dissolved oxygen, and the wastewater has a high oxygen demand.

Septic Tank: A system sometimes used where wastewater collection systems and treatment plants are not available. The system is a settling tank in which settled sludge and floatable scum are in intimate contact with the wastewater flowing through the tank and the organic solids are decomposed by anaerobic bacterial action. Used to treat wastewater and produce an effluent that flows into a subsurface leaching (filtering and disposal) system where additional treatment takes place. Also referred to as an “interceptor;” however, the preferred term is “septic tank.”

Septic Tank Effluent Pump (STEP) System: A facility where effluent is pumped from a septic tank into a pressurized collection system which may flow into a gravity sewer, treatment plant, or subsurface leaching system.

Septicity: The condition in which organic matter decomposes to form foul-smelling products associated with the absence of free oxygen. If severe, the wastewater produces hydrogen sulfide, turns black, gives off foul odors, contains little or no dissolved oxygen, and the wastewater has a high oxygen demand.

Series Operation: Wastewater being treated flows through one treatment unit and then flows through another similar treatment unit.

Service: Any individual person, group of persons, thing, or groups of things served with water through a single pipe, gate, valve, or similar means of transfer from a main distribution system.

Service Drop: Overhead conductors from the last pole to the building being served.

Service Pipe: The pipeline extending from the water main to the building served or to the consumer’s system.

Set Point: In process control systems, a point at which the desired value of the controlled variable is set.

Setback: Reduction of heating or cooling during hours when a building is unoccupied.

Settleable Solids: The portion of the suspended solids which are of sufficient size and weight to settle in a given period of time, usually one hour.

Sewage: The used household water and water-carried solids that flow in sewers to a wastewater treatment plant. The preferred term is “wastewater.”

Sewer: A pipe or conduit that carries wastewater or drainage water. The term “collection line” is often used also.

Sewer Gas: Gas in collection lines (sewers) that result from the decomposition of organic matter in the wastewater. When testing for gases found in sewers, test for lack of oxygen and also for explosive and toxic gases. Any gas present in the wastewater collection system, even though it is from such sources as gas mains, gasoline, and cleaning fluid.

Sewer Main: A sewer pipe to which building laterals are connected. Also called a “collection main.”

Sewerage: System of piping with appurtenances for collecting, moving and treating wastewater from source to discharge.

Shock Load (wastewater): The arrival at a plant of a waste which is toxic to organisms in sufficient quantity or strength to cause operating problems. Possible problems include odors and sloughing off of the growth or slime on the trickling filters media. Organic or hydraulic overloads also can cause a shock load.

Short-Circuiting: A condition that occurs in tanks or basins when some of the water travels faster than the rest of the flowing water. This is usually undesirable since it may result in shorter contact, reaction, or settling times in comparison with the theoretical (calculated) or presumed detention times.

Shredding: A mechanical treatment process which cuts large pieces of wastes into smaller pieces so they won’t plug pipes or damage equipment (comminution).

Side Stream: Wastewater flows that develop from other

storage or treatment facilities. This wastewater may or may not need additional treatment.

Significant Figure: The number of accurate numbers in a measurement. If the distance between two points is measured to the nearest hundredth and recorded as 238.41 feet, the measurement has five significant figures.

Significant Industrial User (SIU): A Significant Industrial User (SIU) includes: all categorical industrial users, and any non categorical industrial user that discharges 25,000 gallons per day or more of process wastewater ("process wastewater" excludes sanitary, noncontact cooling and boiler blow down wastewaters), or contributes a process waste stream which makes up five percent or more of the average dry weather hydraulic or organic (BOD, TSS) capacity of a treatment plant, or has a reasonable potential, in the opinion of the Control or Approval Authority, to adversely affect the POTW treatment plant (inhibition, pass-through of pollutants, sludge contamination, or endangerment of POTW workers).

Significant Noncompliance: An industrial user is in significant noncompliance if its violation meets one or more of the following criteria:

- Chronic violation of wastewater discharge limits, defined here as those in which 66 percent or more of all of the measurements taken during a six-month period exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter
- Technical Review Criteria (TRC) violations, defined here as those in which 33 percent or more of all of the measurements for each pollutant parameter taken during a six-month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC = 1.4 for BOD, TSS, fats, oil and grease, and 1.2 for all other pollutants except pH)
- Any other violation of a pretreatment effluent limit (daily maximum or longer-term average) that the Control Authority determines has caused, alone or in combination with other discharges, interference or pass through (including endangering the health of POTW personnel or the general public)
- Any discharge of a pollutant that has caused imminent endangerment to human health, welfare or to the environment or has resulted in the POTW's exercise of its emergency authority to halt or prevent such a discharge
- Failure to meet, within 90 days after the schedule date, a compliance schedule milestone contained in a local control mechanism or enforcement order for starting construction, completing construction, or attaining final compliance
- Failure to provide, within 30 days after the due date, required reports such as baseline monitoring reports, 90-day compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules
- Failure to accurately report noncompliance
- Any other violation which the Control Authority determines will adversely affect the operation or implementation of the local pretreatment program

Sine Wave: A waveform corresponding to a single-frequency, periodic oscillation, which can be shown as a function of amplitude against angle and in which the value of the curve at any point is a function of the sine of that angle.

Slake: To mix with water so that a true chemical combination takes place.

Slimes: A highly viscous substance formed by microbial growth.

Sloughing: The periodic loss of biofilm that occurs in trickling filters and rotating biological contactors. Sloughing occurs when biofilm is sheared from the trickling filter or RBC media.

Sludge: The settleable solids separated from liquids during processing or the deposits of foreign materials on the bottoms of streams or other bodies of water.

Sludge Digestion: The process of changing organic matter in sludge into a gas or a liquid or a more stable solid form. These changes take place as microorganisms feed on sludge in anaerobic (more common) or aerobic digesters.

Sludge Gasification: A process in which soluble and particulate organic matter are converted into gas by anaerobic decomposition. The resulting gas bubbles can become attached to the settled sludge and cause large clumps of sludge to rise and float on the water surface.

Sludge Volume Index (SVI): This is a calculation used to indicate the tendency of activated sludge solids (aerated solids) in the secondary clarifier to thicken or to become concentrated during the sedimentation/thickening process. To determine SVI, allow a mixed liquor sample from the aeration basin to settle for 30 minutes. Also deter-

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mine the suspended solids concentration for a sample of the same mixed liquor. Calculate SVI by dividing the measured (or observed) wet volume (mL/L) of the settled sludge by the dry weight concentration of MLSS in grams/L. When mixed liquor has an SVI well above 100 mL/gram of solids, it tends to form a thin slurry or billowing sludge blanket or to form bulky sludge.

Slugs: Intermittent releases or discharges of wastewater.

Smoke Test: A method of blowing smoke into a closed-off section of a sewer system to locate sources of surface inflow.

Software Programs: Computer programs; the list of instructions that tell a computer how to perform a given task or tasks. Some software programs are designed and written to monitor and control municipal water and wastewater treatment processes.

Solenoid Valve: Valve that is closed by gravity, pressure, or spring action and opened by the magnetic action of an electrically energized coil, or vice versa.

Solids (S): Material not in liquid or gaseous form.

Colloidal - fine solid particles intermediate between suspended and dissolved solids, or the difference between the total suspended solids and the settleable solids.

Dissolved - Technically an incorrect term since all the solids are not in true solution. The , as used, is all the solids which pass through the filter mat in a Gooch crucible.

Inorganic - solids which are inert and not subject to decay.

Organic - solids, generally originating from animals and plants, which contain carbon, hydrogen, oxygen and other nutrients and are combustible during the volatile solids test.

Settleable - solids of sufficient size and weight to settle in one hour in an Imhoff cone.

Suspended Solids (SS) - solids which are visible and in suspension in the water; or the solids which are retained on the filter mat of a Gooch crucible.

Total - all the solids in the wastewater.

Volatile - burnable, a measure of organic content.

Solids Concentration: The solids in the aeration tank which carry microorganisms that feed on wastewater.

Solids Retention Time: An expression of the average time that a microorganism will spend in the activated sludge process.

Soluble BOD: Soluble BOD is the BOD of water that has been filtered in the standard suspended solids test.

Specific Gravity (SG): The ratio of the weight of a given volume of a substance to the weight of an equal volume of water.

Split System: Air conditioning system with remote condenser or remote condensing unit.

Stabilization: Processes that convert organic materials to a form that resists change. Organic material is stabilized by bacteria which convert the material to gases and other relatively inert substances. Stabilized organic material generally will not give off obnoxious odors.

Stabilized Waste: A waste that has been treated or decomposed to the extent that, if discharged or released, its rate and state of decomposition would be such that the waste would not cause a nuisance or odors.

Stack: Portion of the exhaust system downstream of the draft diverter, draft hood, or barometric draft regulator.

Stasis: Stagnation or inactivity of the life processes within organisms.

Static Pressure: Pressure exerted by a fluid at rest.

Stator: The stationary part of an electric generator or motor.

Steam Boiler: Enclosed vessel in which water is converted into steam.

Steam Trap: Device for allowing the passage of condensate and preventing the passage of steam, or for allowing the passage of air as well as condensate.

Step Controller: Multiple-switch assembly in which a moving element trips multiple output steps successively.

Step-Feed Aeration: Step-feed aeration is a modification of the conventional activated sludge process. In step-feed aeration, primary effluent enters the aeration tank at several points along the length of the tank, rather than all of the primary effluent entering at the beginning or head end of the tank and flowing through the entire tank.

Sterilization: The removal or destruction of all microorganisms, including pathogenic and other bacteria, vegetative forms and spores. Compare with "disinfection."

Storm Collection System: A system of gutters, catch basins, yard drains, culverts and pipes for the purpose of conducting storm waters from an area, but intended to exclude domestic and industrial wastes.

Storm Runoff: The amount of runoff that reaches the

point of measurement within a relatively short period of time after the occurrence of a storm or other form of precipitation. Also called “direct runoff.”

Storm Sewer: A separate pipe, conduit or open channel (sewer) that carries runoff from storms, surface drainage, and street wash, but does not include domestic and industrial wastes. Storm sewers are often the recipients of hazardous or toxic substances due to the illegal dumping of hazardous wastes or spills created by accidents involving vehicles and trains transporting these substances. Also see “sanitary sewer.”

Stuck: A stuck digester does not decompose organic matter properly. It is characterized by low gas production, high volatile acid to alkalinity relationship, and poor liquid-solids separation. A digester in a stuck condition is sometimes called a “sour” digester.

Sump: The term “sump” refers to a structure which connects an industrial discharger to a public sewer. The structure (sump) could be a sample box, a clarifier or an intercepting sewer.

Supernatant (wastewater): Liquid removed from settled sludge. Supernatant commonly refers to the liquid between the sludge on the bottom and the scum on the surface of an anaerobic digester. This liquid is usually returned to the influent wet well or to the primary clarifier.

Surcharge: Sewers are surcharged when the supply of water to be carried is greater than the capacity of the pipes to carry the flow. The surface of the wastewater in manholes rises above the top of the sewer pipe, and the sewer is under pressure or a head, rather than at atmospheric pressure.

Surface Loading: One of the guidelines for the design of settling tanks and clarifiers in treatment plants. Used by operators to determine if tanks and clarifiers are hydraulically (flow) over- or underloaded. Also called overflow rate.

Surface Runoff: The precipitation that cannot be absorbed by the soil and flows across the surface by gravity. The water that reaches a stream by traveling over the soil surface or falls directly into the stream channels, including not only the large permanent streams but also the tiny rills and rivulets. Water that remains after infiltration, interception, and surface storage has been deducted from total precipitation.

Surfactant: Abbreviation for surface-active agent. The active agent in detergents that possesses a high cleaning

ability.

Suspended Growth Processes: Wastewater treatment processes in which the microorganisms and bacteria treating the wastes are suspended in the wastewater being treated. The wastes flow around and through the suspended growths. The various modes of the activated sludge process make use of suspended growth reactors. These reactors can be used for BOD removal, nitrification and denitrification.

Suspended Solids: 1. Solids that either float on the surface or are suspended in water, wastewater, or other liquids, and which are largely removable by laboratory filtering. 2. The quantity of material removed from water in a laboratory test, as prescribed in Standard Methods for the Examination of Water and Wastewater, and referred to as Total Suspended Solids Dried at 103° to 105°C.

Suspension: A solution having small particles dispersed throughout.

TMDL: Total Maximum Daily Load. The sum of the allowable loads of a single pollutant from all contributing point and nonpoint sources. It is a calculation of the maximum amount of a pollutant that a water body can receive on a daily basis and still meet water quality standards; and, an allocation of that amount to the pollutant’s sources.

TSS: See Total Suspended Solids.

Tank: An artificial container in which liquids are held or detained.

Temperature Controller: Device which responds directly or indirectly to deviation from a desired temperature by actuating a control or initiating a control sequence.

Temperature Sensor: A device that opens and closes a switch in response to changes in the temperature. This device might be a metal contact, or a thermocouple that generates minute electric current proportional to the difference in heat, or a variable resistor whose value changes in response to changes in temperature. Also called a “heat sensor.”

Tertiary Treatment: Any process of water renovation that upgrades treated wastewater to meet specific reuse requirements. May include general cleanup of water or removal of specific parts of wastes insufficiently removed by conventional treatment processes. Typical processes include chemical treatment and pressure filtration. Also called “advanced waste treatment.”

Thermal Protection: Refers to an electrical device which

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has inherent protection from over-heating. Typically in the form of a bimetal strip which bends when heated to a certain point. When the bimetal strip is used as a part of appliance's circuitry, the circuit will open when the bimetal bends, breaking the circuit.

Thermocouple: junction of two wires of dissimilar materials, not necessarily metal, with the property of generating an electrical voltage related to the temperature of their junction.

Thermophilic Bacteria: A group of bacteria that grow and thrive in temperatures above 113°F (45°C). The optimum temperature range for these bacteria in anaerobic decomposition is 120°F (49°C) to 135°F (57°C).

Thermostat: Automatic control device responsive to temperature used to maintain constant temperature.

Thickening: Treatment to remove water from the sludge mass to reduce the volume that must be handled.

Thief Hole: A digester sampling well.

Three-way Valve: Valve having either a single inlet and two outlets (diverting) or two inlets and a single outlet (mixing), in which either one or the other of the two inlets or outlets is open or partially open. Usually used for temperature control purposes.

Titrate: Laboratory procedure in which a chemical solution of known strength is added, drop by-drop, to a sample until an end point is reached (usually a color change or the formation of a precipitate).

Ton: (of refrigeration) time-rate of cooling equal to 12,000 Btu/hr

Total Kjeldahl Nitrogen (TKN): Nitrogen contained in organic compounds such as proteins or their decomposition product ammonia, as measured by the Kjeldahl Method.

Total Organic Carbon (TOC): A measure of the amount of carbon contained in organic compounds in water or wastewater.

Total Pressure: In fluid flow, the sum of the static pressure and velocity pressure.

Total Flow: The total flow passing a selected point of measurement in the collection system during a specified period of time.

Total Residual Chlorine: The amount of available chlorine remaining after a given contact time. The sum of the combined available residual chlorine and the free available residual chlorine. Also see "residual chlorine."

Total Suspended Solids: See Suspended Solids.

Totalizer: An instrument which maintains a running total of the measured variable.

Toxic: A substance which is poisonous to a living organism.

Toxicity: The relative degree of being poisonous or toxic. A condition which may exist in wastes and will inhibit or destroy the growth or function of certain organisms.

Transducer: A device for converting energy from one form to another, such as optical energy to electrical energy.

Trained Individual: An employee from a contracting (construction) firm that has received four (4) hours of training endorsed by NYSDEC, or from a Soil and Water Conservation District, CPESC, Inc., or other NYSDEC-endorsed entity

Transformer: A device which uses magnetic force to transfer electrical energy from one coil of wire to another. In the process, transformers can also change the voltage at which this electrical energy is transmitted.

Transmission: The electrical transfer of a signal, message or other form of data from one location to another.

Trap: 1. In the wastewater collection system of a building, plumbing codes require every drain connection from an appliance or fixture to have a trap. The trap in this case is a gooseneck that holds water to prevent vapors or gases in a collection system from entering the building. 2. Various other types of special traps are used in collection systems such as a grit trap or sand trap.

Trickling Filter: A treatment process in which the wastewater trickles over media that provide the opportunity for the formation of slimes or biomass which contain organisms that feed upon and remove wastes from the water being treated.

Trickling Filter Media: Rocks or other durable materials that make up the body of the filter. Synthetic (manufactured) media have been used successfully.

Trihalomethanes (THMs): Derivatives of methane, CH₄, in which three halogen atoms (chlorine or bromine) are substituted for three of the hydrogen atoms. Often formed during chlorination by reactions with natural organic materials in the water. The resulting compounds (THMs) are suspected of causing cancer.

Turbidity: The cloudy appearance of water caused by the presence of suspended and colloidal matter. In the

waterworks field, a turbidity measurement is used to indicate the clarity of water. Technically, turbidity is an optical property of the water based on the amount of light reflected by suspended particles. Turbidity cannot be directly equated to suspended solids because white particles reflect more light than dark-colored particles and many small particles will reflect more light than an equivalent large particle.

Turbidity Meter: An instrument for measuring and comparing the turbidity of liquids by passing light through them and determining how much light is reflected by the particles in the liquid. The normal measuring range is 0 to 100 and is expressed as Nephelometric Turbidity Units (NTUs).

Turbidity Units (TU): Turbidity units are a measure of the cloudiness of water. If measured by a nephelometric (deflected light) instrumental procedure, turbidity units are expressed in nephelometric turbidity units (NTU) or simply TU. Those turbidity units obtained by visual methods are expressed in Jackson Turbidity Units (JTU) which is a measure of the cloudiness of water; they are used to indicate the clarity of water. There is no real connection between NTUs and JTUs. The Jackson turbidimeter is a visual method and the nephelometer is an instrumental method based on deflected light.

Turbulent Mixers: Devices that mix air bubbles and water and cause turbulence to dissolve oxygen in the water.

US EPA: United States Environmental Protection Agency.

Twisted Pair: A type of cable in which pairs of conductors are twisted together to produce certain electrical properties. See also shielded twisted pair and unshielded twisted pair.

Two-Stage Filters: Two filters are used. Effluent from the first filter goes to the second filter, either directly or with a clarifier between the two filters.

Ultra filtration: A membrane filters process used for the removal of some organic compounds in an aqueous (watery) solution.

Underwriters Laboratories (UL): A non-profit organization that was established by the insurance industry to test devices, materials and systems for safety, not satisfactory operation. It has begun to set standards. Items that pass the tests are marked UL Approved.

Uninterrupted Power Supply (UPS): Designation of a power supply providing continuous uninterrupted service.

Unit Heater: Heater consisting of a fan for circulating air over a heat exchange surface or coil, all enclosed in a common casing.

Unit Process: A distinct and separate portion of the total wastewater treatment system.

Unit Ventilator: Fan-coil unit package devised for applications in which the use of outdoor and return air mixing is intended to satisfy tempering requirements and ventilation needs.

Upset Digester: An upset digester does not decompose organic matter properly. An upset digester is characterized by low gas production, high volatile acid/alkalinity relationship, and poor liquids-solids separation. A digester in an upset condition is sometimes called a "sour" or "stuck" digester.

Upstream: The direction against the flow of water; or, toward or in the higher part of a sewer or collection system.

Urbanized Area: For the purposes of this document, the term "urbanized area" refers specifically to areas designated by the 2010 U.S. Census as containing sufficient population density (1,000 people or more per square mile) and sufficient contiguity to a population center of 50,000 people or more, to be designated as "urbanized" and automatically subject to regulation as an MS4 under the SPDES program.

VAV: Variable air volume

Vacuum Breaker: A device which relieves the partial vacuum in pipelines to prevent back siphonage.

Vane Axial Fan: disc-type wheel within a cylinder, a set of air guide vanes located either before or after the wheel, and including driving mechanism supports either for belt drive or direct connection.

Variable Costs (wastewater): Costs that a utility must cover or pay that are associated with the actual collection, treatment, and disposal of wastewater. The costs vary or fluctuate. Also see "fixed costs."

VAV Box: Variable air volume terminal device.

Velocity Pressure: In a moving fluid, the pressure due to the velocity and density of the fluid.

Vent: Opening in a tank or other piece of equipment, sealed to prevent escape of material within normal pressures, but arranged to open automatically to relieve excessive pressure.

Ventilation: Process of supplying or removing air by nat-

Appendix 1: Glossary of Terms

ural or mechanical means to or from any space. Such air may or may not have been conditioned.

Ventilator: Device for replacing air inside a room by outside air.

Volatile: A volatile substance is one that is capable of being evaporated or changed to a vapor at relatively low temperatures. Volatile substances also can be partially removed by air stripping. In terms of solids analysis, volatile refers to materials lost (including most organic matter) upon ignition in a muffle furnace for 60 minutes at 550°C. Natural volatile materials are chemical substances usually of animals or plant origin. Manufactured or synthetic volatile materials such as ether, acetone, and carbon tetrachloride are highly volatile and not of plant or animal origin.

Volatile Acids: Fatty acids produced during digestion that are soluble in water and that can be steam-distilled at atmospheric pressure. Also called “organic acids.” Volatile acids are commonly reported as equivalent to acetic acid.

Volatile Solids: Those solids in water, wastewater, or other liquids that are lost on ignition of the dry solids at 550°C for 60 minutes.

Voltage Drop: Voltage reduction due to wire resistance.

Volume Control Damper: Device mounted in a duct or opening used to vary the volume of air flowing through.

Volumetric: Measurement by volume; as opposed to gravimetric, which is measurement by weight.

Volute: A spiral shaped casing, surrounding the impeller of a centrifugal pump, which collects the liquid discharged by the impeller.

Vulnerability Assessment (water): An evaluation of drinking water source quality and its vulnerability to contamination by pathogens and toxic chemicals.

Waste Activated Sludge (WAS), mg/L: The excess growth of microorganisms which must be removed from the process to keep the biological system in balance.

Wastewater: A community’s used water and water-carried solids (including used water from industrial processes) that flow to a treatment plant. Storm water, surface water, and groundwater infiltration also may be included in the wastewater that enters a wastewater treatment plant. The term “sewage” usually refers to household wastes, but this word is being replaced by the term “wastewater.”

Wastewater Collection System: The pipe system for col-

lecting and carrying water and water-carried wastes from domestic and industrial sources to a wastewater treatment plant.

Wastewater Facilities: The pipes, conduits, structures, equipment, and processes required to collect, convey, and treat domestic and industrial wastes, and dispose of the effluent and sludge.

Wastewater Ordinance: The basic document granting authority to administer a pretreatment inspection program. This ordinance must contain certain basic elements to provide a legal framework for effective enforcement.

Wastewater Treatment Plant: An arrangement of pipes, equipment, devices, tanks and structures for treating wastewater and industrial wastes. A water pollution control plant.

Water Cycle: The process of evaporation of water into the air and its return to earth by precipitation (rain or snow). This process also includes transpiration from plants, groundwater movement, and runoff into rivers, streams and the ocean. Also called the “hydrologic cycle.”

Water Heater: Closed vessel in which water is heated by the combustion of fuels, electricity, or any other source and is withdrawn for use external to the system at pressures not exceeding 160 psig, including the apparatus by which heat is generated, and all controls and devices necessary to prevent water temperatures from exceeding 210 F.

Water Treatment: Process that alters supply water so that it can be used for process or HVAC purposes without deleterious effect.

Watt: The unit of measurement of electrical power or rate of work. One amp represents the amount of current at a pressure of one volt.

Waveform: Characteristic shape of an electrical current or signal. The ac output from an inverter.

Wavelength: The distance between the same two points on adjacent waves; the time required for a wave to complete a single cycle.

Watershed: The region or land area that contributes to the drainage or catchments area above a specific point on a stream or river.

Weir: A wall or plate placed in an open channel and used to measure the flow of water. The depth of the flow over the weir can be used to calculate the flow rate, or a chart or conversion table may be used to convert depth to flow.

A wall or obstruction used to control flow (from settling tanks and clarifiers) to ensure a uniform flow rate and avoid short-circuiting.

Weir Diameter: Circular clarifiers have a circular weir within the outside edge of the clarifier, and all of the water leaving the clarifier flows over this weir. This diameter is the length of a line from one edge of a weir to the opposite edge and passing through the center of the circle formed by the weir.

Weir, Proportional: A specially shaped weir in which the flow through the weir is directly proportional to the head.

Wet Well: A tank or chamber in which the flow of liquid is contained and to which the suction of a pump is connected.

Wet-bulb Temperature: Temperature indicated by a psychrometer when the bulb of one thermometer is covered with a water saturated wick over which air is caused to flow.

Y, Growth Rate: An experimentally determined constant used to express the unit growth rate of bacteria in terms of mass per mass of organic matter degraded (i.e., mg per mg BOD₅).

Zone: Space or group of spaces within a building with heating or cooling requirements sufficiently similar that comfort conditions can be maintained by a single controlling device.

Zoogleal Film: A complex population of organisms that form a "slime growth" on trickling filter media and break down the organic matter in wastewater. These slimes consist of living organisms feeding on organic matter in wastewater, dead organisms, silt, and other debris. "Slime growth" is a more common term.

Zoogleal Mass: Jelly-like masses of bacteria found in both the trickling filter and activated sludge processes. These masses may be formed for or function as protection against predators and for storage of food supplies.

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