

Alireza Bahadori · Scott T. Smith

Dictionary of Environmental Engineering and Wastewater Treatment

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Preface

The main goal of this comprehensive dictionary is to help industrial professionals, academic staff members, and science and engineering students communicate with a clearer understanding of the definitions and descriptions of the processes, equipment, and concepts related to wastewater treatment and environmental engineering that they use every single day in their jobs.

When unclear communication occurs in an industry, the problems that result can be costly, and that's where this dictionary can help to eliminate frustration, cost, downtime, and equipment failure. Now, engineers, students, academic staff, vendors, contract employees, and consultants can quickly refer to key technical terms and definitions in this handy new volume. Providing a common ground for more effective communication, this dictionary is an essential reference for anyone working in a wastewater and environmental industrial setting, and it is a useful reference for students as well.

The alphabetically arranged entries range from a few descriptive words to a page or more, covering key wastewater and environmental terms used in daily communications and all research and industrial activities. The key technical terms, written in easy-to-understand, practical language, clearly demonstrate the principles and concepts behind the definitions. Many terms found in this dictionary have standard definitions and can be found across a wide array of sources. The purpose of this work is to offer these many technical terms in a single, easily accessible format. The editors of this dictionary have carefully compiled terms from various sources, including Earth System Governance Project, Global Environment Facility (GEF), Intergovernmental Panel on Climate Change (IPCC), United Nations Environment Program (UNEP), World Nature Organization (WNO), World Wide Fund for Nature (WWF), European Environment Agency (EEA), Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), Australian Department of Sustainability, Environment, Water, Population and Communities, Australian Network of Environmental Defenders Offices, Australian Student Environment Network, Greening Australia, Environment Victoria, Land care Australia, Brazilian Institute of Environment and Renewable Natural Resources, Environment Canada, Danish Ministry of Climate and Energy, German Federal Ministry for the Environment, Nature Conservation and Nuclear Safety, Hong Kong Environmental Protection Department, Indian Central Pollution Control Board (CPCB), Environmental Protection Agency of Ireland, Ministry of Infrastructure and the Environment of Netherlands, Department of Conservation of New Zealand, Ministry for the Environment

of New Zealand, Norwegian Directorate for Nature Management, Norwegian Climate and Pollution Agency, Saudi Environmental Society, Department for Environment, Food and Rural Affairs of the United Kingdom, English Heritage, Environment Agency of England, Natural England, Scottish Environment Protection Agency, Scottish Natural Heritage, Countryside Council for Wales, Environment Agency Wales, US Environmental Protection Agency, US Fish and Wildlife Service, US National Park Service, Toronto Environmental Alliance (TEA), African American Environmentalist Association, Environment America, Environment California, OMI Industries, Aqueonics, Inc., Stevens Water Monitoring Systems, Inc., Meitler Consulting, Inc., KLa Systems, EnviroChemie GmbH Technology for Water, NEFCO, Inc., and Soil Conservation Service of NSW.

Finally, the book explains the industry-specific terms for those who need to understand aspects of the industry but have been hindered from doing so by their inability to discover the meaning of the jargon used.

Last but not least, we would like to thank the Springer editorial team, in particular Michael Luby, for their editorial assistance and support while working on this book project.

Lismore, NSW, Australia

Alireza Bahadori
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Scott T. Smith is Dean of Engineering at Southern Cross University, Lismore, NSW, Australia. Professor Smith's research interests include the application of advanced materials (e.g., fibre-reinforced polymer composites) for the repair and strengthening of existing concrete, metallic, and timber infrastructure and sustainable development of the built environment. He has published widely in the FRP composites in civil engineering field and has won several research awards from professional international institutions including:

- 2011 Warren Medal, Engineers Australia
- 2010 Distinguished Young Researcher Award, International Institute for FRP in Construction
- CICE 2008 Best Paper Award
- 2004 Howard Medal, Institution of Civil Engineers UK (ICE)

To support his research he has been awarded USD 1.7 million from external sources (Australian Research Council ARC-Discovery, ARC-Linkage, RGC Hong Kong-General Research Fund, National Natural Science Foundation of China NSFC) and sources internal to the university.

A

Abandoned Mine (Derelict Mine) (mm)

A mine which has been inactive for some considerable time and for which no title is current or where the lease has been cancelled.

Abandonment

Discontinued use of a system component or components by removing them or rendering them inaccessible and inoperable.

Abatement

(1) The act or process of reducing the intensity of pollution. (2) The use of some method of abating pollution. (3) 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.

Abiotic Resources

Abiotic Resources are the resources which are considered abiotic and therefore not renewable. Zinc ore and crude oil are examples of abiotic resources.

Abrasion

The removal of surface material from any solid through the frictional action of another solid, a liquid or a gas or combination thereof.

Abrasion Mode

A size range of particles, typically larger than about 3 micrometres in diameter, primarily generated by abrasion of solids.

Abrasion Resistance

The ability of a material to withstand abrasion without appreciative erosion.

Abrupt Climate Change

Sudden (on the order of decades), large changes in some major component of the climate system, with rapid, widespread effects.

Absorption

Process of incorporation or assimilation by which one substance is physically taken into and included with another substance; for example, bacteria assimilating nutrients from effluent. The penetration of atoms, ions or molecules into the bulk mass of a substance. A physio-chemical process in which a substance associates with another to form a homogeneous mixture presenting the characteristics of a solution. Absorption is a process in which liquid molecules are taken up by a liquid or solid and distributed throughout the body of that liquid or solid.

Absorption Area

Design parameter described by the square footage of an absorptive surface that is associated with the hydraulic acceptance of effluent.

Absorption Capacity

A measure of the quantity of a soluble substance that can be absorbed by a given quantity of a solid substance.

Absorption Coefficient

A measure of the ability of particles or gases to absorb photons; a number that is proportional to the number of photons removed from the sight path by absorption per unit length.

Absorption Cross Section

The amount of light absorbed by a particle divided by its physical cross section.

Absorption Trench

An Absorption Trench is a trench that is excavated into the ground and is installed along the natural contour of the ground and contains an arch or slotted pipe, aggregate, geo-textile, and is back filled with topsoil. Absorption trenches treat wastewater from toilets, laundries, bathrooms and kitchens. The length of trench depends on the soils absorptive capacity and the local climatic conditions.

Absorptive Surface

Plane of native soil where hydraulic properties change.

Abstraction

The removal of water from any source, either permanently or temporarily, so that it: Ceases to be part of the resources of that area, or; is transferred to another source within the area.

Abuse Coverings and Finishes

Jackets, mastics or films used to protect insulation from mechanical and personnel abuse.

Acceleration Corrosion Test

Method designed to approximate, in a short-time, the deteriorating effect under normal long-term service condition.

Acceptable

Condition in which a component is performing its intended purpose and is considered to be in an operable state.

Acceptable Daily Intake (ADI)

The highest daily amount of a substance that may be consumed over a lifetime without adverse effects.

Accepted Engineering Practices

Those requirements which are compatible with standards of practice required of a registered professional engineer.

Acceptance Rate

Infiltration of effluent into a designated media expressed as a rate (e.g., cm/day).

Access Hole

A hole in the duct, at the extremity of a sampling line, through which sampling is undertaken.

Acclimation

The dynamic response of a system to the addition or deletion of a substance until equilibrium is reached; adjustment to a change in the environment.

Accretion

Gradual addition of sand to a beach or lake shoreline during periods of light on-shore wind and/or lowered sea level.

Accumulation Mode

A size range of particles, from about 0.1 to 3 micrometres, formed largely by accumulation of gases and particles upon smaller particles. They are very effective in scattering light.

Accuracy

The absolute nearness to the truth. In physical measurements, it is the degree of agreement between the quantity measured and the actual

quantity. It should not be confused with "precision," which denotes the reproducibility of the measurement.

Acequia

Acequias are gravity-driven waterways, similar in concept to a flume. Most are simple ditches with dirt banks, but they can be lined with concrete. They were important forms of irrigation in the development of agriculture in the American Southwest. The proliferation of cotton, pecans and green chile as major agricultural staples owe their progress to the acequia system.

Acicular Ferrite

A highly substructured, non-equiaxed ferrite formed upon continuous cooling by a mixed diffusion and shear mode of transformation that begins at a temperature slightly higher than the transformation temperature range for upper bainite. It is distinguished from bainite in that it has a limited amount of carbon available thus, there is only a small amount of carbide present.

Acid

(1) A substance that tends to lose a proton. (2) A substance that dissolves in water with the formation of hydrogen ions. (3) A substance containing hydrogen which may be replaced by metals to form salts.

Acid Deposition

A term for the conversion of sulfur oxide and nitrogen oxide emissions into acidic compounds which precipitate in rain, snow, fog, or dry particles. A complex chemical and atmospheric phenomenon that occurs when emissions of sulfur and nitrogen compounds and other substances are transformed by chemical processes in the

atmosphere, often far from the original sources, and then deposited on earth in either wet or dry form. The wet forms, popularly called “acid rain,” can fall to earth as rain, snow, or fog. The dry forms are acidic gases or particulates.

Acid Embrittlement

A form of hydrogen embrittlement that may be induced in some metals by acid.

Acid-Forming Bacteria

Microorganisms that can metabolize complex organic compounds under anaerobic conditions. This metabolic activity is the first step in the two-step anaerobic fermentation process leading to the production of methane.

Acid Precipitation

Typically is rain with high concentrations of acids produced by the interaction of water with oxygenated compounds of sulfur and nitrogen which are the by-products of fossil fuel combustion.

Acid Rain

Air pollution produced when acid chemicals are incorporated into rain, snow, fog or mist. The “acid” in acid rain comes from sulfur oxides and nitrogen oxides, products of burning coal and other fuels and from certain industrial processes. The sulfur oxides and nitrogen oxides are related to two strong acids: sulfuric acid and nitric acid. When sulfur dioxide and nitrogen oxides are released from power plants and other sources, winds blow them far from their source. If the acid chemicals in the air are blown into areas where the weather is wet, the acids can fall to Earth in the rain, snow, fog, or mist. In areas where the weather is dry, the acid chemicals may become incorporated into dusts or smokes. Acid rain can

damage the environment, human health, and property. Acid rain is atmospheric precipitation with a pH below 3.6–5.7. Burning of fossil fuels for heat and power is the major factor in the generation of oxides of nitrogen and sulfur, which are converted into nitric and sulfuric acids washed down in the rain. See also **ATMOSPHERIC CORROSION**.

Acid Soil

A soil giving an acid reaction throughout most or all of the soil profile (precisely, below a pH of 7.0; practically, below a pH of 6.5). Generally speaking, acid soils become a problem when the pH drops below 5.5. At this level, and particularly below 5.0, the following specific problems may occur—aluminum toxicity, manganese toxicity, calcium deficiency and/or molybdenum deficiency. Such problems adversely affect plant growth and root nodulation, which may result in a decline in plant cover and increase in erosion hazard. The term is frequently used to describe soils with acidity problems as above. Correction of the acidity is normally carried out by the application of appropriate amounts of lime to bring the soil pH to a level of 6.0–6.5.

Acidity

The quantitative capacity of aqueous solutions to neutralize a base; measured by titration with a standard solution of a base to a specified end point; usually expressed as milligrams of equivalent calcium carbonate per litre (mg/L CaCO₃); not to be confused with pH. Water does not have to have a low pH to have high acidity.

Acidity

The chemical activity of hydrogen ions in soil expressed in terms of pH. See also **ACID SOIL**, pH.

ACM

Asbestos-containing material: a substance (usually a construction material) that includes some form of asbestos.

Acoustic Logging

Acoustic logging is a method of determining the location of a leak in a water main, by placing listening devices at known distances along the main.

Acoustic Insulation

Refers to the measures taken to reduce the transmission of noise from its source to the places which must be protected or insulated.

Acoustics

The study of sound, and its transfer, reflection and absorption.

Acre-Foot (ac-ft)

A volume of water 1-ft deep and 1 ac in area, or 43,560 cu ft (1233.5 m³).

Acrylic

Resin polymerized from acrylic acid, methacrylic acid, esters of these acids, or acrylonitrile.

Act

In an air pollution control context, usually refers to the federal Clean Air Act.

Action

Service Action: The identifier for the type of action to take when the service is executed. The available actions vary by service.

Action

The service action to take.

Active Recreation

A level of land development which provides for ovals, camp sites or other activities requiring extensive clearing or leveling for facilities.

ACTS

Asbestos Contractor Tracking System, a US EPA database system for keeping track of asbestos removal contractors and sites. The APCD uses ACTS.

Activated Carbon

Adsorptive particles or granules usually obtained by heating carbonaceous material in the absence of air or in steam and possessing a high capacity to selectively remove trace and soluble components from solution.

Activated Carbon Adsorption

Removal of soluble components from aqueous solution by contact with highly adsorptive granular or powdered carbon.

Activated Carbon Treatment

A process intended for the removal of dissolved and colloidal organic substances from water and wastewater by absorption on activated carbon; for example for the amelioration of taste, odour or colour.

Activated Sludge

A flocculent microbial/mass, produced when sewage is continuously aerated. Sludge that has undergone flocculation forming a bacterial culture typically carried out in tanks. Can be

extended with aeration. Activated sludge is Sludge particles produced by the growth of organisms in the aeration tank in the presence of dissolved oxygen.

Activated Sludge Process

A common method of disposing of pollutants in wastewaters. In the process, large quantities of air are bubbled through wastewaters that contain dissolved organic substances in open aeration tanks. Bacteria and other types of microorganisms present in the system need oxygen to live, grown, and multiply in order to consume the dissolved organic "food" or pollutants in the waste. After several hours in a large holding tank, the water is separated from the sludge of bacteria and discharged from the system. Most of the activated sludge is returned to the treatment process, while the remainder is disposed of by one of several acceptable methods.

Activated-Sludge Loading

The pounds (kilograms) of BOD in the applied liquid per unit volume of aeration capacity or per pound (kilogram) of activated sludge per day.

Activated-Sludge Process

Wastewater treatment process that uses activated sludge to biologically convert non-settle able (suspended, dissolved, and colloidal) organic materials to a settle able product using aerobic and facultative microorganisms; typically followed by clarification and sludge return.

Activation

The changing of a passive surface of a metal to a chemically active state. Contrast with passivation.

Active

A state in which a metal tends to corrode (opposite of passive).

Active Metal

A metal ready to corrode, or being corroded.

Active Potential

The potential of a corroding material.

Activity

A measure of the chemical potential of a substance, where chemical potential is not equal to concentration, that allows mathematical relations equivalent to those for ideal systems to be used to correlate changes in an experimentally measured quantity with changes in chemical potential.

Activity (Ion)

The ion concentration corrected for deviations from ideal behavior. Concentration multiplied by activity coefficient. Activity coefficient. A characteristic of a quantity expressing the deviation of a solution from ideal thermodynamic behavior; often used in connection with electrolytes.

Acute

A stimulus severe enough to rapidly induce an effect; in aquatic toxicity tests, an effect observed in 96 h or less is typically considered acute. When referring to aquatic toxicology or human health, an acute effect is not always measured in terms of lethality.

Acute Exposure

One or a series of short-term exposures generally lasting less than 24 h.

Acute Health Effect

A health effect that occurs over a relatively short period of time (e.g., minutes or hours). The term is used to describe brief exposures and effects which appear promptly after exposure.

Adaptability

Refers to the degree to which adjustments are possible in practices, processes, or structures of systems to projected or actual changes of climate. Adaptation can be spontaneous or planned, and be carried out in response to or in anticipation of changes in conditions.

Adaptation

Measures taken by societies and individuals to adapt to actual or expected adverse impacts on the environment, especially as the result of climate change.

Adaptive Capacity

The ability of a system to adjust to climate change (including climate variability and extremes) to moderate potential damages, to take advantage of opportunities, or to cope with the consequences.

Added R-Value

Thermal resistance added to a construction element by insulation.

Addition Agent

A substance added to a solution for the purpose of altering or controlling a process. Examples include wetting agents in acid pickles, brighteners or antipitting agents in plating solutions, and inhibitors.

Additive

Product added to a sewage treatment system marketed to improve performance. Additive is a Substance added in a small amount, usually to a fluid, for a special purpose, such as to reduce friction, corrosion, etc.

Add-On Control Device

An air pollution control device such as carbon absorber or incinerator that reduces the pollution in exhaust gas. The control device usually does not affect the process being controlled and thus is “add-on” technology, as opposed to a scheme to control pollution through altering the basic process itself. See also POLLUTION PREVENTION.

Adhesive

A substance used to bond materials by surface attachment.

Adsorption

Adhesion of a substance to the surface of solid bodies or liquids with which it is in contact. A physical process in which the molecules of a gas, of dissolved substances or of liquids, adhere in extremely thin layers to the exposed surface of solid substances with which they come into contact. The retention of atoms, ions or molecules

onto the surface of another substance. Refers to the surface retention or adhesion of a very thin layer of water molecules to the surfaces of a material (such as insulation fibers) with which they are in contact.

Adsorption Water

Water held on the surface of solid particles by molecular forces with the emission of heat (heat of wetting).

Advanced Primary Treatment

The use of special additives to raw wastewater to cause flocculation or clumping to help settling before the primary treatment such as screening.

Advanced Technology Partial Zero Emission Vehicle (AT PZEV)

A vehicle that meets the Partial Zero Emission Vehicle (PZEV) standard and includes zero emission vehicle enabling technologies.

Advanced Waste Treatment

Any physical, chemical, or biological treatment process used to accomplish a degree of treatment greater than that achieved by secondary treatment.

Advanced Wastewater Treatment

Any advanced process used above and beyond the defacto typical minimum primary and secondary wastewater treatment.

Adverse Health Effects

Health effects from exposure to air contaminants that may range from relatively mild temporary conditions, such as minor eye or throat irritation,

shortness of breath, or headaches, to permanent and serious conditions such as birth defects, cancer, or damage to lungs, nerves, liver, heart, or other organs.

Adverse Impact

A determination that an air-quality related value is likely to be degraded within a Class I area.

Aeolian

A term applied to deposits of soil materials transported and/or arranged by wind.

Aerated

Solution containing more than 10 PPb (Parts Per billion) oxygen.

Aerated Contact Bed

A biological treatment unit consisting of stone, cement-asbestos, or other surfaces supported in an aeration tank, in which air is diffused up and around the surfaces and settled wastewater flows through the tank; also called a contact aerator.

Aerated Pond

A natural or artificial wastewater treatment pond in which mechanical or diffused air aeration is used to supplement the oxygen supply. Aeration (1) The bringing about of intimate contact between air and a liquid by one or more of the following methods: (a) spraying the liquid in the air; (b) bubbling air through the liquid; and (c) agitating the liquid to promote surface absorption of air. (2) The supplying of air to confined spaces under nappes, downstream from gates in conduits, and so on, to relieve low pressures and to replenish air entrained and removed from such

confined spaces by flowing water. (3) Relief of the effects of cavitation by admitting air to the affected section.

Aeration

(1) Exposing to the action of air. (2) Causing air to bubble through. (3) Introducing air into a solution by spraying, stirring, or a similar method. (4) Supplying or infusing with air, as in sand or soil.

Aeration, Active

Introduction of air via either mechanical means or diffused aeration.

Aeration Cell

An oxygen concentration cell; an electrolytic cell resulting from differences in dissolved oxygen at two points. Also see DIFFERENTIAL AERATION CELL.

Aeration Chamber

Chamber or tank in which wastewater is brought into contact with air to facilitate biological degradation such as in (but not limited to) the activated sludge process.

Aeration, Diffused

Process of introducing air bubbles under pressure into a treatment unit using a compressor or blower and a diffuser (Fig. 1).

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.



Fig. 1 Diffused aeration

Aeration, Mechanical

Process of introducing air into a treatment component by physical agitation using a device such as a paddle, paddle wheel, spray nozzle or turbine.

Aeration, Passive

Process of introducing air into a treatment component without mechanical means.

Aeration Period

(1) The theoretical time, usually expressed in hours, during which mixed liquor is subjected to aeration in an aeration tank while undergoing activated-sludge treatment. It is equal to the volume of the tank divided by the volumetric rate of flow of the wastewater and return sludge. (2) The theoretical time during which water is subjected to aeration.

Aeration System

Piping, diffusers, air source, vents, and all other necessary devices for an active aeration process.

Aeration Tank

A tank in which wastewater or other liquid is aerated. A chamber for injecting air into water. The tank where raw or settled wastewater is mixed with return sludge and aerated. The same as "aeration bay," "aerator," or "reactor." Following primary treatment, contaminants dissolved in sewage are consumed by microorganisms in large tanks that are supplied with the oxygen (air) necessary for the survival of the microorganisms.

Aerator

A device that brings air and a liquid into intimate contact.

Aerial Photograph

Any photograph taken of the surface of the earth from fixed wing aircraft, helicopters, balloons or spacecraft. There are two categories of aerial photography: Vertical where an attempt is made to keep the optical axis of the camera perpendicular to the earth's surface. If the axis is exactly vertical, the photo is called a truly vertical photo and therefore contains zero TILT. However, in practice it is impossible to keep the camera axis vertical and small tilts of less than 3° are tolerated, The resultant photos are referred to as near vertical and may be regarded as equivalent to truly vertical for most photo interpretation purposes. Oblique where the optical axis is deliberately tilted away from the vertical. If it is tilted sufficiently to include the horizon, the photo is

called a high oblique and if the horizon does not appear, it is called a low oblique. Oblique aerial photographs cover more ground area than vertical aerial photographs exposed at the same altitude.

Aerial Photograph Interpretation (API)

A technique of obtaining information from aerial photographs, principally applied to the techniques involving the stereoscopic viewing of the photographs. This method enables the evaluation of terrain in three dimensions. It is basically a deductive process that requires conscious or subconscious consideration of the elements of the image. The quality, reliability and efficiency of any interpretation are dependent on the personal experience and expertise of the interpreter. The acquisition of such knowledge, either by field examination to establish ground truth, or by the study of available maps and reports, should, therefore be considered an essential part of any photo-interpretation job. API involves some basic steps: examine the photographs to get a three-dimensional perception: identify ground conditions by observing certain elements appearing in the photographs: and analyzing specific problems by the association of ground conditions with one's background experience. No other technique can provide a three-dimensional overview of the terrain from which the inter-relations of topography, drainage, surface cover, geologic materials, and human activities on the landscape can be viewed and evaluated.

Aerobic

In the presence of, or requiring, oxygen. Wastewater treatment depending on oxygen for bacterial breakdown of waste.

Aerobic Bacteria

Bacteria that require free (elementary) oxygen for growth.

Aerobic Composting

It is a method of composting organic waste using bacteria that need oxygen. This requires that the waste be exposed to air either by turning or by forcing air through pipes that pass through the material.

Aerobic Condition

Descriptive of a condition in which dissolved oxygen is present.

Aerobic Digestion

The breakdown of suspended and dissolved organic matter in the presence of dissolved oxygen. An extension of the activated-sludge process, waste sludge is stored in an aerated tank where aerobic microorganisms break down the material.

Aerobic Lagoon

An oxygen-containing lagoon, often equipped with mechanical aerators, in which wastewater is partially stabilized by the metabolic activities of bacteria and algae (Fig. 2). Small lagoons (less than 0.5 ac [0.2 ha] and less than 3-ft [0.9-m] deep) may remain aerobic without mechanical aeration. See also ANAEROBIC LAGOON.

Aerobic Treatment Unit (ATU)

A mechanical wastewater treatment unit that provides secondary wastewater treatment for a single home, a cluster of homes, or a commercial establishment by mixing air (oxygen) and aerobic and facultative microbes with the wastewater. ATUs typically use a suspended growth process (such as activated sludge-extended aeration and batch reactors), a fixed-film process (similar to a trickling filter), or a combination of the two treatment processes.

Aerobic Wastewater Treatment System

An Aerobic Wastewater Treatment System is an aerobic biological wastewater treatment system, usually producing secondary treatment.

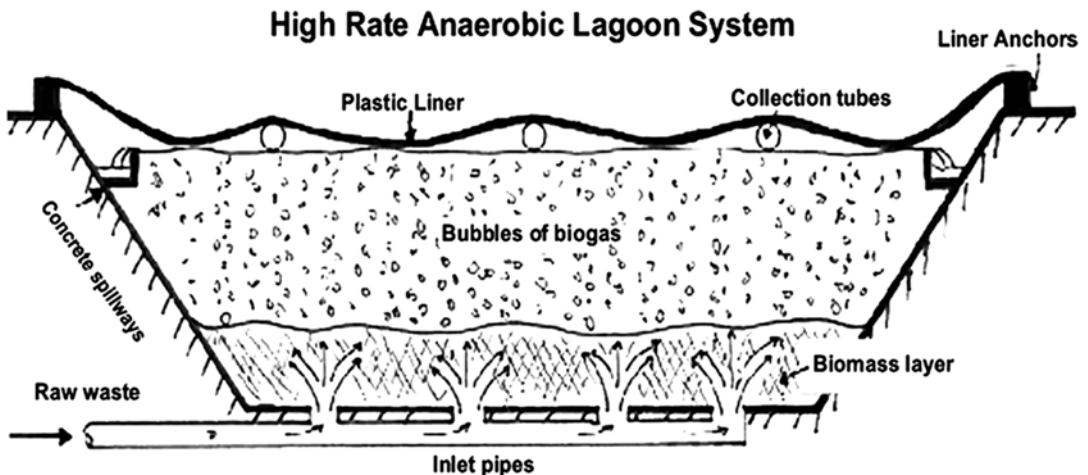


Fig. 2 Aerobic lagoon

Aerometric Information Retrieval System (AIRS)

A computer-based repository of US air pollution information administered by the EPA Office of Air Quality Planning and Standards.

Aerogel

A homogeneous, low-density solid state material derived from a gel, in which the liquid component of the gel has been replaced with a gas. The resulting material has a porous structure with an average pore size below the mean free path of air molecules at standard atmospheric pressure and temperature.

Aerosol

A suspension, in a gaseous medium, of solid particles, liquid particles, or solid particles and liquid particles, having a negligible falling velocity. (Note: In physics, an upper value is arbitrarily assigned to the dimensions of particles capable of constituting an aerosol, adopting for the place being considered a maximum limit for the falling velocity. It is defined as being that of a spherical particle of density equal to 103 kg/m^3 and of diameter $100 \text{ }\mu\text{m}$, falling under the effect of its own weight in an immobile gas at a temperature of $20 \text{ }^\circ\text{C}$ and at a pressure of 101.3 kPa . In air, under a gravitational acceleration of 9.81 m/s^2 , this speed is 0.25 m/s .)

Aeration Chamber

Chamber or tank in which wastewater is brought into contact with air to facilitate biological degradation such as in (but not limited to) the activated sludge process.

Aeration System

Piping, diffusers, air source, vents, and all other necessary devices for an active aeration process.

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 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.

Aerobic Treatment Unit (ATU)

(1) Treatment component that utilizes oxygen to degrade or decompose wastewater, with or without mechanical means; (2) Term traditionally used to describe proprietary devices that use direct introduction of air into wastewater by mechanical means to maintain aerobic conditions within the pre-treatment component.

Aerobic Wastewater Treatment

Oxygen dependent wastewater treatment requiring the presence of oxygen for aerobic bacterial breakdown of waste.

Aethalometer

An aerosol monitoring instrument that continuously measures particle light absorption (aerosol black carbon) on a quartz fibre filter.

Afforestation

The establishment of a forest on land that has not previously, or not recently, been timbered. The planting of new forests on lands where the preceding vegetation or land did not contain forests.

Afterburner

An air pollution abatement device that removes undesirable organic gases through incineration. In incinerator technology, a burner located so that the combustion gases are made to pass through its flame in order to remove smoke and odours. It may be attached to or be separated from the incinerator proper.

Age Hardening

Hardening by aging, usually after rapid cooling or cold working.

Agglomerate

A collection of solid particles adhering to each other.

Agglomeration

The grouping, or coming together of dispersed suspended matter into larger particles, which settle more rapidly. The action leading to the formation of agglomerates (Fig. 3). The coalescence of

flocks or particles of suspended matter to form larger flocks or particles which settle or may be caused to float more readily.

Agglutination

The action of joining, by impact, solid particles coated with a thin adhesive layer or of trapping solid particles by impact on a surface coated with adhesive.

Aggradation

The process of building up of surfaces, such as streambeds or floodplains, by the deposition of sediment and/or colluviums.

Aggregate

(1) Primary soil particles that cohere to each other more strongly than other surrounding particles. (2) Naturally-occurring inorganic material (crushed rock or gravel) screened to sizes for various uses. (3) A relatively stable assembly of dry particles, formed under the influence of physical forces.

Aging

A change in the properties of certain metals and alloys that occurs at ambient or moderately elevated temperatures after hot working or a heat treatment (quench aging in ferrous alloys, natural

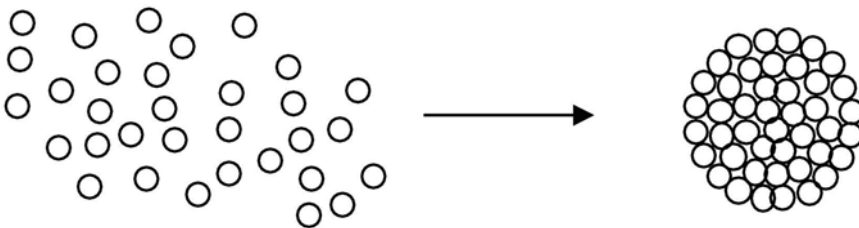


Fig. 3 Agglomeration

or artificial aging in ferrous and non-ferrous alloys) or after a cold working operation (strain aging). The change in properties is often but not always, due to a phase change (precipitation), but never involves a change in chemical composition of the metal or alloy.

Agitator

Mechanical apparatus for mixing or aerating. A device for creating turbulence.

Agricultural Residue

Plant parts, primarily stalks and leaves, not removed from the fields with the primary food or fibre product. Examples include corn Stover (stalks, leaves, husks, and cobs); wheat straw; and rice straw.

Agroforestry

The integration of commercial tree growing into the operation of a farming enterprise. It involves the commercial utilization of native trees as well as the planting and management of quicker-growing trees through afforestation. The aim is to ensure a long term viable enterprise based on timber and lumber products, as part of the overall farm operation.

Agronomy

The study of land management and associated practices for the establishment, growth and use of crops and pastures involves an understanding of soils, land, climate, plant characteristics and animal husbandry in relation to crop and pasture production.

AHERA

Asbestos Hazards Emergency Response Act.

AIM

Architectural and industrial maintenance (coatings).

Air

So-called “pure” air is a mixture of gases containing about 78% nitrogen; 21% oxygen; less than 1% of carbon dioxide, argon, and other inert gases; and varying amounts of water vapour.

Air Barrier

A layer of material resistant to air flow usually in the form of polyolefin. A material that is applied in conjunction with a building component (such as a wall, ceiling or sill plate) to prevent the movement of air through that component.

Air Barrier System

The assembly of components used in building construction to create a plane of air tightness throughout the building envelope and to control air leakage.

Air Basins

Areas defined by geographical or administrative boundaries; used for air pollution control programs.

Air-Bound

Obstructed, as to the free flow of water, because of air entrapped in a high point; used to describe a pipeline or pump in such condition.

Air Chamber

A closed pipe chamber installed on the discharge line of a reciprocating pump to take up irregularities in hydraulic conditions, induce a uniform flow in suction and discharge lines, and relieve the pump of shocks caused by pulsating flow.

Air-Chamber Pump

A displacement pump equipped with an air chamber in which the air is alternately compressed and expanded by the water displaced by the pump, resulting in the water being discharged at a more even rate.

Air Changes Per Hour

An expression of ventilation rates—the number of times in an hour that a home's entire air volume is exchanged with outside air.

Air Diffuser

Devices of varied design that transfer oxygen from air into a liquid.

Air Diffusion

The transfer of air into a liquid through an oxygen-transfer device. See DIFFUSION.

Air Duct

Ducts, usually made of sheet metal, that carry cooled or heated air to all rooms.

Air Filters

Adhesive filters made of metal or various fibres that are coated with an adhesive liquid to which particles of lint and dust adhere. These filters will remove as much as 90% of the dirt if they do not become clogged. The more common filters are of the throwaway or disposable type.

Air Gap

The unobstructed vertical distance through the free atmosphere between the lowest opening from any pipe or outlet supplying water to a tank, plumbing fixture, or other device, and the flood-level rim of the receptacle.

Air Hawks

Rectangular shaped vents at the attic rooftops.

Air Infiltration

The amount of air leaking in and out of a building through cracks in walls, windows and doors.

Air Intake

An opening in a building's envelope whose purpose is to allow outside air to be drawn in to replace inside air.

Air Lift

A device for raising liquid by injecting air in and near the bottom of a riser pipe submerged in the liquid to be raised.

Air-Lift Pump

A pump, used largely for lifting water from wells, from which fine pressured air bubbles are discharged into the water at the bottom of the well.

The bubbles reduce the density of the water at the bottom, allowing the denser surrounding water to push it up in the discharge pipe to the outlet. Also called an air lift.

Air Light

Light scattered by air (molecules or particles) toward an observer, reducing the contrast of observed images.

Air Lock

(1) Condition in a pressurized distribution system where the presence of air or other gases prevents flow; (2) Condition where air or other gases collect at a high point in a gravity distribution system and prevent or restrict flow.

Air Monitoring

Sampling for and measuring of pollutants present in the atmosphere.

Air Parcel

A volume of air that tends to be transported as a single entity.

Air Pollutant

Any material emitted into the atmosphere either by human activity or natural processes and adversely affecting man or the environment. Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in the form of solid particles, liquid droplets, gases, or in combination thereof. Generally, they fall into

two main groups (1) those emitted directly from identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photo activation. Exclusive of pollen, fog, and dust, which are of natural origin, about 100 contaminants have been identified. Air pollutants are often grouped in categories for ease in classification; some of the categories are solids, sulfur compounds, volatile organic chemicals, particulate matter, nitrogen compounds, oxygen compounds, halogen compounds, radioactive compound, and odours.

Air Pollution

Usually the presence of substances in the atmosphere resulting either from human activity or natural processes, present in sufficient concentration, for a sufficient time and under circumstances such as to interfere with comfort, health or welfare of persons or the environment. Air Pollution is the presence of polluting gases and suspended particles in the atmosphere in excess of air quality standards.

Air Pollution Bandings

The Air Pollution Information Service uses four bands to describe levels of pollution. The bands are Low, Moderate, High and Very High. Healthy people do not normally notice any effects from air pollution, except occasionally when air pollution is "Very High".

Air Pollution Control Device

Mechanism or equipment that cleans emissions generated by a source (e.g. an incinerator, industrial smokestack, or an automobile exhaust system) by removing pollutants that would otherwise be released to the atmosphere.

Air Quality Criteria

The varying amounts of pollution and lengths of exposure at which specific adverse effects to health and comfort take place.

Air Quality Index (AQI)

A numerical index used for reporting severity of air pollution levels to the public. It replaces the formerly used Pollutant Standards Index (PSI). AQI incorporates five criteria pollutants—ozone, particulate matter, carbon monoxide, sulfur dioxide, and nitrogen dioxide—into a single index. AQI levels range from 0 (Good air quality) to 500 (Hazardous air quality). The higher the index, the higher the level of pollutants and the greater the likelihood of health effects.

Air Quality Management Area (AQMA)

If a Local Authority identifies any locations within its boundaries where the Air Quality Objectives are not likely to be achieved, it must declare the area as an Air Quality Management Area (AQMA). The area may encompass just one or two streets, or it could be much bigger. The Local Authority is subsequently required to put together a plan to improve air quality in that area—a Local Air Quality Action Plan.

Air Quality Management District (AQMD)

Local agency charged with controlling air pollution and attaining air quality standards.

Air Quality Objectives

The Air Quality Objectives are policy targets generally expressed as a maximum ambient concentration to be achieved, either without exception or with a permitted number of exceedances,

within a specified timescale. The Objectives are set out in the UK Governments Air Quality Strategy for the key air pollutants.

Air Quality Plan (AQP)

A plan developed to attain and maintain an air quality standard.

Air Quality Simulation Model

A mathematical relationship between emissions and air quality which simulates on a computer the transport, dispersion and transformation of compounds emitted into the air.

Air Quality Standard (AQS)

The prescribed level of a pollutant in the outside air that should not be exceeded during a specific time period to protect public health. Established by both federal and state governments. The level of pollutants prescribed by regulations that are not being exceeded during a given time in a defined area.

Air Release

Allowing air to escape during pressurization of a distribution system using an air/vacuum release valve.

Air Scour

The use of air either alone or in combination with backwash to enhance filter cleaning.

Air Space

The area between insulation facing and interior of exterior wall coverings. Normally a 1" air gap.

Air Stripping

A technique for removal of volatile substances from a solution; employs the principles of Henry's Law to transfer volatile pollutants from a solution of high concentration into an air stream of lower concentration. The process ordinarily is designed so that the solution containing the volatile pollutant contacts large volumes of air. The method is used to remove ammonia in advanced waste treatment.

Air Tightness

Describes the leakiness of the building fabric.

Air Toxic

Any air pollutant for which a national ambient air quality standard does not exist (i.e., excluding ozone, carbon monoxide, PM10, sulfur dioxide, and nitrogen dioxide) that may reasonably be anticipated to cause cancer, developmental effects, reproductive dysfunctions, neurological disorders, heritable gene mutations or other serious or irreversible chronic or acute health effects in humans.

Air Valve

An air valve is a valve used on pipes to release air trapped within the pipes as a result of filling or emptying it. Air valves are situated on high points of the pipeline.

Airway

A space between roof insulation and roof boards provided for movement of air.

Airborne Particulates

Total suspended particulate matter found in the atmosphere as solid particles or liquid droplets. Chemical composition of particulates varies

widely, depending on location and time of year. Sources of airborne particulates include dust, emissions from industrial processes, combustion products from the burning of wood and coal, combustion products associated with motor vehicle or non-road engine exhausts, and reactions to gases in the atmosphere.

AIRS

Aerometric Information Retrieval Subsystem, the US EPA's main air pollution database system. It includes ambient monitoring and meteorological data (stored in SAROAD before 1987) in the Air Quality Subsystem (AQS) and compliance and permit data in the AIRS Facility Subsystem (AFS). Until recently, AFS also contained source emission data, but those data are moving to the EPA's NET database system and soon to the new NEI. For a while, there was also an Area and Mobile Sources subsystem, but it has been shut down. The EPA has more information on AIRS and also provides data from AIRS through the web.

Air Shed

A term denoting a geographical area of which, because of topography, meteorology, and climate, shares the same air (see AIR BASINS).

Airspace

A volume in a water storage, which is kept empty for the purpose of mitigating potential floods.

Alarm

Device that provides information on the status of a component using a visual and/or audible device; can either be on site or remotely located.

Albedo

The amount of solar radiation reflected from an object or surface, often expressed as a percentage.

Alclad

Composite wrought product comprised of an aluminum alloy core having on one or both surfaces a metallurgically bonded aluminum or aluminum alloy coating that is anodic to the core and thus electrochemically protects the core against corrosion.

Alcove

A moderately inclined to very steep open depression with concave cross-section, such as the recess created in a hill/slope as the result of a slump.

Algal Bloom

A large, visible mass of algae found in bodies of water such as lakes or estuaries. Blooms occur most often during warm weather, but may also occur at other times of the year. Color ranges from green to red.

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 Assay

An analytical procedure that uses specified nutrients and algal inoculums to identify the limiting algal nutrient in water bodies.

Algal Bloom

Large masses of microscopic and macroscopic plant life, such as green algae, occurring in bodies of water.

Alkali Generally

Any substance that has highly basic properties; used particularly with reference to the soluble salts of sodium, potassium, calcium, and magnesium.

Alkali Metal

A metal in group 1A of the periodic system—namely, lithium, sodium, potassium, rubidium, cesium, and francium. They form strongly alkaline hydroxides, hence the name.

Alkaline

The condition of water, wastewater, or soil that contains a sufficient amount of alkali substances to raise the pH above 7.0. Alkaline is Having properties of an alkali. (2) Having a pH greater than 7.

Alkaline Cleaner

A material blended from alkali hydroxides and such alkaline salts as borates, carbonates, phosphates, or silicates. The cleaning action may be enhanced by the addition of surface-active agents and special solvents.

Alkaline Soil

A soil giving an alkaline reaction throughout most or all of the soil profile (precisely, above a pH of 7.0; practically, above a pH of 8.0). Many alkaline soils have a high pH indicated by the presence of calcium carbonate, and are suitable for agriculture. However, others are problem soils because of salinity and/or sodicity. Soils with a pH above 9.5 are generally unsuitable for agriculture. See also SODIC SOIL, SALINE, SOIL, pH.

Alkalinity

The capacity of water to neutralize acids; a property imparted by carbonates, bicarbonates, hydroxides, and occasionally borates, silicates,

and phosphates. It is expressed in milligrams of equivalent calcium carbonate per litre (mg/L CaCO₃).

Alkyd

Resin used in coatings. Reaction products of polyhydric alcohols and polybasic acids.

Alkyl Benzene Sulfonate (ABS)

A type of surfactant, or surface active agent, present in synthetic detergents in the United States prior to 1965. ABS was troublesome because of its foam-producing characteristics and resistance to breakdown by biological action. ABS has been replaced in detergents by linear alkyl sulfonate, which is biodegradable.

Alkylation

(1) A chemical process in which an alkyl radical is introduced into an organic compound by substitution or addition. (2) A refinery process for chemically combining isoparaffin with olefin hydrocarbons.

Alligatoring

(1) Pronounced wide cracking over the entire surface of a coating having the appearance of alligator hide. (2) The longitudinal splitting of flat slabs in a plane parallel to the rolled surface. Also called fish-mouthing.

Allocation Announcement

The basis upon which Water Allocation is calculated from time to time. It may take the form of an Initial Announcement at the beginning of the Water Year or a Supplementary Announcement during the Water Year. It is expressed as a percentage of Entitlement.

Allowances

An authorization to emit, during a specified year, up to one ton of carbon dioxide equivalent.

Alloy Plating

The code position of two or more metallic elements.

Alloy Steel

Is one that contains either silicon or manganese in amounts in excess of those quoted in plain carbon steel or that contains any other element, or elements, as the result of deliberately made alloying additions.

Alluvial

Pertaining to processes or materials associated with transportation or deposition of sediment by water. Describes material deposited by, or in transit in, flowing water.

Alluvial Fan

An accretion of sediments in a flow line characterized by radial slope lines inclined away from a point, giving it a typical fan' shape. Such deposits may build up to eventually block and divert flows.

Alluvial Plain

A large flat area of alluvium. Although it includes floodplains, the preferred use of the term is to describe former floodplains where there is no recent accumulation of sediment.

Alluvial Soil

A soil developed from recently deposited alluvium, normally characterised by little or no modification of the deposited material by soil-forming

processes, particularly with respect to soil horizon development. (1) Soil developing from sediments (alluvium) recently deposited by running water of streams and rivers and exhibiting essentially no horizon development or modification of the recently deposited materials; (2) When capitalized, it refers to a great soil group of the azonal order consisting of soils with little or no modification of the recent sediment in which they are forming.

Alluvium

Deposits of clay, silt, sand, gravel, or other particulate material that has been deposited by a stream or other body of running water in a streambed, on a flood plain, on a delta, or at the base of a mountain. An extensive stream-laid deposit of unconsolidated material, including gravel, sand, silt and clay. Typically it forms floodplains that develop alluvial soils.

Alpha Factor

In an activated sludge plant, the ratio of the oxygen transfer coefficient in mixed liquor to the oxygen transfer coefficient in clean water.

Alpha Iron

The body-centered cubic form of pure iron, stable below 910 °C (1670 °F).

Alternate-Immersion Test

A corrosion test in which the specimens are intermittently exposed to a liquid medium at definite time intervals.

Alteration

Modification of a wastewater treatment system on the basis of: an increase in the volume of permitted flow; a change in the nature of permitted

influent; a change from the planning materials approved by the permitting authority; a change in construction; or an increase, lengthening, or expansion of the treatment or dispersal system.

Alternate Meter

A Meter (or series of meters) attached to the device which drives the extraction pump at a Licensed Work.

Alternating Drain Fields

Final treatment and dispersal component that is comprised of multiple soil treatment areas which are independently dosed.

Alternative Energy

Energy that is not popularly used and is usually environmentally sound, such as solar or wind energy (as opposed to fossil fuels).

Alternative Fibres

Fibres produced from non-wood sources for use in paper making.

Alternative Fuels

Fuels that can replace ordinary gasoline. Alternative fuels may have particularly desirable energy efficiency and pollution reduction features. Alternative fuels include compressed natural gas, alcohols, liquefied petroleum gas (LPG), and electricity.

Alternative Transportation

Modes of travel other than private cars, such as walking, bicycling, rollerblading, carpooling and transit.

Altitude Valve

An altitude valve is a type of valve typically found in a storage tank of a water distribution system. It closes to prevent the storage tank from overflowing when a pres-set level is reached, but will remain open while the level is below the set point.

Aluminizing

Process for impregnating the surface of a metal with aluminium in order to obtain protection from oxidation and corrosion.

Aluminium (Al)

Aluminium is one of the main components of the most common rock species. Increased acidification in the soil releases aluminium which travels in the and then runs into the sea and lakes where it has a negative effect on the reproductive capability of fish and birds, for example. The metal aluminium is made from bauxite. Its production consumes a huge amount of energy, but at the same time aluminium is easy to recycle many times.

Aluminium Foil

Thin sheet of rolled aluminium (0.15 mm thick and under).

Alum, Aluminium Sulphate

[$\text{Al}_2(\text{SO}_4)_3 \cdot 18\text{H}_2\text{O}$] Used as a coagulant in filtration. Dissolved in water, it hydrolyzes into $\text{Al}(\text{OH})_3$ and sulfuric acid (H_2SO_4). To precipitate the hydroxide, as needed for coagulation, the water must be alkaline.

Amalgam

An alloy of mercury with one or more other metals.

Ambient

Pertaining to the current environmental condition; ambient monitoring evaluates water quality periodically at fixed locations; data collected over long periods of time help determine the status and trends of water quality of a particular body of water. Generally refers to the prevailing dynamic environmental conditions in a given area.

Ambient Air

Outside air; any portion of the atmosphere not confined by walls and a roof.

Amendment

A change or addition to an existing law or rule.

Amenities

Benefits of a property, such as nearby playgrounds, swimming pools, community centres or parks.

American Society for Testing and Materials (ASTM)

A non-profit organization that provides a forum for producers, consumers and representatives of government and industry to write laboratory test standards for materials, products, systems and services. ASTM publishes standard test methods, specifications, practices, guides, classifications and terminology.

Ammeter

An instrument for measuring the magnitude of electric current flow.

Ammonia (NH_3)

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

Ammonia, Ammonium

(NH₃, NH₄¹) Urea and proteins are degraded into dissolved ammonia and ammonium in raw wastewaters. Typically, raw wastewater contains 30–50 mg/L of NH₃. Reactions between chlorine and ammonia are important in disinfection.

Ammonia Nitrogen

The quantity of elemental nitrogen present in the form of ammonia (NH₃).

Ammoniator

Apparatus used for applying ammonia or ammonium compounds to water.

Ammonification

Bacterial decomposition of organic nitrogen to ammonia.

Ammonia Stripping

A method of removing ammonia content from water by making it alkaline, and aerating.

Amoeba

A group of simple protozoans, some of which produce diseases such as dysentery in humans.

Amorphous Solid

A rigid material whose structure lacks crystalline periodicity; that is, the pattern of its constituent atoms or molecules does not repeat periodically in three dimensions.

Ampere

The unit of measurement of electrical current. It is proportional to the quantity of electrons flowing through a conductor past a given point in one second and is analogous to cubic feet of water flowing per second. It is the current produced in a circuit by one volt acting through a resistance of one ohm.

Amperometric

Pertaining to measurement of electric current flowing or generated, rather than by voltage.

Amphoteric

A term applied to oxides and hydroxides which can act basic toward strong acids and acidic toward strong alkalis. Substances which can dissociate electrolytically to produce hydrogen or hydroxyl ions according to conditions.

Anchor Pattern/Surface Profile

Shape and amplitude of profile of blast cleaned or grooved steel which influences the bond between metallic or paint of films and the substrate.

Anchorite

A zinc-iron phosphate coating for iron and steel.

Anaerobic

Wastewater treatment in which bacteria breakdown waste without using oxygen.

Anaerobic Bacteria

Bacteria that grow in the absence of free oxygen and derive oxygen from breaking down complex substances.

Anaerobic Decomposition

Decomposition of cellulose and proteins occurring in the absence of oxygen, such as in landfill waste, producing methane and carbon dioxide. Anaerobic bioreactors increase the rate of methane generation, which can then be collected and used for energy recovery.

Anaerobic Digestion

The degradation of concentrated wastewater solids, during which anaerobic bacteria break down the organic material into inert solids, water, carbon dioxide, and methane.

Anaerobic Lagoon

A wastewater or sludge treatment process that involves retention under anaerobic conditions.

Anaerobic Wastewater Treatment

Wastewater treatment in the absence of oxygen, anaerobic bacteria breakdown waste.

Ancient Forest

A forest that is typically older than 200 years with large trees, dense canopies and an abundance of diverse wildlife.

Angle of Repose

The stable angle between the horizontal and the maximum slope that loose material assumes through the influence of gravity.

Animal Feeding Operation (AFO)

Lot or facility (other than an aquatic animal production facility) where the following conditions are met:

- Animals (other than aquatic animals) have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period, and
- Crops, vegetation, forage growth, or post-harvest residues are not sustained in the normal growing season over any portion of the lot or facility.

Anion

A negatively charged ion attracted to the anode under the influence of electrical potential.

Anionic Flocculants

A polyelectrolyte with a net negative electrical charge.

Announcement

An Announcement is made to a Water Source and Access License Category and applies to all Access Licenses in the Water Source with that License Category. The key elements of an Announcement are:

- Water Source
- License Category
- Announcement Type
- Date or period that the Announcement applies to
- Percentage Allocation—transaction change to apply to the Access License.

Anoxic

Condition in which all constituents are in their reduced form (no oxidants present); conditions in a septic tank are generally anaerobic, but not anoxic.

Condition in which oxygen is available in the combined form only; there is no free oxygen. Anoxic sections in an activated-sludge plant may be used for denitrification.

Annealing

A generic term denoting a treatment, consisting of heating to and holding at a suitable temperature, followed by cooling at a suitable rate, used primarily to soften metallic materials, but also to simultaneously produce microstructure. The purpose of such changes may be, but is not confined to improvement of machinability, facilitation of cold work, improvement of mechanical or electrical properties and/or increase in stability of dimensions. When the term is used by itself, full annealing is implied. When applied only for the relief of stress, the process is properly called stress relieving or stress-relief annealing.

Annual Arithmetic Mean

The mean (average) of a set of values of a variable over a calendar year. The arithmetic mean is equal to the sum of all the readings divided by the number of readings.

Annual Exceedance Probability

The chance that a particular storm or flood event will be equalled or exceeded in any year, expressed as a percentage. It is the reciprocal of return period. For example, a 20 year return period is equivalent to a 5% annual exceedance probability.

Annual Geometric Mean

The geometric average of a set of values of a variable over a calendar year. The geometric mean is the n th root of the product of n readings,

usually calculated as the antilogarithm of the average of the logarithms of the data points. This statistic has been used to compile total suspended particulate data, for example.

Annual Use Limit

This is the maximum Annual Usage allowable for the Access Licence. It is defined as a percentage of the Annual Share Component for the Access Licence.

Anode

An electrode at which oxidation of the surface or some component of the solution is occurring.

Anode Corrosion

The dissolution of a metal acting as an anode.

Anode Corrosion Efficiency

Ratio of actual to theoretical corrosion based on the total current flow calculated by Faraday's law from the quantity of electricity that has passed.

Anode Effect

The effect produced by polarization of the anode in electrolysis. It is characterized by a sudden increase in voltage and a corresponding decrease in amperage due to the anode becoming virtually separated from the electrolyte by a gas film.

Anode Efficiency

Current efficiency of the anode.

Anode Film

(1) The portion of solution in immediate contact with the anode, especially if the concentration gradient is steep. (2) The outer layer of the anode itself.

Anode Polarization

Difference between the potential of an anode passing current and equilibrium potential (or steady-state potential) of the electrode having the same electrode reaction.

Anodic Cleaning

Electrolytic cleaning in which the work is the anode. Also called reverse-current cleaning.

Anodic Coating

A film on a metal surface resulting from an electrolytic treatment at the anode.

Anodic Inhibitor

A chemical substance or combination of substances that prevent or reduce, by physical, physiochemical or chemical action, the rate of the anodic or oxidation reaction.

Anodic Metallic Coating

A coating, composed wholly or partially of an anodic metal (in sufficient quantity to set off electrochemical reaction) which is electrically positive to the substrate to which it is applied.

Anodic Polarization

The change in the initial anode potential resulting from current flow effects at or near the anode surface. Potential becomes more noble (more positive) because of anodic polarization.

Anodic Potential

An appreciable reduction in corrosion by making a metal an anode and maintaining this highly polarized condition with very little current flow.

Anodic Protection

A technique to reduce corrosion of a metal surface under some conditions, by passing sufficient anodic current to it to cause its electrode potential to enter and remain in the passive region.

Anodic Reaction

Electrode reaction equivalent to a transfer of positive charge from the electronic to the ionic conductor. An anodic reaction is an oxidation process. An example common in corrosion is: $\text{Me} \sim \text{Me}^{n+} + n\text{e}$.

Anodizing

Forming a conversion coating on a metal surface by anodic oxidation; most frequently applied to aluminum.

Anolyte

The electrolyte adjacent to the anode in an electrolytic cell.

Antagonism

Detrimental interaction between two entities.

Antecedent Moisture Content

The moisture content of a soil prior to a rainfall event. It has an important influence on the likelihood of runoff occurring as a result of subsequent rainfall, because antecedent moisture restricts the amount of infiltration which can take place.

Anthric Saturation

Variation of episaturation associated with controlled flooding, which causes a reduced environment in a soil layer and oxidation of mobilized iron and manganese in a deeper unsaturated subsoil.

Anthropogenic

Made by people or resulting from human activities. Usually used in the context of emissions that are produced as a result of human activities.

Anti-Abrasive Coating

Cushioning material applied where insulation contacts the pipe, duct, vessel or adjacent insulation to prevent eroding of either or both.

Antichlors

Reagents, such as sulfur dioxide, sodium bisulfite, and sodium thiosulfate, that can be used to remove excess chlorine residuals from water or watery wastes by conversion to an inert salt.

Anticorrosion Treatment

Treatment to reduce or eliminate corrosion-producing qualities of a water.

Ant Degradation

Policies which ensure protection of water quality for a particular water body where the water quality exceeds levels necessary to protect fish and wildlife propagation and recreation on and in the water. This also includes special protection of waters designated as outstanding natural resource waters. Antidegradation plans are adopted by each state to minimize adverse effects on water.

Anti-Fouling

Intended to prevent fouling of under-water structures, such as the bottoms of ships; refers to the prevention of marine organism's attachment or growth on a submerged metal surface, generally through chemical toxicity caused by the composition of the metal or coating layer.

Antipitting Agent

An addition agent for electroplating solutions to prevent the formation of pits or large pores in the electrodeposit.

Anti-Siphon Device

Any device in a supply line designed to return pressure to atmospheric conditions in order to prevent undesired water movement (such as water siphoning out of pump tank); includes valves, vent holes, spit tubes, etc.

Anti-Vortex Device

A device, usually a vertical or horizontal plate, placed at the entrance of a pipe to prevent the formation of a vortex (whirlpool effect) in the water at the pipe entrance.

An Open Dump

An open dump is a facility that does not meet the criteria for a sanitary landfill and is not a facility for disposal of hazardous waste.

ANSI

The American National Standards Institute, the private non-profit organization that administrates and coordinates the U.S. private-sector voluntary standardization system. It is the US member organization of ISO.

APCD

Air Pollution Control District. Here, the Louisville Metro Air Pollution Control District (also known as the Air Pollution Control District of Jefferson County).

APCDJC

The Air Pollution Control District of Jefferson County (Kentucky), now called the Louisville Metro Air Pollution Control District.

Apedal

Describes a soil in which none of the soil material occurs in the form of peds in the moist state. Such a soil is without apparent structure and is typically massive or single grained. When disturbed it separates into primary particles or fragments which may be crushed to primary particles.

Apparent Contrast

Contrast at the observer of a target with respect to some background, usually an element of horizon sky directly above the target.

Appropriation Doctrine

The system for allocating water to private individuals used in most Western states. The doctrine of Prior Appropriation was in common use throughout the arid west as early settlers and miners began to develop the land. The prior appropriation doctrine is based on the concept of "First in Time, First in Right." The first person to take a quantity of water and put it to Beneficial Use has a higher priority of right than a subsequent user. Under drought conditions, higher priority users are satisfied before junior users receive water. Appropriative rights can be lost

through non-use; they can also be sold or transferred apart from the land. Contrasts with Riparian Water Rights.

Appurtenances Machinery

Appliances, or auxiliary structures attached to a main structure enabling it to function, but not considered an integral part of it.

Apron

A layer of concrete, stone, timber, or other relatively permanent material placed at the entrance or outlet of a hydraulic structure, such as a culvert or chute, in the channel bed, to protect the structure against erosion.

Aquaculture

The controlled rearing of fish or shellfish by people or corporations who own the harvestable product, often involving the capture of the eggs or young of a species from wild sources, followed by rearing more intensively than possible in nature.

Aquatic Bench

A 10–15 foot wide bench around the inside perimeter of a permanent pool that ranges in depth from 0 to 12 inches—vegetated with emergent plants, it augments pollutant removal, provides habitats, protects the shoreline from the effects of water level fluctuations and enhances safety.

Aqueduct

A pipe, conduit, or channel designed to transport water from a remote source, usually by gravity.

Aqueous

Pertaining to water; an aqueous solution is a water solution.

Aqueous Vapor

The gaseous form of water. See WATER VAPOR.

Aquic Moisture Regime

Primarily reducing soil moisture regime nearly free of dissolved oxygen due to saturation by groundwater or its capillary fringe and occurring during periods when the soil temperature 50 cm (20 inches) below the surface is greater than 5 °C (41 °F).

Aquic Conditions

Continuous or periodic saturation and reduction indicated by redoximorphic features and verified by measuring saturation and reduction of the soil.

Aquifer

A geologic formation capable of transmitting significant quantities of groundwater under normal hydraulic gradients. Water-bearing formation

(bed or stratum) of permeable rock, sand, or gravel capable of yielding significant quantities of water. An underground geological formation or group of formations containing usable amounts of groundwater that can supply wells and springs.

Aquifer (Confined)

Soil or rock below the land surface that is saturated with water. There are layers of impermeable material both above and below it and it is under pressure so that when the aquifer is penetrated by a well, the water will rise above the top of the aquifer (Fig. 4).

Aquifer (Unconfined)

An aquifer whose upper water surface (water table) is at atmospheric pressure, and thus is able to rise and fall (Fig. 5).

Aquifer

A porous soil or geological formation, often lying between impermeable sub-surface strata, which holds water and through which water can percolate slowly over long distances and which yields ground water to springs and wells. Aquifers may, however, be unconfined and the water level subject to seasonal inflow. An AQUITAnO is also

Fig. 4 Confined aquifer

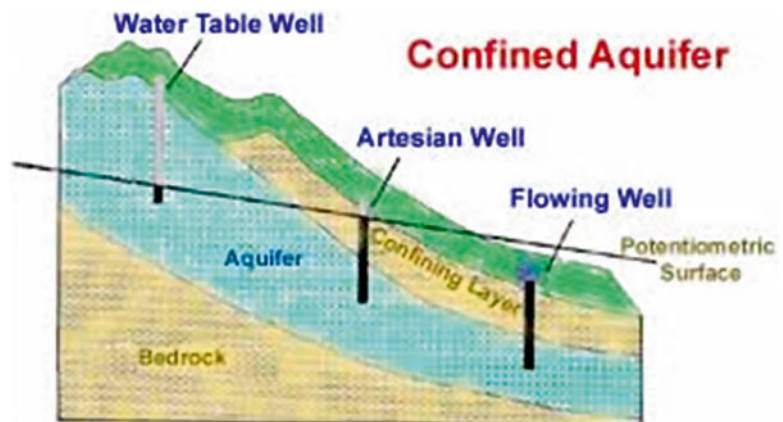
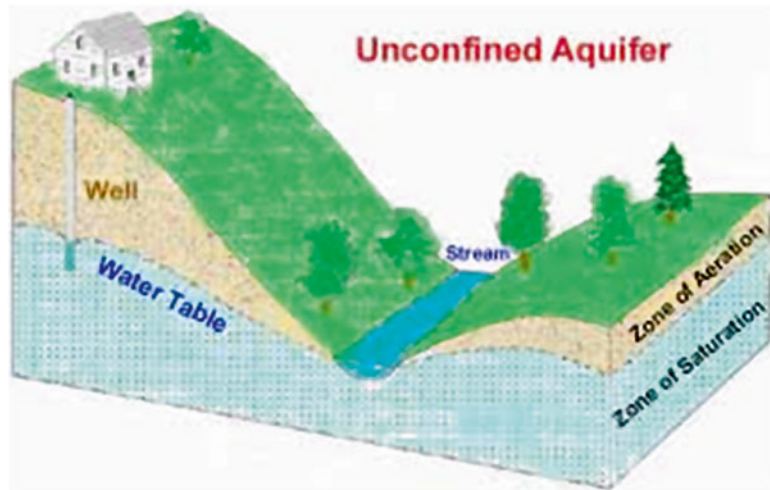


Fig. 5 Unconfined aquifer



a groundwater bearing formation but is insufficiently permeable to transmit and yield water in usable quantities.

Aquifer Compaction

The reduction in the porosity (pore spaces) of an aquifer, and may result from over pumping the aquifer.

Aquifer License

A licence granting access to using an amount of water from an aquifer.

Aquitard

A geologic formation that may contain groundwater but not capable of transmitting significant quantities of groundwater under normal hydraulic gradients.

Area Drain

A drain installed to collect surface or stormwater from an open area of a building.

Area Sources

Those sources for which a methodology is used to estimate emissions. This can include area-wide, mobile and natural sources, and also groups of stationary sources (such as dry cleaners and gas stations). The federal air toxics program defines a source that emits less than 10 tons per year of a single hazardous air pollutant (HAP) or 25 tons per year of all HAPs as an area source.

Area-Wide Sources

Sources of pollution where the emissions are spread over a wide area, such as consumer products, fireplaces, road dust and farming operations. Area-wide sources do not include mobile sources or stationary sources.

Areal Fill

Above-grade soil treatment area designed and installed such that the entire infiltrative surface is located above the original ground elevation using suitable imported soil material for fill; utilizes gravity, pressure-dosed gravity or low-pressure distribution; a final cover of suitable soil stabilizes the completed installation and supports vegetative growth.

Arid (ram)

Refers to climates or regions which lack sufficient rainfall for crop production or extensive sown pastures. Usually defined as a climate with annual average rainfall less than 250 mm (10 inches).

Armouring

The process of development of a layer of coarse particles on the surface of a soil which is capable of protecting the soil below from wind or flowing water.

Armouring Layer

A layer of particles, some of which may be in the process of being moved by erosive forces, but which are deep enough to prevent access of the moving wind or water to the soil below. It protects the underlying soil until it is broken by stock trampling or cultivation or until a stronger erosion event removes it.

Aromatic

Aromatic is of or relating to organic compounds that resemble benzene in chemical behaviour. A hydrocarbon that consists of one or more benzenoid rings (i.e., benzene).

Artesian Water

Ground water that is under pressure when tapped by a well and is able to rise above the level at which it is first encountered. It may or may not flow out at ground level. The pressure in such an aquifer commonly is called artesian pressure, and the formation containing artesian water is an artesian aquifer or confined aquifer.

Artificial Aging

Aging above room temperature. See also AGING. Compare with natural aging.

Artificial Recharge

An process where water is put back into ground-water storage from surface-water supplies such as irrigation, or induced infiltration from streams or wells.

Asbestos

A mineral fiber that can pollute air or water and cause cancer or asbestosis when inhaled. The U.S. EPA has banned or severely restricted its use in manufacturing and construction and the ARB has imposed limits on the amount of asbestos in serpentine rock that is used for surfacing applications. A general term for a group of fibrous minerals (primarily chrysotile, amosite and crocidolite) that have long been used as fireproof insulation and as a strengthener in pipe insulation, roofing tiles, floor tiles, wall coverings and other materials. For purposes of APCD regulations, asbestos is defined as the asbestiform varieties of serpentinite (chrysotile), riebeckite (crocidolite), cummingtonite-grunerite, amosite, anthophyllite, and actinolite-tremolite. The generic name for those silicate minerals that cleave naturally into fibers, the three important forms being chrysotile (white asbestos), crocidolite (blue asbestos), and amosite.

As-Built

Written plan prepared after system installation that reflects the actual construction and indicates differences from the original design.

ASCII

American Standard Code for Information Interchange, a protocol, ANSI Standard X3.4-1968, for transmitting text data that encodes teletype characters (typewriter characters and control codes), in seven bits (binary digits), that is, as numbers from 0 to 127. International standard character sets, such as ISO Latin-1 (ISO 8859/1, the character set used for this HTML document) and Unicode, include the printable characters and some of the control characters of ASCII as a subset.

Ash

The solid residue of effectively complete combustion. Ash is incombustible residue left over after incineration or other thermal processes.

Aspirator

Device which moves fluid (liquid or gas) by developing a vacuum.

Assessment

An evaluation of watersheds based on the presence or lack of specific nonpoint source indicators.

Assessment of Usage

The Determination of a volume of water taken by an access licence, where a water meter is not properly functioning. Assessments must be made by a State Water officer; customers are not permitted to make their own usage assessments.

Assimilation

Conversion of absorbed wastewater constituents into living tissue.

Assimilative Capacity

The amount of pollutants that a water body may absorb while maintaining corresponding water quality standards, including protection of aquatic life and human health.

Assured Inflows

The volumes of water which hydro-logic information indicates are the minimum which can be expected to flow into the water source.

Asthma

A medical condition characterized by abnormal restriction of breathing, especially in response to allergens or air contaminants.

ASTM

The American Society for Testing and Materials, a professional organization that develops and distributes protocols for testing and provides reference standards.

ASTM C-739

Standard Specifications for Cellulosic Fibber (wood base) Loose-Fill Thermal Insulation.

ASTM C-1149

Standard Specification for Self-Supported Spray-Applied Cellulosic Thermal/Acoustical Insulation. Covers 10 material attributes (density, thermal resistance, surface burning characteristics, adhesive/cohesive strength, smouldering combustion, fungi resistance, corrosion, moisture vapor absorption, odour and flame resistance permanency.)

At-Grade

Above-grade soil treatment area designed and installed such that some part of the infiltrative surface is located at the original ground elevation using suitable imported soil material for fill; excavation is 0 to 6" into native soil; utilizes gravity, pressure-dosed gravity or low-pressure distribution with the orifices of the distribution pipe above the original ground elevation; a final cover of suitable soil stabilizes the completed installation and supports vegetative growth.

Atmosphere

The gaseous mass or envelope of air surrounding the Earth. From ground-level up, the atmosphere is further subdivided into the troposphere, stratosphere, mesosphere and the thermosphere.

Atmospheric Corrosion

The gradual degradation or alteration of a material by contact with substances present in the atmosphere, such as oxygen, carbon dioxide, water vapor, and sulfur and chlorine compounds.

Atmospheric Deposition

Process by which atmospheric pollutants reach the land surface either as dry deposition or as dissolved or particulate matter contained in precipitation.

Atmospheric Lifetime

Atmospheric lifetime is the average time that a molecule resides in the atmosphere before it is removed by chemical reaction or deposition. This can also be thought of as the time that it takes after the human-caused emission of a gas for the

concentrations of that gas in the atmosphere to return to natural levels. Greenhouse gas lifetimes can range from a few years to a few thousand years.

Atomic Absorption Spectroscopy

A method of chemical analysis based on the absorption of light of specific wavelengths of light by disassociated atoms in a flame or high temperature furnace. It is sensitive only to elements.

Atomic Energy

Energy released in nuclear reactions. When a neutron splits an atom's nucleus into smaller pieces it is called fission. When two nuclei are joined together under millions of degrees of heat it is called fusion.

ATSDR

Agency for Toxic Substances and Disease Registry (US Dept. of Health and Human Services).

Attached-Growth Process

Configuration wherein the microorganisms responsible for treatment colonize a fixed medium.

Attack Hydrant

An attack hydrant is a term used to describe a fire hydrant with flow and pressure suitable for fighting a fire at a commercial premises. In most cases it would be an internal hydrant on a commercial premises supplied from a permanent booster pump or a fire fighting appliance.

Attainment

A designation used when an area meets an air quality standard.

Attainment Area

A geographic area in which levels of a criteria air pollutant meet the health-based primary standard (national ambient air quality standard, or NAAQS) for the pollutant. An area may have on acceptable level for one criteria air pollutant, but may have unacceptable levels for others. Thus, an area could be both attainment and non-attainment at the same time.

Attenuation

Attenuation is to reduce or lessen in amount (e.g., a reduction in the amount of contaminants in a plume as it migrates from the source).

Atterberg Limits

The soil water contents at the solid/plastic and plastic liquid boundaries. Atterberg limits are based on the concept that a fine-grained soil can exist in any of three states depending on its water content. Thus, on the addition of water, a soil may proceed from the solid state through to the plastic and finally liquid states. The water contents at the boundaries between adjacent states are termed the plastic limit and the liquid limit. Water content is expressed as a percentage of the oven dry weight of soil.

Attic

An attic is a space found directly below the pitched roof of a house.

Attic Fans

A fan that blows heated air out of the attic of a building.

Attic Insulation

The installation of approved insulation products (rock wool, fiberglass, and cellulose) evenly across the unconditioned attic area to achieve desired levels of thermal resistance.

Attic Insulation Removal

The removal of visible soot and char off the surface of insulating materials sufficient enough to achieve an appearance acceptance. One of the most difficult jobs is working in attics and attempting to remove settled loose soot and char particles off of insulation.

Attic Vent

A passive or mechanical device used to ventilate an attic space, primarily to reduce heat build up and moisture condensation.

Attic Ventilation

The process of ventilating the attic in order to remove moisture and heat from the attic.

Attic Ventilators

In houses, screened openings provided to ventilate an attic space. They are located in the soffit area as inlet ventilators and in the gable end or along the ridge as outlet ventilators. They can also consist of power-driven fans used as an exhaust system.

Attrition Fire

A fire whose fuel is comprised of dead or pruned tree or bush branches, limbs and cuttings.

Audit

An investigation of the ability of a system of procedures and activities to produce data of a specified quality.

Austenitic Stainless Steel

Steel containing sufficient amount of Nickel, Nickel and Chromium, or Manganese to retain austenite at atmospheric temperature.

Austenite

A solid solution of one or more elements in face-centred cubic iron. Unless otherwise designated (such as nickel austenite) the solute is generally assumed to be carbon.

Austenitic

The name given to the face-centered cubic crystal structure (FCC) of ferrous metals. Ordinary iron and steel has this structure at elevated temperatures; also certain stainless steels (300 series) have this structure at room temperature.

Austenitizing

Forming austenite by heating a ferrous alloy into the transformation range (partial austenitizing) or above the transformation range (complete austenitizing). When used without qualification, the term implies complete austenitizing.

Automatic Recording Gauge

An automatic instrument for measuring and recording graphically and continuously. Also called register.

Automatic Sampling

Collecting of samples of prescribed volume over a defined time period by an apparatus designed to operate remotely without direct manual control. See also COMPOSITE SAMPLE.

Automatic Welding

Welding in which the welding variables and the mean of making the weld are controlled by machine.

**Autothermal Thermophilic
Aerobic Digestion**

As part of the aerobic digestion process, heat is evolved. In a container vessel, the sufficient heat is generated to maintain temperatures in the thermophilic range. At higher temperatures, detention time requirements are reduced for a given solids reduction resulting in an end product that is relatively pathogen free.

Autotrophic Organisms

Organisms including nitrifying bacteria and algae that use carbon dioxide as a source of carbon for cell synthesis. They can consume dissolved nitrates and ammonium salts.

Auxiliary Anode

In electroplating, a supplementary anode positioned so as to raise the current density on a certain area of the cathode and thus obtain better distribution of plating.

Auxiliary Electrode

The electrode of an electrochemical cell that is used to transfer current to or from a test electrode. An electrode commonly used in polarization studies to pass current to or from a test electrode. It is usually made of non-corroding material:

CUI Corrosion Under Insulation

DLA Double Layer Activation

ER Electrical Resistance

HAZ Heat Affected Zone

LPR Linear Polarization Resistance.

Available Chlorine

A measure of the total oxidizing power of chlorinated lime, hypochlorite, and other materials used as a source of chlorine as compared with that of elemental chlorine.

Available Head

The difference between the depth to the top of the target aquifer, and an initial piezometric level.

Available Water

The water that is available in a water management area or water source in accordance with an available water determination that is in force in respect of that area or water source.

Avalanche

A form of mass movement that results in a characteristic long and narrow track down the steep slopes on which it typically occurs.

Downhill motion is extremely rapid and it may occur under a variety of moisture conditions.

Avalanching

The process of self-perpetuation that increases the intensity and severity of wind erosion down-wind. It may be initiated by saltation whence the particles, as they hit the ground, dislodge more particles resulting in a cumulative effect down-wind.

Average

An arithmetic mean obtained by adding quantities and dividing the sum by the number of quantities.

Average Daily Flow

(1) The total quantity of liquid tributary to a point divided by the number of days of flow measurement. (2) In water and wastewater applications, the total flow past a point over a period of time divided by the number of days in that period.

Average Flow

Arithmetic average of flows measured at a given point.

Average Land Cover Condition

Percentage of impervious cover considered to generate an equivalent amount of phosphorus as the total combined land uses within the Chesapeake Bay watershed at the time of the CBA adoption, assumed to be 16%.

Average Monthly Discharge Limitations

The highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during that month divided by the number of days on which monitoring was performed (except in the case of fecal coliform).

Average Velocity

The average velocity of a stream flowing in a channel or conduit at a given cross section or in a given reach. It is equal to the discharge divided by the cross-sectional area of the section or the average cross-sectional area of the reach. Also called mean velocity.

Average Weekly Discharge Limitation

The highest allowable average of daily discharges over a calendar week, calculated as the sum of all daily discharges measured during a calendar

week divided by the number of daily discharges measured during that week.

A-Weighted Scale

It resembles the audible response of human ear. Represented as dB(A).

AWMA, A&WMA

Air and Waste Management Association, a professional organization of people involved in air pollution control and solid waste management, from both the public and private sectors. For more information, see AWMA's website.

Axis

A line about which a figure or a body is symmetrically arranged, or about which such a figure or body rotates.

B

BAC

Benchmark ambient concentration: the concentration of a toxic air contaminant that is used in determining environmental acceptability pursuant to Regulation 5.21 Environmental Acceptability for Toxic Air Contaminants. The benchmark ambient concentration for a carcinogen (BACC) is the concentration, including an averaging time frame, of a toxic air contaminant that is representative of an additional lifetime cancer risk of one in one million (1×10^{-6}). The benchmark ambient concentration for a carcinogen is established pursuant to Regulation 5.20 Methodology for Determining Benchmark Ambient Concentration for a Toxic Air Contaminant, Section 3. The benchmark ambient concentration for the non-carcinogenic effects of a toxic air contaminant (BACNC) is the concentration, including an averaging time frame, of a toxic air contaminant that is likely to be without an appreciable risk of deleterious effects during a lifetime. The benchmark ambient concentration for the non-carcinogenic effects of a toxic air contaminant is established pursuant to Regulation 5.20 Section 4. A substance can have both, with different values. See Regulation 5.1 for more information.

Backer Board

A rigid, non-vapour barrier-forming material such as drywall, treated cardboard, plywood, etc. that is used to cover the open side of an existing wall and forms a cavity that may be filled with loose-fill insulation. Must have sufficient strength to withstand the pressure developed when filling the cavity.

Backfill

(1) Material placed in an excavation; (2) To place material in an excavation; (3) Portion of an excavation above the haunch zone; for straight-walled tanks or structures, that portion of an excavation above the bedding. (4) Material placed in a drilled hole to fill space around anodes, vent pipe, and buried components of a cathodic protection system.

Backfill, Initial

Portion of an excavation above the haunch zone or bedding with a depth of 6–12 inches (15–30 cm) above the piping, conduit tank, or structure.

Backfill Final

Portion of an excavation extending from above the initial backfill to final grade.

Backflow

Reverse direction of flow, with liquid returning to the source.

Backflow Connection

In plumbing, any arrangement whereby backflow can occur. Also called interconnection, cross connection.

Backflow Preventer

A device on a water supply pipe to prevent the backflow of water into the water supply system from the connections on its outlet end. See also VACUUM BREAKER and AIR GAP.

Backflow Prevention Device

Any device, method, or configuration used to prevent a reversal of flow.

Back Flush

To reverse the direction of flow to clean laterals or filter media.

Back Flushing

The action of reversing the flow through a conduit for the purpose of cleaning the conduit of deposits.

Background Level

Amount of a substance expected to occur naturally in the environment.

Background Luminance

A measure of light power reflected or emitted from the background of an object within a solid angle of one steradian per unit area projected in a given direction.

Back-Pressure Valve

A valve provided with a disk hinged on the edge so that it opens in the direction of normal flow and closes with reverse flow; a check valve.

Backplain

A large flat area comprising the part of a flood plain away from the watercourse beyond the levee. It is often characterized by a high water table, fine sediments, and the presence of swamps or lakes.

Backsight

Rod reading taken on a point of known or assumed elevation (where establishing the first bench mark, usually assumed as 100.00); the backsight reading is added to the elevation to determine the Height of Instrument (HI). The first sight taken after setting up a level. A back sight is taken to a bench mark at the start of leveling and then to change points at each subsequent instrument set up.

Back Trajectory

The modelled path of an air parcel as it is projected backward in time.

Backwash

Cleaning a granular media bed by means of an upward flow of clean water.

Backwashing

The operation of cleaning a filter with water, or with air and water, by reversing the direction of flow. The operation of cleaning a filter by reversing the flow of liquid through it and washing out matter previously captured in it. Filters include true filters such as sand and diatomaceous earth-types, but not other treatment units such as trickling filters (Fig. 6).

Backwater

A strep cropping term for surface water backed up by vegetated strips, typically on country of less than 1% slope. Runoff is retarded as it moves through the vegetated strips with the result that velocity is also reduced on the cultivated strips above, provided that the strips are not too wide.

Backyard Burning

An illegal method of getting rid of household waste, possibly in an attempt to save on bin charges, that releases levels of pollutants into the air, so harming air quality and risking the

health of those burning the waste and of their neighbours.

BACM

Best achievable control measure.

BACT

Best available control technology for limiting pollutant emissions, required on major new or modified stationary sources that use volatile organic compounds.

Bacteria

Single cell microscopic living organisms lacking chlorophyll, which digest many organic and inorganic substances. An essential part of the ecosystem including within human beings, microscopic one-celled organisms which live everywhere and perform a variety of functions. While decomposing organic matter in water, bacteria can greatly reduce the amount of oxygen in the water.

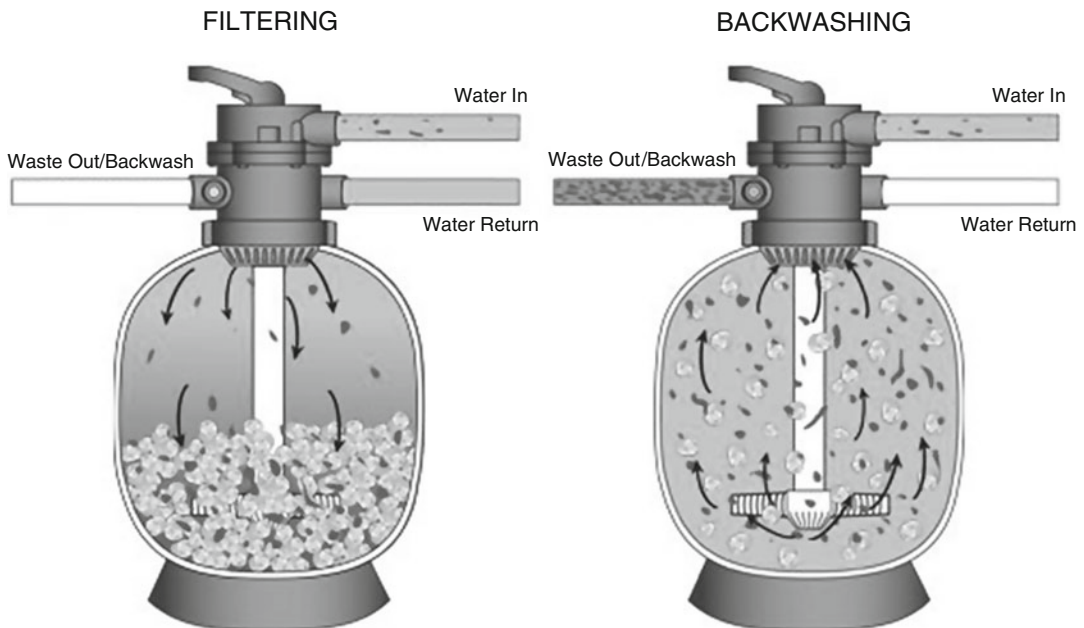


Fig. 6 Backwashing

Bacteria, Aerobic

Bacteria that can metabolize only in the presence of molecular oxygen.

Bacteria, Anaerobic

Bacteria that is able to metabolize in the absence of molecular oxygen.

Bacteria, Facultative

Bacteria that can metabolize with or without molecular oxygen present in the environment.

Bacteria, Mesophilic

Bacteria which grow best at temperatures between 20 and 50 °C (68 and 122 °F) with optimum growth between 25 and 40 °C (77 and 104 °F).

Bacteria, Psychrophilic

Bacteria which grow best at temperatures between 10 and 30 °C (50 and 86 °F) with optimum growth between 12 and 18 °C (54 and 64 °F).

Bacteria, Thermophilic

Bacteria which grow best at temperatures between 35 and 75 °C (95 and 167 °F) with optimum growth between 55 and 65 °C (131 and 149 °F).

Bacterial Analysis

The examination of water and wastewater to determine the presence, number, and identity of bacteria; more commonly called bacterial examination.

Bacterial Examination

The examination of water and wastewater to determine the presence, number, and identity of bacteria. Also called bacterial analysis. See also BACTERIOLOGICAL COUNT.

Bacteriological Count

A means for quantifying numbers of organisms.

Bactericide

Chemicals that kill bacteria.

Baffle

Physical barrier placed in a component to dissipate energy, direct flow, retain solids and FOG, and/or draw water from a specific depth.

Baffle, Cargo Tank

One or more partitions installed across the shortest dimension of a cargo tank that partially restrict the free flow of liquid from end to end in the tank; designed to reduce liquid surge and increase vehicle handling safety.

Baffle, Flow Restrictor

Baffle designed to moderate discharge rate.

Baffle, Gas Deflector

Baffle designed to direct gases and rising solids away from the bottom of the outlet.

Baffle, Inlet

Pipe tee or wall segment at or near the inlet pipe of a tank which is designed to dissipate energy, direct flow below the wastewater surface, isolate scum from the inlet pipe, and allow ventilation.

Baffle, Outlet

Pipe tee or wall segment at or near the outlet pipe of a tank designed to collect flow from the clear zone, isolate scum from the outlet pipe, and allow ventilation.

Baffles

Deflector vanes, guides, grids, gratings, or similar devices constructed or placed in flowing water, wastewater, or slurry systems as a check or to produce a more uniform distribution of velocities; absorb energy; divert, guide, or agitate the liquids; and check eddies. Device used to achieve a 1" ventilation space between insulation and roof sheathing. Helps assure airflow from eave-vents in attics and cathedral ceilings.

Bag House

An air pollution abatement device that traps particulates (dust) by forcing gas streams through large permeable bags usually made of glass fibres.

Bag House Filter

Large fabric bag, usually made of glass fibres, used to eliminate intermediate and large (greater than PM₂₀ in diameter) particles. This device operates like the bag of an electric vacuum cleaner, passing the air and smaller particles while entrapping the larger ones.

Bainite

A metastable aggregate of ferrite and cementite resulting from the transformation of austenite at temperatures below the pearlite but above the martensite start temperature.

Balance Tank

A Balance Tank is a tank or reservoir used to store water for the purpose of equalising or balancing fluctuating demand.

Ballasting (Deballasting)

The act of taking on (discharging) ballast water.

BAM (Beta Attenuation Mass Monitor)

The BAM (Beta Attenuation Mass Monitor) measures particulate concentrations automatically. The mass density is measured using the technique of Beta attenuation. A small Beta source is coupled to a sensitive detector which counts the Beta particles. As the mass of particles increases the Beta count is reduced. The relationship between the decrease in count and the particulate mass is computed according to a known equation (the Beer-Lambert law).

Banded Structure

A segregated structure consisting of alternating nearly parallel bands of different composition, typically aligned in the direction of primary hot working.

Bands

Strapping used to fasten insulation and/or jacketing in place.

Bandwidth

(Ultrasonics) Range of frequencies around a mean value that constitutes the nominal frequency.

Bank

A constructed earth embankment, incorporating a channel on the upslope side, typically traversing a slope to control and/or prevent the erosion of that slope. This is achieved by intercepting, diverting or storing runoff instead of permitting it to flow uninterrupted down the slope. The purpose of each bank is to increase the time of concentration of runoff and to control its volume and velocity so that serious erosion will not occur.

Where a series of banks is constructed it is possible, particularly in an arable situation and depending on the bank design criteria used, that some interbank erosion will occur. Complementary land management practices such as contour farming and conservation tillage carried out between the banks should then aim to prevent such erosion. Banks should be maintained to conform with their designed purpose. Apart from banks built for the above purposes there are also a number of banks designed for other more specific purposes such as water spreading.

Two basic construction methods are used. A CONVENTIONAL BANK is constructed by moving the soil down slope so that the excavation or channel is immediately above the bank. A BACK-PUSH BANK is constructed by moving the soil upslope so that the excavation is immediately below the bank. These are constructed where it is necessary to retain undisturbed vegetation on the upslope side, such as in critical disposal situations on highly erodible soils.

Bank Capacity

The calculated or actual volume or discharge rate of a soil conservation bank. For a graded bank the important design requirement is for the bank to safely carry the design peak discharge! and this represents the bank capacity. For an absorption bank the important design requirement is for the bank to hold a certain volume of runoff without overtopping, and this represents the bank capacity.

Bank Spacing

The actual distance along the ground between adjacent soil conservation banks! used particularly when talking to landholders.

Banking System

A scheme involving the construction of a series of soil conservation banks to control erosion over a large area. Such a system is frequently integrated with a number of gully control structures and/or waterways. In some circumstances a parallel banking system allows for easier cultivation between the banks.

Bar

An offshore ridge of unconsolidated material submerged by high tide, lying at the mouth of a river or a short distance from and parallel to the beach. Bars tend to form in beach systems following periods of beach erosion and represent a temporary storage of beach sand which is returned during ensuing light weather. An elongated gently to moderately inclined low ridge of unconsolidated sediment built up by channeled water flow. Typically occurs as part of a streambed as a result of localized retardance to flow, causing deposition of sediment.

Barminutor

A bar screen of standard design fitted with an electrically operated shredding device that sweeps vertically up and down the screen cutting up material retained on the screen.

Bar Screen

A screen composed of parallel bars, either vertical or inclined, placed in a waterway to catch debris. The screenings are raked from it either manually or automatically. Also called bar rack, rack.

Basal Area

Total area of an above-grade soil treatment area (mound, modified mound, or areal fill) including the absorption area; perimeter is measured at the interface of imported fill material and original grade.

Base

A compound that dissociates in aqueous solution to yield hydroxyl ions. A chemical substance that yields hydroxyl ions (OH) when dissolved in water. Compare with ACID.

Base Metal

(1) The metal present in the largest proportion in an alloy; brass, for example, is a copper-base alloy. (2) An active metal that readily oxidizes, or that dissolves to form ions. (3) The metal to be brazed, cut, soldered, or welded. (4) After welding, that part of the metal which was not melted.

Base Flow

The amount of water in a stream that results from groundwater discharge.

Baseline Water Use

Baseline Water Use is the water usage for all sites within an organisation's Water Management Action Plan over a 12 month period.

Basement

That portion of a building which is partly or completely below grade.

Basement Wall

A wall of a building that is mostly below grade.

Basic Data

Records of observations and measurements of physical facts, occurrences, and conditions, as they have occurred, excluding any material or information developed by means of computation or estimate. In the strictest sense, basic data include only the recorded notes of observations and measurements, although in general use it is taken to include computations or estimates necessary to present a clear statement of facts, occurrences, and conditions.

Basin

The area drained by a river. The term is also used to describe an area which, when surrounded by embankments, may be flood irrigated.

Batch Process

Configuration in which flow is controlled so that effluent is neither entering nor leaving the treatment component while a specific operation is being performed.

Batt

A piece of flexible to semi-rigid type insulation of specified width and length with or without vapor retarder facing.

Batter

The excavated or constructed face of a dam wall, embankment or cutting! produced as a result of earthmoving operations involving cutting and filling. In describing batter grade. 1:3 or line 3 means a fall (or rise) of 1 vertical meter in a horizontal distance of 3 meters. Batters created in the construction of soil conservation banks are identified by numbering them 1, 2 and 3 on the basis that the No. 2 batter is always the water bearing face of the embankment and the No. 1 batter is

the excavation batter. Thus, on a conventional bank the No. 1 batter is upslope of the embankment the No. 2 batter is the uphill side of the embankment (uphill batter) and the No. 3 batter is the downhill side of the embankment (downhill batter). On a back-push bank the No. 1 batter is downslope of the embankment but the embankment batters are numbered similarly to those of a conventional bank, i.e. the No. 2 and 3 batters are the uphill and downhill batters respectively.

Batters created in the construction of gully control structures and dams are also identified by numbering them 1, 2 and 3 on the basis that the water-bearing face is the No. 2 batter, viz:

*No. 1 batter the excavation batter typically formed on the upstream of the floor of the storage. In this case it is denoted the upstream excavation batter.

No. 2 batter the batter typically formed by the combination of the exposed face on the downstream side of the floor excavation (downstream excavation batter) and the constructed face on the upstream side of the embankment (upstream embankment batter). It is always the batter which causes the water to pond.

No. 3 batter the batter formed on the downstream side, or outside, of the embankment and denoted the downstream embankment batter.

The above descriptors for GCS and dam batters are particularly applicable to structures with straight or curved embankments. For square or oblong structures the batters associated with the side embankments should be identified as left or right looking downstream in conjunction with the numbering system (e.g. left hand No. 2 batter).

Batter Drop-Down

A constructed and stabilized drain to carry runoff down a batter, typically down the line of greatest slope.

Batter Stabilisation

The process of stabilizing batters and their environs. This may involve vegetative and/or structural measures. Revegetation of exposed batters

may be achieved by using grasses and legumes sown by hand, seed drills or hydro seeders, with or without special mulches such as hay and bitumen emulsion, or various types of netting. In certain situations revegetation may involve sodding or sprigging. Stabilization of unstable materials, particularly batters subject to mass movement, may require the use of trees such as willows or poplars to provide more deep rooted stability.

Masonry measures may include revetments, gabions and concrete. Special attention is needed in designing drainage systems, including the use of berms, to provide protection of the batter surface against erosion by concentrated runoff. To assist stabilization, batter slopes should be constructed to an angle less than the angle of repose.

Battery Electric Vehicle (BEV)

A vehicle that runs on electricity stored in batteries and has an electric motor rather than an internal combustion engine. These vehicles also meet the requirements of the Zero Emission Vehicle Regulation.

Beach

A gentle or moderately sloping shore at the margin of a sea or lake, formed by waves or tides. Generally covered by loose granular materials, but can be composed of a wide range of materials from boulders to silts. A beach is laterally extensive relative to its width.

Beach Face

The section of the beach normally exposed to the action of wave up rush.

Beach Marks

Macroscopic progression marks on a fatigue fracture or stress-corrosion cracking surface that indicate successive positions of the advancing crack front. The classic appearance is of irregular

elliptical or semielliptical rings, radiating outward from one or more origins. Beach marks (also known as clamshell marks or arrest marks) are typically found on service fractures where the part is loaded randomly, intermittently, or with periodic variations in mean stress or alternating stress.

Beach Ridge

A long low, linear, even-crested rise built up by wave action at a former shoreline. Such ridges are usually modified by the wind and may occur singly or in a series of parallel ridges.

Beach Scarp

A laterally extensive precipitous face along a beach or dune formed by erosive wave action where sand falls away under the influence of wave-assisted mass movement.

Bead

A single run of weld metal on a surface.

Bed

Below-grade soil treatment area consisting of an excavation greater than three feet wide containing distribution media and more than one lateral; typically installed in an excavation 18–36 inches below original ground elevation; utilizes pressure or gravity distribution; a final cover of suitable soil stabilizes the completed installation, supports vegetative growth, and sheds runoff.

Bed, Deep

Bed installed in an excavation greater than 36 inches deep.

Bed, Shallow

Bed installed in an excavation less than 18 inches deep such that the entire infiltrative surface is below the original ground elevation.

Bedding

(1) Process of laying piping, conduit or other structure in a trench shaped to the appropriate contour; (2) Tamping earth around piping, conduit, or other structure to provide support; (3) Material placed under piping, conduit, tank, or other component for uniform structural support.

Bedload

The sediment that moves by sliding, rolling or bounding on or very near the bed of a channel due to the action of flowing water. It is moved mainly by tractive and/or gravitational forces, but at velocities less than the surrounding flow.

Bedrock

The solid rock underlying unconsolidated sediments such as the soil and weathered rock. Bedrock is a general term for solid rock that lies beneath soil, loose sediments, or other unconsolidated material.

Beggiatoa

A filamentous organism whose growth is stimulated by H_2S .

Bell-Bottom Pier Hole

Type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

Below-Grade

Soil treatment area designed and installed such that the infiltrative surface and most of the side-wall are below the original ground elevation; a final cover of suitable soil stabilizes the completed installation, supports vegetative growth, and sheds runoff.

Belt Press

A belt press or belt press filter is a device used to separate out sludge from wastewater. Belt presses typically consist of two permeable filter belts and a number of rollers.

Belt Screen

A continuous band or belt of wire mesh, bars, plates, or other screening medium that passes around upper and lower rollers and from which the material caught on the screen is usually removed by gravity, brushes, or other means.

Bench

(1) Soil placed downslope of an excavation to create a level surface on which to work;
(2) Shallow excavation adjacent to a deeper excavation (such as for a tank or advanced treatment component) that allows placement of associated piping on undisturbed soil.

Bench Level

Surveying with a level to establish elevations on bench marks; usually run as part of a cross section, profile, or topographic survey.

Bench Mark (BM)

Reference point of known elevation; a permanent bench mark can be established with a brass pin or cap set in concrete, a long metal stake driven in the ground, or a specific point on a concrete bridge or other solid object; a temporary bench

mark (needed for only a few days or weeks until a job is completed) could be a wooden stake driven in the ground, or a nail driven in a tree or post; for many temporary bench marks the elevation may be assumed (usually 100.00 feet); permanent bench mark locations should be accurately described in the field book so that a person who had never been to the area could find them.

Bench Mark, Assumed

Temporary bench mark used as a reference; typically assigned an elevation of 100.00 feet.

Bench Mark, Referenced

Official, permanent point of known elevation.

Bench Mark, Transfer

Local bench mark established from a referenced bench mark.

Benching (Benching System)

Method of protecting employees from cave-ins by excavating to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels in accordance with OSHA safety standards for protective systems.

Beneficial Use

Use of a [water] resource that includes, but is not limited to, domestic (including public water supply), agricultural, commercial, industrial, water-based recreational uses and the propagation and growth of aquatic life.

Benthic

Pertains to the bottom, or bed, of a body of water.

Benzene (C₆H₆)

Benzene is an aromatic organic compound which is a minor constituent of petrol (about 2% by volume). The main sources of benzene in the atmosphere in Europe are the distribution and combustion of petrol. Combustion by petrol vehicles is the largest component (70% of total emissions) whilst the refining, distribution and evaporation of petrol from vehicles accounts for approximately a further 10% of total emissions. Benzene is emitted in vehicle exhaust as unburnt fuel and also as a product of the decomposition of other aromatic compounds. Benzene is a known human carcinogen.

Berm

(1) Natural or constructed raised drainage feature used to divert runoff of stormwater and direct the flow to an effective outlet; may be used in conjunction with a swale; (2) Raised earthen structure designed to contain wastewater such as in a lagoon.

Best Available Technology Economically Achievable

Technology-based standard established by the Clean Water Act (CWA) as the most appropriate means available on a national basis for controlling the direct discharge of toxic and nonconventional pollutants to navigable waters. BAT effluent limitations guidelines, in general, represent the best existing performance of treatment technologies that are economically achievable within an industrial point source category or subcategory.

Best Available Retrofit Control Technology (BARCT)

An emission limitation based on the maximum degree of reduction achievable for existing sources taking into account environmental, energy, and economic impact.

Best Management Practice (BMP)

A structural or non-structural method, activity, maintenance procedure, or other management practice used singularly or in combination to reduce nonpoint source inputs to receiving waters in order to achieve water quality protection goals. Examples include animal waste management systems, conservation tillage systems, vegetated filter strips, etc.

Best Practical Technology Currently Available (BPTCA)

BPTCA is generally defined as the equivalent of secondary treatment presently being practiced in the particular industrial subcategory. For example, this may be considered as the activated sludge process in the organic chemicals industry.

Best Usage

The most appropriate uses of a body of water as designated by the Environmental Management Commission given the characteristics of the water body and surrounding area. Best uses may include use for public water supplies; protection and propagation of fish, shellfish, and wildlife; recreation in and on the water; as well as uses for agriculture, industry, and navigation.

Bentonite

A clay usually formed by the weathering of volcanic ash, and which is largely composed of montmorillonite type clay minerals. It has great capacity to absorb water and swell accordingly. For this reason it is used to seal dams and/or earth embankments built of coarse materials or which contain a coarse textured seam causing them to leak.

Berm

A level area of loose sand between the upper limit of the swash, formed from marine deposition. A constructed ledge formed at one or more

levels between the top and bottom of a batter. Its purpose is to intercept runoff and reduce slope instability. A constructed ledge on the excavation batter of a dam or tank which increases the storage capacity and/or enables the entrapment of debris before water enters the storage. The latter is achieved by inclining the berm outwards. The term is also applied to a structure used in border check irrigation to prevent sideways flow of water.

Bevelled Lags

Lags similar to plain lags, but with one or more edges bevelled.

Bias

A systematic or persistent distortion of a measurement process that causes error in one direction in a set of data. An unbiased measurement is close to the true value. Bias is estimated by the signed difference of an observed value from a reference value, as a percentage of the reference value. See also ACCURACY and PRECISION.

Biennial Plant

A plant whose tile cycle extends for 2 years. The first year it produces roots, stems and leaves. In the second year it flowers, produces fruits and seeds for future regeneration, then dies. The term is also used loosely to describe short-lived perennial plants which rarely persist more than 2 years in sown pasture, such as red clover.

Bifurcation

Division into two branches. In a soil conservation context, it is used to describe the formation of two gullies from one, due to the inflow of runoff to a gully head from two separate sources.

Billfish

Pelagic fish with long, spear-like protrusions at their snouts, such as swordfish and marlin.

Binder

Substance contained in insulation material that stabilizes the fibers (sometimes called a thermal setting resin).

Bioaccumulants

Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted.

Bicarbonate Alkalinity

Alkalinity caused by bicarbonate ions.

Biodegradable Waste

Organic waste, typically coming from plant or animal sources (for example food scraps and paper), which other living organisms can break down.

Bio Filter

Media filter in which the media used is biological in origin (i.e., peat or coir).

Bi-Fuel

A vehicle that has the ability to operate on gasoline or diesel as their primary fuel.

Binding Targets

It refers to environmental standards that are to be met in the future.

Bioassay

A test used to evaluate the relative potency of a chemical or a mixture of chemicals by comparing its effect on a living organism with the effect of a standard preparation on the same type of organism. Bioassay is (1) An assay method using a change in biological activity as a qualitative or quantitative means of analysing a material's response to biological treatment. (2) A method of determining the toxic effects of industrial wastes and other wastewaters by using viable organisms; exposure of fish to various levels of a chemical under controlled conditions to determine safe and toxic levels of that chemical.

Biochemical

(1) Pertaining to chemical change resulting from biological action. (2) A chemical compound resulting from fermentation. (3) Pertaining to the chemistry of plant and animal life.

Biochemical Oxidation

Oxidation brought about by biological activity resulting in the chemical combination of oxygen with organic matter. See OXIDIZED WASTEWATER.

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. Biochemical oxygen demand is oxygen demand by microorganisms during stabilization of organic matter under prescribed condition, usually over a 5 day period, BOD₅ specifically denotes the oxygen demand over a 5 days period at 20 °C. The Biological Oxygen Demand (BOD) water test is

used to determine how much oxygen is being used by aerobic microorganism in the water to decompose organic matter. The amount of oxygen required by aerobic biological processes to break down the organic matter in water. BOD is a measure of the pollutional strength of biodegradable waste on dissolved oxygen in water. measure of the quantity of oxygen used in the biochemical oxidation of organic matter in a specified time, at a specific temperature, and under specified conditions.

Biochemical Oxygen Demand (BOD) Load

The BOD content (usually expressed in mass per unit of time) of wastewater passing into a waste treatment system or to a body of water.

Biocide

A chemical which kills other of life in addition to bacteria.

Biodegradation

The breakdown of organic matter by bacteria to more stable forms which will not create a nuisance or give off foul odors. A process by which microbial organisms transform or alter through enzymatic action the structure of chemicals introduced into the environment. Molecular degradation of organic matter resulting from the complex actions of living organisms, ordinarily in an aqueous medium. biodegradation is the destruction of organic materials by microorganisms, soils, natural bodies of water, or wastewater treatment systems.

Biodiesel

Biodiesel is a cleaner-burning diesel replacement fuel made from natural, renewable sources such as new and used vegetable oils and animal fats. Like petroleum diesel, biodiesel operates in

compression-ignition engines. Blends of up to 20% biodiesel (mixed with petroleum diesel fuels) can be used in nearly all diesel equipment and are compatible with most storage and distribution equipment. These low level blends (20% and less) don't require any engine modifications and can provide the same payload capacity as diesel. Using biodiesel in a conventional diesel engine substantially reduces emissions

Biodiversity

A large number and wide range of species of animals, plants, fungi, and microorganisms. Ecologically, wide biodiversity is conducive to the development of all species.

Bioengineering

A low-tech construction method using living plants as a functioning, self-sustaining part of the system. Examples include control of erosion of stream banks, water quality treatment, and flood control and habitat restoration.

Biofilm

Thin coating of microbial growth, organic matter, and microbial secretions on a solid substrate particle. A biofilm is a microbial layer that is formed on the inside of water distribution pipes. The source of the bacteria is the water itself. Even treated water is not 100% free of bacteria. These bacteria remain after surviving the treatment process or ingress into the pipes by other means and thereby escape treatment.

Biofilm (of a Sand Filter)

The film, consisting of living organisms, which forms on the surface of a slow sand filter and which is considered to provide an important part of the effective filtering zone.

Bio Filter

Media filter in which the media used is biological in origin (i.e., peat or coir).

Biofuel

The joint name of fuels which originate from plants (biomass). This can include everything from wood and straw to refined biofuels such as pellets and ethanol. Biofuels are converted solar energy; plants transform solar energy into chemical energy in the form of different types of sugar. Biofuels are renewable because they can be re-created in a relatively short period of time once they have been used, as long as we do not consume more than we grow. Cutting down too many trees can have a negative effect on biodiversity. Peat is no longer regarded as a biofuel.

Biogenic Source

Biological sources such as plants and animals that emit air pollutants such as volatile organic compounds. Examples of biogenic sources include animal management operations and oak and pine tree forests.

Biogeochemical Cycle

Movements through the Earth system of key chemical constituents essential to life, such as carbon, nitrogen, oxygen, and phosphorus.

Biological Contactors

Inert surfaces engineered to provide a high specific surface area on which a biofilm can develop; usually designed so that the surface is cyclically moved through the medium to be biologically oxidized and through the open air so that oxygen transfer occurs.

Biological Corrosion

Biological corrosion is not a type of corrosion; it is the deterioration of a metal by corrosion processes that occur directly or indirectly as a result of the activity of living organisms. These organisms include micro forms such as bacteria and macro types such as algae and barnacles. Microscopic and macroscopic organisms have been observed to live and reproduce in mediums with pH values between 0 and 11, temperatures between $-1.1\text{ }^{\circ}\text{C}$ ($30\text{ }^{\circ}\text{F}$) and $82.2\text{ }^{\circ}\text{C}$ ($180\text{ }^{\circ}\text{F}$), and under pressures up to 1020 bar ($15,000\text{ lb/in}^2$). Thus biological activity may influence corrosion in a variety of environments including soil, natural water and sea water, natural petroleum products, and oil emulsion-cutting fluids.

Biological Denitrification

The transformation of nitrate nitrogen to inert nitrogen gas by microorganisms in an anoxic environment in the presence of an electron donor to drive the reaction.

Biological Effects

Ecological studies to determine the nature or extent of air pollution injury to biological systems.

Biological Filter

A bed of relatively inert material (such as slay, moulded plastics, clinker, etc.) to promote or assist natural aerobic degradation of sewage. A bed of sand, gravel, broken stone, or other medium through which wastewater flows or trickles. It depends on biological action for its effectiveness.

Biological Filtration

The process of passing a liquid through a biological filter containing fixed media on the surfaces of which develop zoogeal films that absorb and

adsorb fine suspended, colloidal, and dissolved solids and release end products of biochemical action.

Biological Nutrient Removal (BNR)

Use of microbiological activity for removal of nitrogen and phosphorus in a wastewater treatment system.

Biological Oxidation

The process by which bacteria and other types of microorganisms consume dissolved oxygen and organic substances in wastewater, using the energy released to convert organic carbon into carbon dioxide and cellular material. The process by which living organisms in the presence of oxygen convert organic matter into a more stable or mineral form.

Biological Process

(1) The process by which metabolic activities of bacteria and other microorganisms break down complex organic materials into simple, more stable substances. Self-purification of polluted streams, sludge digestion, and all the so-called secondary wastewater treatments depend on this process. (2) Process involving living organisms and their life activities. Also called biochemical process.

Biological Water Quality Sampling

The use of biological or ecological characteristics, such as the growth, survival and reproduction of an aquatic species, the diversity, structure and functioning of an aquatic community, and characterizations of aquatic habitat, to measure the "effects" of environmental impairment.

Biomass

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

The amount of living matter in a given area or volume. The total mass of living material in a given body of water. The mass of biological material contained in a system.

Biomass Burning

It is the burning of organic matter for energy production, forest clearing and agricultural purposes. Carbon dioxide is a bi-product of biomass burning.

Biomat

Layer of biological growth and inorganic residue that develops at the infiltrative surface.

Biomass Fuels

It is wood and forest residues, animal manure and waste, grains, crops and aquatic plants are some common biomass fuels.

Biome

It is a climatic region characterised by its dominant vegetation.

Bio Reserve

Bio Reserve are the areas with rich ecosystems and species diversity are reserved for conservation.

Bio Retention Basin

Water quality BMP engineered to filter the water quality volume through an engineered planting bed, consisting of a vegetated surface layer (vegetation, mulch, ground cover), planting soil and sand bed (optional), and into the in-situ material—also called rain gardens.

Bio Retention Filter

Bioretention basin with the addition of a sand layer and collector pipe system beneath the planting bed.

Bio Solids

Bio solids is sewage sludge that has been treated to reduce disease causing pathogens, thus becoming suitable for beneficial reuse. Bio solids have been used in. Rich organic material leftover from aerobic wastewater treatment, essentially dewatered sludge that can be re-used.

Biosphere

(1) The part of the earth and its atmosphere in which living organisms exist or that is capable of supporting life; (2) the living organisms and their environment composing the biosphere.

Biosphere Reserve

A part of an international network of preserved areas designated by the United Nations Educational, Scientific and Cultural Organization (UNESCO). Biosphere Reserves are vital centres of biodiversity where research and monitoring activities are conducted, with the participation of local communities, to protect and preserve healthy natural systems threatened by development. The global system currently includes 324 reserves in 83 countries.

Biostat

A chemical which retards growth of other forms of life in addition to bacteria.

Biota

The living components of an aquatic system including Flora and Fauna of a Region.

Biotic

Biotic are the resources which are considered biotic and therefore renewable. The rainforests and tigers are examples of biotic resources.

Biotic Index

A numerical value used to describe the biota of a water body, serving to indicate its biological quality.

Biotope

A biotope is the special type of nature in which a plant or animal species lives and is dependent on. A biotope can be a highland deciduous forest, the edge of a ditch, forests near the mountains or another type of nature with special characteristics. When the biotope changes, the living conditions for the individuals living there also change. Many biotopes are changed as a result of human intervention, such as cutting down forests, drainage or eutrophication.

Bio Zone

Zone of biologically active treatment in soil, fill, or other media.

Bimetallic Corrosion

(Galvanic Corrosion) Corrosion resulting from dissimilar metal contact.

Bipolar Electrode

An electrode in an electrolytic cell that is not mechanically connected to the power supply, but is so placed in the electrolyte, between the anode and cathode, that the part nearer the anode becomes cathodic and the part nearer the cathode becomes anodic. Also called intermediate electrode.

Birth Control

Preventing birth or reducing frequency of birth, primarily by preventing conception.

Birth Defects

Unhealthy defects found in newborns, often caused by the mother's exposure to environmental hazards or the intake of drugs or alcohol during pregnancy.

Birth Rate

The number of babies born annually per 1000 women of reproductive age in any given set of people.

Bitumen

A viscous hydrocarbon mixture commercially obtained from the destructive distillation of primary energy sources such as coal and crude oil. It retains a 'solid' character under normal air temperatures and for application must be heated. For soil conservation purposes bitumen emulsions are used in stabilization programs.

Bitumen Emulsion

A mixture of bitumen, emulsifying agent, stabilizing agent and water which has low viscosity and may be applied without heating. Its production does not create any chemical change in the bitumen, but the physical state is altered so that it is no longer a homogeneous mass but a series of minute particles, each coated with the emulsifying agent to keep them apart and suspended in the water.

Bituminous Coating

Coal tar or asphalt-based coating.

Black Carbon Aerosol

Black carbon (BC) is the most strongly light-absorbing component of particulate matter (PM), and is formed by the incomplete combustion of fossil fuels, biofuels, and biomass. It is emitted directly into the atmosphere in the form of fine particles (PM_{2.5}).

Black Liquor

The liquid material remaining from pulpwood cooking in the soda or sulfate paper-making process.

Black Smoke

Black Smoke consists of fine particulate matter. These particles can be hazardous to health especially in combination with other pollutants which can adhere to the particulate surfaces. Black Smoke is emitted mainly from fuel combustion. Following the large reductions in domestic coal use, the main source is diesel-engined vehicles. Black smoke is measured by its blackening effect on filters. It has been measured for many years in the UK. Now interest is moving to the mass of small particles regardless of this blackening effect.

Blackwater

Portion of the wastewater stream that originates from toilet fixtures, dishwashers, and food preparation sinks. Black water is water which contains human, food or animal waste.

Blanket

Insulation of the flexible type, formed into sheets or rolls, usually with a vapour-barrier on one side and with or without a container sheet on the other side.

Blanket Insulation

Insulation of flexible type, formed into sheets or rolls, usually with a vapour barrier on side and with or without a container sheet on the other side.

Blanket Insulation, Metal Mesh

Blanket insulation covered by flexible metal-mesh facings attached on one or both sides.

Blast Cleaning

Cleaning and roughening of a surface (particularly steel) by the use of metallic grit or non-metallic grit or metal shot, which is projected against a surface by compressed air, centrifugal force, or water.

Blast Peening

Treatment for relieving tensile stress by inducing beneficial compressive stress in the surface by kinetic energy of rounded abrasive particles.

Bleed

To drain a liquid or gas, as in bleeding accumulated air from a water line or bleeding (draining) a trap of accumulated water bleed. (1) To drain a liquid or gas, as to vent accumulated air from a water line or to drain a trap or a container of accumulated water. (2) The exuding, percolation, or seeping of a liquid through a surface.

Blinding

- (1) Clogging of the filter cloth of a vacuum filter, belt press, belt thickener, or pressure filter.
- (2) Obstruction of the fine media of a sand filter.

Blister

A raised area, often dome shaped, resulting from (1) loss of adhesion between a coating or deposit and the base metal or (2) delamination under the pressure of expanding gas trapped in a metal in a near-subsurface zone. Very small blisters may be called pinhead blisters or pepper blisters.

Bloc

A group of people with the same interest or goal (usually used to describe a voting bloc, a group of representatives intending to vote the same way).

Block Insulation

Semi-rigid insulation formed into sections, rectangular both in plan and cross section, usually 90–120 cm long, 15–60 cm wide and 2.5–15 cm thick.

Block Insulation (Slab)

Semi rigid insulation formed into sections rectangular both in plan and cross section, usually 90–120 cm long, 15–60 cm wide and 2.5–15 cm thick.

Block (Slab)

Rigid or semi-rigid insulation formed into sections, rectangular both in plan and cross section usually 90–120 cm long, 15–60 cm wide and 2.5–15 cm thick.

Blocking

A material used to retain the insulation in place in open areas.

Blood Lead Levels

The amount of lead in the blood. Human exposure to lead in blood can cause brain damage, especially in children.

Blowdown

(1) The removal of a portion of any process flow to maintain the constituents of the flow within desired levels. The process may be intermittent or continuous. (2) The water discharged from a boiler or cooling tower to dispose of accumulated dissolved solids. (3) Injection of air or water under high pressure through a tube to the anode area for the purpose of purging the annular space and possibly correcting high resistance caused by gas blocking. (4) In connection with boilers or cooling towers, the process of discharging a significant portion of the aqueous solution in order to remove accumulated salts, deposits, and other impurities.

Blowout

A closed depression formed in the land surface as a result of wind erosion removing material and depositing it in an accumulation adjacent to the resulting trough. In a beach situation such blowouts develop where the vegetative cover of a dune is removed and exposed sand is transported landward by prevailing on-shore winds. As a blowout proceeds through the dunes it develops an advancing front of loose sand and trailing arms which are held back by boundary vegetation. Blowouts which remain unchecked thus ultimately form parabolic or 'U' dunes which are found disrupting the coastal dune ridge system.

Blower, Air

Device that uses a fan to deliver air to a component; does not substantially compress air.

Blower Door

Diagnostic equipment consisting of a fan, removable panel and gauges, used to measure and locate air leaks.

Blower Door Test

A test used to determine the “tightness” (energy leakage) of your home.

Blowing Agent

A gas or a substance capable of producing a gas used in making foamed materials.

Blow Out

A blow out commonly occurs in pressure pipes due to corrosion pitting in metallic pipes.

Blown Insulation

Fiber insulation in loose form used to insulate attics and existing walls where framing members are not exposed.

Blue Brittleness

Brittleness exhibited by some steels after being heated to a temperature within the range of about 200–370 °C (400–700 °F), particularly if the steel is worked at the elevated temperature.

Blushing

Whitening and loss of gloss of a usually organic coating caused by moisture. Also called blooming.

Board

Rigid or semi-rigid insulation formed into sections, rectangular both in plan and cross section, usually more than 120 cm long, 60–75 cm wide and up to 10 cm thick.

Board Insulation

Semi-rigid insulation formed into section, rectangular both in plan and cross section, usually more than 120 cm long, 60–75 cm wide and up to 10 cm thick.

BOD5

Refers to the 5-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 50–70 days. BOD usually refers to the five-day BOD or BOD5. The amount of dissolved oxygen consumed in five days by biological process breaking down organic matter.

Bolus

A small handful of soil which has been moistened and kneaded into a soil ball which just fails to stick to the fingers. The behavior of the bolus and of the ribbon produced by pressing it between thumb and forefinger characterizes soil/texture.

Bonderizing

A proprietary custom process for phosphatizing.

Booster Pump Station

A Booster Pump Station is a pump station designed to boost the pressure of water within a long pipeline. Typically they would be used to boost low reticulation pressure in areas of higher elevation but can also be used to boost pressure in long transfer mains.

Boot

Flexible device attached to piping to provide a watertight seal. A hollow component attached to a soil opener and through which seed and/or fertilizer are conveyed from the sowing tube to the soil. It comprises part of the soil opener at its lower end opener at its lower end.

Bord and Pillar

A system of underground coal mining consisting of a network of parallel and intersecting drives or passageways (bords) separated by solid blocks of coal or pillars.

Bore

A bore is a shaft constructed to extract water from an aquifer. If the water flows to the surface without the need for a pump, then the bore is called an artesian well.

Bore Pump Station

A Bore Pump Station is a water pump station designed to extract water from an aquifer.

Borehole

Any exploratory hole drilled into the Earth or ice to gather geophysical data. Climate researchers often take ice core samples, a type of borehole,

to predict atmospheric composition in earlier years.

Boric Acid

A non-toxic chemical additive that is used as a fire retardant in cellulose insulation.

Borrow Area (Borrow Pit)

An area or excavation from which soil, clay, sand, rock or gravel has been extracted for a specific purpose. The material extracted is typically employed for dam construction, road construction, filling or top soiling.

Bottom Contraction

The reduction in the area of overflowing water caused by the crest of a weir contracting the nappe.

Bottom Ventilation

Movement of air through the medium of a wastewater filter facilitated by vent stacks or provisions for the entrance or exit of air at the base of the filter.

Brackish Water

Brackish Water contains 500–3000 ppm of sodium chloride. Water having salinity values ranging from approximately 0.5 to 17 parts per thousand. Water having less salt than seawater, but undrinkable.

Branch Circuit

That portion of the wiring system between the final overcurrent device that protects the circuit and the outlet.

Branches

Branches are collection from various drain funnels, catch basins and area drains and tie into sub laterals. They are called T, Y, T-Y, double Y, and V branches according to their respective shapes.

Braze Welding

The joining of metals using a technique similar to fusion welding and a filler metal with a lower melting point than the parent metal but neither using capillary action as in brazing nor intentionally melting the parent metal.

Brazing

A process of joining metals in which, during or after heating, molten filler metal is drawn by capillary action into the space between closed adjacent surfaces of the parts to be joined. In general, the melting point of the filler metal is above 500 °C, but always below the melting temperature of the parent metal.

Brazing Alloy

Filler metal used in brazing.

Breakdown Potential

The least noble potential where pitting or crevice corrosion, or both, will initiate and propagate.

Breakpoint Chlorination

Addition of chlorine to water or wastewater until the chlorine demand has been satisfied, with further additions resulting in a residual that is directly proportional to the amount added beyond the breakpoint.

Breakaway Corrosion

A sudden increase in corrosion rate, especially in high temperature “dry” oxidation, etc.

Breather Coating

A weather barrier coating designed to prevent water (rain, snow, sleet, spillage, wash water, etc.) from entering the insulation system, while still allowing the escape of small quantities of water vapor resulting from heat applied to the moisture entrapped in the insulation.

Brightener

An agent or combination of agents added to an electroplating bath to produce a smooth, lustrous deposit.

Brightness

A measure of the light received from an object, adjusted for the wavelength response of the human eye, so as to correspond to the subjective sensation of brightness. For visually large objects, the brightness does not depend on the distance from the observer.

Brightness Contrast

The ratio of the difference in brightness between two objects to the brightness of the brighter of the two. It varies from 0 to -1 .

Brine

Seawater containing a higher concentration of dissolved salt than that of the ordinary ocean.

British Thermal Unit (BTU)

A unit of heat used to describe the capacity of boilers and furnaces. One BTU equals the amount of heat required to raise the temperature of one pound of water 1 °F at sea level.

Brittle Fracture

Separation of a solid accompanied by little or no macroscopic plastic deformation. Typically, brittle fracture occurs by rapid crack propagation with less expenditure of energy than for ductile fracture.

Bromine Flame Retardants

Bromine flame retardants are added to plastic, plastic insulation material, the plastic casing of electronic systems and printed circuit boards. Samples from the bed of the Baltic Sea reveal that the levels of bromine aromatic substances are rapidly increasing and this could cause a new problem.

Brownfields

Abandoned, idled, or under-used industrial and commercial facilities where expansion or redevelopment is complicated by real or perceived environmental contamination.

Brush Aerator

A surface aerator that rotates about a horizontal shaft with metal blades attached to it; commonly used in oxidation ditches.

Bscat

Scattering coefficient. Measured directly by a nephelometer, the scattering coefficient includes scattering due to particles and atmospheric gases (Rayleigh scattering). Standard reporting units are inverse megameters (Mm^{-1}).

Btu

British thermal unit, a unit of energy: 1 Btu = 1060 J.

BTU British Thermal Unit

The amount of energy that is required to raise 1 lb of water up 1 °F. Fuel values, heat loss and heat gain are measured in BTU's.

BTUH

A rate of energy transfer—can be expressed as BTU's/hour.

Bubble, Coarse

Bubble of 3–8 mm diameter generated by an air diffuser.

Bubble, Fine

Bubble of 0.2–3 mm diameter generated by an air diffuser.

Bubble, Micro

It is of less than 0.2 mm diameter generated by an air diffuser.

Budget

A formal projection of spending and income for an upcoming period of time, traditionally submitted by the President or Executive for consideration and approval.

Budget Reconciliation

Legislation making changes to existing law (such as entitlements under Social Security or Medicare) so that it conforms to numbers in the budget resolution.

Budget Resolution

The first step in the annual budget process. This resolution must be agreed to by the House and Senate. It is not signed by the President and does not have the effect of law, but instead sets out the targets and assumptions that will guide Congress as it passes the annual appropriations and other budget bills.

Buffer

A substance that resists a change in pH.

Buffer Capacity

The ability of a soil to resist changes in pH. The buffering action is due mainly to the properties of clay and fine organic matter. Thus, with the same pH level, more lime is required to neutralize a clayey soil than a sandy soil, or a soil rich in organic matter than one low in organic matter.

Buffer Zone

An area surrounding a Groundwater-dependent ecosystem or other feature (such as an area of low quality) within which extraction, or the impact of extraction, is restricted.

Any area of land used or designed to isolate one area of land from another so that adverse effects arising from one area do not affect the other. For example:—a buffer zone around a mine site intended to reduce the effects of noise, dust etc. on adjacent landholders. A buffer zone at the outflow of a creek or waterway designed to spread the water before it enters a strip cropping system.

Building Envelope

The external elements walls, floor, ceiling, roof, windows and doors of a building that encloses conditioned space; the building shell.

Bulk Access Regime

The bulk access regime is the water sharing rules that will determine how much water will be available for extraction by all licensed water users within a Water Sharing Plan.

Bulk Density

The amount of mass of a soil per unit volume of soil; where mass is measured after all water has been extracted and total volume includes the volume of the soil itself and the volume of air space between the soil grains.

The mass of dry soil per unit bulk volume. The bulk volume is determined before drying to constant weight at 105 °C. The unit of measurement is usually grams per cubic centimeter. Bulk density is a measure of soil/porosity, with low values meaning a highly porous soil and vice-versa. It does not, however, give any indication of the number, sizes, shapes, distribution or continuity of soil pores.

This parameter is also used as an indicator of the structural condition of a soil, with low values indicating a better state of aggregation than high values. The range for soils in natural condition would typically be from t to $2.9/cm^3$.

Bulk Insulation

Insulation depending for its performance upon thickness and thermal conductivity to achieve Material R-value.

Bulk Plant

An intermediate gasoline distribution facility where delivery of gasoline to and from the facility is solely by truck.

Bulking

Inability of sludge solids to separate from the liquid under quiescent conditions; under aerobic conditions may be associated with the growth of

filamentous organisms, low DO, or high sludge loading rates; under anaerobic. Conditions, may be associated with attachment of gas bubbles to solids. Bulking is Inability of activated-sludge solids to separate from the liquid under quiescent conditions; may be associated with the growth of filamentous organisms, low DO, or high sludge loading rates. Bulking sludge typically has an SVI. 150 mL/g.

Bulking Factor (mm)

The degree to which spoil swells in volume as it is excavated. It may involve an increase of up to 35% in a typical dragline operation. The increase in volume is due to a loosening of the material and a consequent increase in pore space.

The bulking factor needs to be taken into account when planning rehabilitation programs, to allow for consolidation and/or compaction.

Building Sewer

Piping that conveys wastewater to the first system component or the sewer main.

Bundled Pipe

Distribution media consisting of two or more co-joined perforated pipes.

Buoyancy

Tendency of a body to float in water or other liquid; upward force that a fluid exerts on an object that is less dense than itself.

Bureau of Automotive Repair (BAR)

An agency of the California Department of Consumer Affairs that manages the implementation of the motor vehicle Inspection and Maintenance Program.

Buried Soil (Paleosol)

One or more layers of soil which were formerly at the surface but which have been covered by a more recent deposition, usually to a depth greater than the thickness of the soil.

Burn Day

A day that is not officially determined by meteorologists and air quality managers to be a no-burn day. Burn days vary by air basin on any given day.

Burning (Corrosion)

(1) Permanently damaging a metal or alloy by heating to cause either incipient melting or intergranular oxidation. See also OVER-HEATING. (2) In grinding, getting the work hot enough to cause discoloration or to change the microstructure by tempering or hardening.

Bury Depth

Depth from the surface of the finished grade to the top of a component.

Bus

An electrical conductor that serves as a common connection for two or more electrical circuits. A bus may be in the form of rigid bars, either circular or rectangular in cross section, or in the form of stranded conductor cables held under tension.

Butt Joint

A connection between the ends or edges of two parts making an angle to one another of 135° to 180° inclusive in the region of the joint. The end joints of pipe insulation.

Butt Strip

Strips of similar jacket material applied around pipe insulation butt joints.

Butterfly Valve

A valve in which the disk, as it opens or closes, rotates about a spindle supported by the frame of the valve. The valve is opened at a stem. At full opening, the disk is in a position parallel to the axis of the conduit.

Bycatch

Fish and/or other marine life that are incidentally caught with the targeted species. Most of the time by catch is discarded at sea.

By Catch Reduction Device (BDR)

A device used to cut by catch while fishing. These gear modifications are most commonly used with shrimp trawls. They are also called “finfish excluder devices” (feds) or, when specifically designed to exclude sea turtles, they are called “turtle excluder devices” (teds).

Bypass

The intentional diversion of waste streams from any portion of a treatment (or pre-treatment) facility. An arrangement of pipes, conduits, gates, and valves by which the flow may be passed around a hydraulic structure appurtenance or treatment process; a controlled diversion.

C

C-Value (Thermal Conductance)

A measure of a material's ability to allow heat to pass through it. The same as U-Value, but without air film resistances.

Cadmium (Cd)

Cadmium is easily absorbed by the body and by the kidneys and liver in particular. Acidification increases the leaching of cadmium into the sea and lakes. In the future, chronic cadmium poisoning is expected to be substantial, primarily as a result of the amounts in artificial fertiliser. Cadmium removes zinc, a necessary metal in the body. As a result of its toxicity, it is important that the use of cadmium ceases completely.

Cairo Plan

Recommendations for stabilizing world population agreed upon at the U.N. International Conference on Population and Development, held in Cairo in September 1994. The plan calls for improved health care and family planning services for women, children and families throughout the world, and also emphasizes the importance of education for girls as a factor in the shift to smaller families.

Cake

Wastewater solids that have been sufficiently dewatered to form a semisolid mass.

Calcareous Coating or Deposit

A layer consisting of a mixture of calcium carbonate and magnesium hydroxide deposited on surfaces being cathodically protected because of the increased pH ADJACENT to the protected surface.

Calcium Hypochlorite [Ca(OCl)₂·4H₂O]

A solid that, when mixed with water, liberates the hypochlorite ion OCl² and can be used for disinfection.

Calcium Silicate Insulation

Hydrated calcium silicate with added reinforcing fibres. Calcium Silicate Insulation composed principally of hydrous calcium silicate, and which usually contains reinforcing fibres.

Calibration Factor

The factor which provides a correction to the readings from a Primary Meter or an Alternate Meter, based on known variations, to determine the actual volume of water extracted through a Licensed Works.

Calibration

(1) The determination, checking, or rectifying of the graduation of any instrument giving quantitative measurements. (2) The process of taking measurements or of making observations to establish the relationship between two quantities.

Calomel Electrode

An electrode widely used as a reference electrode of known potential in electrometric measurement of acidity and alkalinity, corrosion studies, voltammetry, and measurement of the potentials of other electrodes.

Calorie

The amount of heat necessary to raise the temperature of 1 g of water at 15 °C by 1 °C.

Calorie Metric Thermal Unit

Calorie Metric Thermal Unit is a measure of heat energy; the amount needed to raise the temperature of 1 kg of water by 1 °C. This is the large Calorie (used relating to food energy content) definition. The “small” calorie of fuel research is the amount of energy needed to raise the temperature of one gram of water by 1 °C.

Calorizing

Imparting resistance to oxidation to an iron or steel surface by heating in aluminum powder at 800–1000 °C (1470–1830 °F).

Cancer

A group of diseases characterized by uncontrolled invasive growth of body cells leading to the formation of malignant tumors that tend to grow rapidly and spread (i.e., metastasize).

Canvas

A closely woven fabric of cotton, flax, hemp, or jute characterized by strength of firmness.

Cap

An enforceable limit on total emissions for the facilities covered under the cap-and-trade program. The cap is set for each compliance period of the program by the state and emissions are reduced as the cap declines over time.

Cap-and-Trade

Cap-and-trade is a regulatory approach used to control pollution by setting a firm cap on allowed emissions while employing market mechanisms to achieve emissions reductions while driving costs down. In a cap-and-trade program, a limit, or cap is put on the amount of greenhouse gases that can be emitted.

Capacitor (Condenser)

A device to provide capacitance, which is the property of a system of conductors and dielectrics that permit the storage of electrically separated charges when potential differences exist between the conductors. A dielectric is an insulator.

Capacity

(1) The quantity that can be contained exactly, or the rate of flow that can be carried out exactly. (2) The load for which an electrical apparatus is rated either by the user or manufacturer.

Capillary Action

The means by which liquid moves through the porous spaces in a solid, such as soil, plant roots, and the capillary blood vessels in our bodies due to the forces of adhesion, cohesion, and surface tension. Capillary action is essential in carrying substances and nutrients from one place to another in plants and animals.

Capillary Fringe

The zone of a porous medium above the water table within which the porous medium is saturated but is at less than atmospheric pressure. The capillary fringe is considered to be part of the vadose zone, but not of the unsaturated zone.

Capillary Suction

Process where water rises above the water table into the void spaces of a soil due to tension forces between the water and soil particles.

Capture

The extraction of solid particles, liquid particles or gases close to their sources.

Capture Efficiency

The fraction of organic vapours generated by a process that are directed to an abatement or recovery device.

Carbon (C)

- (1) A chemical element essential for growth.
- (2) A solid material used for adsorption of pollutants.

Carbon Adsorption

The use of either granular or powdered carbon to remove organic compounds from wastewater or effluents. Organic molecules in solution are drawn to the highly porous surface of the carbon by intermolecular attraction forces.

Carbon Canister Vapor Capture

An automotive filter in which activated carbon has been placed so that gas tank fuel vapours, which have accumulated when the vehicle is not running, are trapped in the filter. When the engine is running, hot air is forced into the filter and pushes out the vapours into the engine. In this way pollution is reduced and fuel conservation is maintained.

Carbon Capture and Sequestration (CCS)

The process of capturing CO₂ from a stationary source, followed by compressing, transporting and injecting it into a suitable geologic formation where it will be sequestered.

Carbon Cycle

Carbon Cycle is the process of removal and uptake of carbon on a global scale. This involves components in food chains, in the atmosphere as carbon dioxide, in the hydrosphere and in the geosphere. The major movement of carbon results from photosynthesis and from respiration. See also SINK and SOURCE.

Carbon Dioxide (CO₂)

A colourless, odourless gas that occurs naturally in the Earth's atmosphere. Significant quantities also are emitted into the air by fossil fuel

combustion. Carbon Dioxide (CO₂) is a non-poisonous gas that results from fossil fuel combustion and is a normal constituent of ambient air.

Carbon Dioxide Equivalent (CO₂E)

The amount of carbon dioxide by weight that would produce the same global warming impact as a given weight of another greenhouse gas, based on the best available science, including from the Intergovernmental Panel on Climate Change.

Carbon Dioxide Fertilization

The enhancement of the growth of plants as a result of increased atmospheric CO₂ concentration. Depending on their mechanism of photosynthesis, certain types of plants are more sensitive to changes in atmospheric CO₂ concentration.

Carbon Dioxide Welding

Metal-arc welding in which a bare wire electrode is used, the arc and molten pool being shielded with carbon dioxide gas.

Carbon Footprint

The total amount of greenhouse gases that are emitted into the atmosphere each year by a person, family, building, organization, or company. A person's carbon footprint includes greenhouse gas emissions from fuel that an individual burns directly, such as by heating a home or riding in a car. It also includes greenhouse gases that come from producing the goods or services that the individual uses, including emissions from power plants that make electricity, factories that make products, and landfills where trash gets sent.

Carbon Monoxide (CO)

A colourless, odourless, poisonous gas, produced by incomplete burning of carbon-based fuels including gasoline, oil, and wood. Carbon monoxide is also produced from incomplete combustion of many natural and synthetic products. For instance, cigarette smoke contains carbon monoxide. When carbon monoxide gets into the body, the carbon monoxide combines with chemicals in the blood and prevents the blood from bringing oxygen to cells, tissues, and organs. The body's parts need oxygen for energy, so high-level exposures to carbon monoxide can cause serious health effects. Massive exposures to CO can cause death. Symptoms of exposure to carbon monoxide can include vision problems, reduced alertness, and general reduction in mental and physical functions. Carbon monoxide exposures are especially harmful to people with heart, lung, and circulatory system diseases. Carbon Monoxide is a toxic gas produced by the incomplete combustion of carbon-containing substances. One of the major air pollutants, it is emitted in large quantities by exhaust from gasoline-powered vehicles.

Carbon Neutral

A situation that arises when the amount of carbon dioxide released into the air equals the amount of carbon dioxide removed from the air, for example by planting trees, or the amount saved by using renewable energy sources to produce the same amount of energy.

Carbon Offset

A financial instrument representing a reduction in greenhouse gas emissions. Although there are six primary categories of greenhouse gases, carbon offsets are measured in metric tons of carbon dioxide-equivalent (CO₂e). One carbon offset

represents the reduction of one metric ton of carbon dioxide, or its equivalent in other greenhouse gases.

Carbon Sequestration

The process of removing carbon dioxide (CO₂) from the atmosphere by storing it in a carbon reservoir other than the atmosphere. Sequestration enhances carbon storage in trees and soils, preserves existing tree and soil carbon and reduces emissions of CO₂, methane (CH₄) and nitrous oxide (N₂O).

Carbon Sink

Carbon sink is a pool (reservoir) that absorbs or takes up released carbon from another part of the carbon cycle. For example, if the net exchange between the biosphere and the atmosphere is toward the atmosphere, the biosphere is the source, and the atmosphere is the sink.

Carbon Tax

A charge on fossil fuels (coal, oil, natural gas) based on their carbon content. When burned, the carbon in these fuels becomes carbon dioxide in the atmosphere, the chief greenhouse gas.

Carbonaceous Biochemical Oxygen Demand (CBOD)

A quantitative measure of the amount of dissolved oxygen required for the biological oxidation of carbon-containing compounds in a sample. See BOD.

Carbonate Hardness

Hardness caused by the presence of carbonates and bicarbonates of calcium and magnesium in water. Such hardness may be removed to the

limit of solubility by boiling the water. When the hardness is numerically greater than the sum of the carbonate alkalinity and bicarbonate alkalinity, the amount of hardness is equivalent to the total alkalinity and is called carbonate hardness. It is expressed in milligrams of equivalent calcium carbonate per litre (mg/L CaCO₃). See also HARDNESS.

Carbonation

The diffusion of carbon dioxide gas through a liquid to render the liquid stable with respect to precipitation or dissolution of alkaline constituents. See also RECARBONATION.

Carbonitriding

A case hardening process in which a suitable ferrous material is heated above the lower transformation temperature in a gaseous atmosphere of such composition as to cause simultaneous absorption of carbon and nitrogen by the surface and, by diffusion, create a concentration gradient. The process is completed by cooling at a rate that produces the desired properties in the work piece.

Carburization

The absorption of carbon into a metal surface; may or may not be desirable.

Carburizing

The absorption of carbon atoms by a metal at high temperatures; it may remain dissolved, or form metal carbides; absorption and diffusion of carbon into solid ferrous alloys by heating, to a temperature usually above Ac in contact with a suitable carbonaceous material. A form of case hardening that produces a carbon gradient extending inward from the surface, enabling the surface layer to be hardened either by quenching

directly from the carburizing temperature or by cooling to room temperature then re austenitizing and quenching.

Carcinogen

A material that induces excessive or abnormal cellular growth in an organism. Carcinogen is any substance that can cause or contribute to the production of cancer.

Cardiovascular Diseases

A group of diseases of the blood vessels that includes coronary heart disease, stroke, and hypertension.

Carnivore

Carnivore are the flesh eating species.

Carrying Capacity

The maximum stocking rate possible which grazing land can support throughout the greatest period of stress each year.

Carryover

That part of an Allocation which remains unused at the end of the Water Year and which, under certain circumstances and subject to conditions, may be taken in the following Water Year.

Carryover Evaporation Reduction

A percentage reduction, applied to the Carryover sub-account. Carryover Evaporation Reduction Announcements can be issued any time during a Water Year.

Carryover Limit

The maximum End of Year Account Balance allowable for the Access Licence. It is defined as a percentage of the Annual Share Component for the Access Licence. At the end of the Open Water Year, actual Account Balance beyond this limit is forfeited.

Carryover Transaction Volume

The volume of water carried over from the previous water year as well as any allocation assignments that have been credited or debited on the account.

Carryover Sub-Account Balance

The balance of the account after each transaction has occurred is recorded in this field.

Carryover Spill Reduction

This is a percentage reduction of the Carryover sub-account. Carryover Spill Reduction Announcements can be issued at any time during a Water Year.

Carrying Capacity

The maximum rate of flow that a conduit, channel, or other hydraulic structure is capable of passing.

CAS Registry Number

The Chemical Abstracts Service Registry Number (CAS) is a numeric designation assigned by the American Chemical Society's Chemical Abstract Service and uniquely identifies a

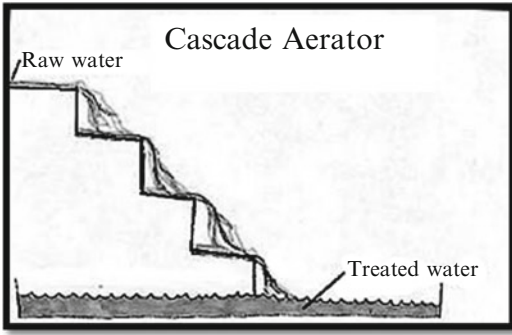


Fig. 7 Cascade aerator

specific compound. This entry allows one to conclusively identify a material regardless of the name or naming system used.

Cascade Aerator

An aerating device built in the form of steps or an inclined plane on which are placed staggered projections arranged to break up the water and bring it into contact with air (Fig. 7).

Cascade Impactor

An instrument that samples particles by impacting on solid surfaces via jets of air. After passing the first surface, the air is accelerated toward the next surface by a higher speed jet, in order to capture smaller particles than could be captured by the previous one.

Case Hardening

A generic term covering several processes applicable to steel that change the chemical composition of the surface layer by absorption of carbon, nitrogen or a mixture of the two and, by diffusion, create a concentration gradient. The outer portion, or case, is made substantially harder than the inner portion, or core.

Catalyst

A substance that can increase or decrease the rate of a chemical reaction between the other chemical species without being consumed in the process.

Catalytic Converter

An air pollution abatement device used primarily on motor vehicles and other sources. It removes organic contaminants by oxidizing them into carbon dioxide and water through chemical reaction. May convert nitrogen dioxide to nitrogen and oxygen or promote other similar reactions.

Catalytic Incinerator

A control device that oxidizes volatile organic compounds (VOCs) by using a catalyst to promote the combustion process. Catalytic incinerators require lower temperatures than conventional thermal incinerators, thus saving fuel and other costs.

Catch Basins

Catch basins are used to collect surface drainage and process wastes in individual drainage areas and to trap sediment at the point nearest the source.

Catchment

The name of a river, creek or lake. It may represent a number of streams such as unnamed water courses. The names are generally in accordance with the Geographical Names Board.

Catchment Area

Catchment area is an area defined by a number of effluent streams which have a common discharge directed into a surface water drainage system, or water course. The area draining naturally to a water source or to a given point.

Catchment Code

A code representing a stream name. The codes are structured within a valley and may represent reaches of a valley from highest order stream upstream. A catchment name may have multiple catchment codes for administrative convenience. For example, the Murray valley has five catchment codes in sequence.

Catena

A repetitive sequence of soils generally of similar age and parent material, encountered between hillcrests and the valley floor. The soils in the sequence occur under similar climatic conditions, but have different characteristics due to variation in relief, drainage and the past history of the land surface. Such variations are normally manifest in differential transport of eroded material and the leaching, translocation and re-deposition of mobile chemical constituents. In soil mapping, the use of this term has been largely replaced by the more general term toposequence.

Cathode

The electrode of an electrolytic cell at which reduction occurs. In corrosion processes, usually the area at which metal ions do not enter the solution. Typical cathodic processes are cations taking up electrons and being discharged, oxygen being reduced and the reduction from a higher to a lower state of valency.

Cathode Film

The portion of solution in immediate contact with the cathode during electrolysis.

Cathodic Corrosion

Corrosion resulting from a cathodic condition of a structure usually caused by the reaction of an amphoteric metal with the alkaline products of electrolysis.

Cathodic Disbondment

The destruction of adhesion between a coating and its substrate by products of a cathodic reaction.

Cathodic Inhibitor

A chemical substance or combination of substances that prevent or reduce the rate of cathodic reaction by a physical, physiochemical or chemical action.

Cathodic Pickling

Electrolytic pickling in which the work is the cathode.

Cathodic Polarization

Polarization of the cathode; a reduction from the initial potential resulting from current flow effects at or near the cathode surface. Potential becomes more active (negative) because of cathodic polarization.

Cathodic Protection

An electrical system for prevention of rust, corrosion, and pitting of steel and iron surfaces in contact with water. A low-voltage current is made to flow through a liquid or a soil in contact with the metal in such a manner that the external electromotive force renders the metal structure cathodic and concentrates corrosion on auxiliary anodic parts used for that purpose.

(1) Reduction of corrosion rate by shifting the "Corrosion Potential" of the electrode toward a

less oxidizing potential by applying an external “Electromotive Force”.

(2) Partial or complete protection of a metal from corrosion by making it a cathode using either a galvanic or an impressed current. Contrast with anodic protection.

Cathodic Reaction

Electrode reaction equivalent to a transfer of negative charge from the electronic to the ionic conductor. A cathodic reaction is a reduction process. An example common in corrosion is: $Ox + ne \rightarrow Red$.

Catholyte

The electrolyte adjacent to the cathode of an electrolytic cell.

Cation

A positively charged ion attracted to the cathode under the influence of electrical potential.

Cation Exchange Capacity

The total amount of exchangeable cations that a soil can adsorb, expressed in centimoles of positive charge per kilogram of soil. Cations are positive ions such as calcium, magnesium, potassium, sodium, hydrogen, aluminum and manganese, these being the most important ones found in soils. Cation exchange is the process whereby these ions interchange between the soil solution and the clay or organic matter complexes in the soil. The process is very important as it has a major controlling effect on soil properties and behavior, stability of soil structure, the nutrients available for plant growth, soil pH, and the soil's reaction to fertilizers' and other ameliorants added to the soil.

Cationic Flocculants

A polyelectrolyte with a net positive electrical charge.

Caulk

To seal and make water and/or air tight.

Caustic

(1) Burning or corrosive. (2) A hydroxide of a light metal, such as sodium hydroxide or potassium hydroxide.

Caustic Alkalinity

The alkalinity caused by hydroxyl ions. See also ALKALINITY.

Caustic Dip

A strongly alkaline solution into which metal is immersed for etching, for neutralizing acid, or for removing organic materials such as greases or paints.

Caustic Embrittlement

An obsolete historical term denoting a form of stress-corrosion cracking most frequently encountered in carbon steels or iron-chromium-nickel alloys that are exposed to concentrated hydroxide solutions at temperatures of 200–250 °C (400–480 °F).

Cave-in

Separation of a mass of soil or rock material from the side of an excavation, or the loss of soil from under a trench shield or support system, and its

sudden movement into the excavation, either by falling or sliding, in sufficient quantity so that it could entrap, bury, or otherwise injure and immobilize a person.

Cavitation

(1) The action, resulting from forcing a flow stream to change direction, in which reduced internal pressure causes dissolved gases to expand, creating negative pressure. Cavitation frequently causes pitting of the hydraulic structure affected. (2) The formation of a cavity between the downstream surface of a moving body (e.g., the blade of a propeller) and a liquid normally in contact with it. (3) Describing the action of an operating centrifugal pump when it is attempting to discharge more water than suction can provide.

Cavitation is a particular kind of erosion-corrosion caused by the formation and collapse of vapour bubbles in a liquid contacting a metal surface. The resultant shock forces reach high levels in local areas and can tear out jagged chunks of brittle materials or deform soft metals. Where the environment is corrosive, severity of cavitation damage increases.

Cavitation Damage

The degradation of a solid body resulting from its exposure to cavitation. This may include loss of material, surface deformation, or changes in properties or appearance.

Cavitation Erosion

Cavitation is a particular kind of erosion-corrosion caused by the formation and collapse of vapor bubbles in a liquid contacting a metal surface. The resultant shock forces reach high levels in local areas and can tear out jagged chunks of brittle materials or deform soft metals. Where the environment is corrosive, severity of cavitation damage increases.

Cavity

Empty space between studs/joists in which insulation is placed.

Cell

A circuit consisting of an anode and a cathode in electrical contact in a solid or liquid electrolyte. Corrosion generally occurs only at anodic areas.

Cellular Elastomeric

Insulation composed principally of natural or synthetic elastomers, or both, processed to form a flexible, semi-rigid or rigid foam that has a closed-cell structure.

Cellular Glass

Insulation composed of glass processed to form a rigid foam having a predominately closed-cell structure.

Cellular Glass (Foamed Glass)

A lightweight expanded glass with small cells, preferably non-intercommunicating, produced by a foaming process.

Cellular Insulation

Insulation composed of small, individual cells separated from each other. The cellular material may be glass or plastic such as polystyrene, polyurethane, polyisocyanurate or elastomeric.

Cellulose Insulation

Insulation made from recycled newspaper, making it a natural, environmentally friendly alternative to other insulation products.

Cellulosic Fibber

Insulation composed principally of cellulose fibers usually derived from paper, paperboard stock or wood, with or without binders.

Celsius

The international name for the centigrade scale of temperature, on which the freezing point and boiling point of water are 0 and 100 °C, respectively, at a barometric pressure of 1.013×10^5 Pa (760 mmHg).

CEM

Continuous emission monitoring (at stationary sources).

Cement, Insulating

A mixture of dry granular, fibrous or powdery (or both) materials that when mixed with water develops a plastic consistency, and when dried in place forms a coherent covering that affords substantial resistance to heat transmission.

Cementation Coating

A coating developed on a metal surface by a high temperature diffusion process (as carburization, calorizing, or chromizing).

Cemented

Describes soil materials having a hard, brittle consistency because the particles are held together by cementing substances such as humus, calcium carbonate or the oxides of silicon, iron and aluminum. The hardness and brittleness persist even when the soil is wet.

Cementite

A compound of iron and carbon, known chemically as iron carbide and having the approximate chemical formula Fe_3C . It is characterized by an orthorhombic crystal structure. When it occurs as a phase in steel, the chemical composition will be altered by the presence of manganese and other carbide-forming elements.

Centigrade

A thermometer temperature scale in which 0° marks the freezing point and 100° the boiling point of water at 760 mmHg barometric pressure. Also called Celsius. To convert temperature on this scale to Fahrenheit, multiply by 1.8 and add 32.

Centrate

Liquid removed by a centrifuge; typically contains high concentrations of suspended, nonsettling solids.

Centrifugal Collector

A mechanical system using centrifugal force to remove aerosols from a gas stream or to remove water from sludge.

Centrifugal Pump

A pump consisting of an impeller fixed on a rotating shaft and enclosed in a casing having an inlet and a discharge connection. The rotating impeller creates pressure in the liquid by the velocity derived from centrifugal force.

Centrifugal Screw Pump

A centrifugal pump having a screw-type impeller; may be of axial flow or combined axial and radial flow.

Certification

Program to substantiate the capabilities of personnel by documentation of experience and learning in a defined area of endeavour.

Centrifugation

Imposition of a centrifugal force to separate solids from liquids based on density differences. In sludge dewatering, the separated solids commonly are called cake and the liquid is called centrate.

Centrifuge

A mechanical device in which centrifugal force is used to separate solids from liquids or to separate liquids of different densities.

A centrifuge is a piece of equipment, generally driven by a motor, that puts an object in rotation around a fixed axis, applying force perpendicular to the axis. Centrifuges are commonly used in water and wastewater treatment to dry sludges.

Ceramic Fibre

Fibrous material, loose or fabricated into convenient forms, mainly intended for use at appropriate elevated temperatures. The fibres may consist of silica (SiO_2) or of an appropriate metal silicate, e.g., alumino-silicate. Alternatively, they may be formed synthetically from appropriate refractory metal oxides, e.g., alumina, zirconia.

Cesspool

A covered watertight tank used for receiving and storing sewage from premises which cannot be connected to a public sewer and where ground conditions prevent the use of a small sewage treatment works including a septic tank. A further stage of treating sewage.

CFS (cu ft/sec)

The rate of flow of a material in cubic feet per second; used for measurement of water, wastewater, or gas.

Chain Bucket

A continuous chain equipped with buckets and mounted on a scow. Also called a ladder dredge.

Chalking

The development of loose removable powder at the surface of an organic coating usually caused by weathering.

Chamber

Pre-formed manufactured distribution medium with an open-bottom configuration commonly used in soil treatment areas. chamber is any space enclosed by walls or a compartment; often prefixed by a descriptive word indicating its function, such as grit chamber, screen chamber, discharge chamber, or flushing chamber.

Chamfering

The surface produced by bevelling an edge or corner.

Change of State

The process by which a substance passes from one to another of the solid, the liquid, and the gaseous states, and in which marked changes in its physical properties and molecular structure occur.

Change Point (Turning Point)

A point on which the staff has been observed and on which it is then held whilst the level is being moved during leveling. It can be a peg, base plate, rock or any readily identified and firm point.

Channel

The main flow of a natural or manmade waterway. (1) A perceptible natural or artificial waterway that periodically or continuously contains moving water or forms a connecting link between two bodies of water. It has a definite bed and banks that confine the water. (2) The deep portion of a river or waterway where the main current flows. (3) The part of a body of water deep enough to be used for navigation through an area otherwise too shallow for navigation. (4) Informally, a more or less linear conduit of substantial size in cavernous lime stones or lava rocks. See also OPEN CHANNEL.

Channel Roughness

That roughness of a channel including the extra roughness owing to local expansion or contraction and obstacles, as well as the roughness of the stream bed proper; that is, friction offered to the flow by the surface of the bed of the channel in contact with the water. It is expressed as the roughness coefficient in velocity formulas.

Channel Stabilization

The introduction of natural or manmade materials placed within a channel so as to prevent or minimize the erosion of the channel bed and/or banks.

Channelization

The straightening of a stream, primarily a result of human activity.

Charge Neutralization

A process of removing static electric charges. This is done to particle-sampling filters in order to prevent electrostatic forces from distorting the apparent weight of the sample.

Check Valve

A valve with a disk hinged on one edge so that it opens in the direction of normal flow and closes with reverse flow. An approved check valve is of substantial construction and suitable materials, is positive in closing, and permits no leakage in a direction opposite to normal flow.

Checking

The development of slight breaks in a coating that do not penetrate to the underlying surface.

Checks

Numerous, very fine cracks in a coating or at the surface of a metal part. Checks may appear during processing or during service and are most often associated with thermal treatment or thermal cycling. Also called check marks, checking, or heat checks.

Chelate

(1) A molecular structure in which a heterocyclic ring can be formed by the unshared electrons of neighboring atoms. (2) A coordination compound

in which a heterocyclic ring is formed by a metal bound to two atoms of the associated ligand. See also COMPLEXATION.

Chelating Agent

(1) An organic compound in which atoms form more than one coordinate bond with metals in solution. (2) A substance used in metal finishing to control or eliminate certain metallic ions present in undesirable quantities.

Chelation

A chemical process involving formation of a heterocyclic ring compound that contains at least one metal cation or hydrogen ion in the ring.

Chemical

Commonly, any substance used in or produced by a chemical process. Certain chemicals may be added to water or wastewater to improve treatment efficiency; others are pollutants that require removal.

Chemical Analysis

Analysis by chemical methods to show the composition and concentration of substances.

Chemical Cleaning

Method of surface preparation or cleaning involving the use of chemicals, with or without electrical force, for removal of mill scale, rust, sediments and paint. These chemicals can also be introduced into some systems on-stream while the system is operating.

Chemical Coagulation

The destabilization and initial aggregation of colloidal and finely divided suspended matter by the addition of an inorganic coagulant. See also FLOCCULATION.

Chemical Conditioning

Mixing chemicals with a sludge prior to dewatering to improve the solids separation characteristics. Typical conditioners include polyelectrolytes, iron salts, and lime.

Chemical Conversion Coating

A protective or decorative coating which is produced deliberately on a metal surface by reaction of the surface with a chosen chemical environment. The thin layer formed by this reaction may perform several or all of the following functions: protect against corrosion; provide a base for organic coatings; improve retention of lubricants or compounds; improve abrasion resistance; provide an absorbent layer for rust-preventive oils and waxes.

Chemical Dose

A specific quantity of chemical applied to a specific quantity of fluid for a specific purpose.

Chemical Equilibrium

The condition that exists when there is no net transfer of mass or energy between the components of a system. This is the condition in a reversible chemical reaction when the rate of the forward reaction equals the rate of the reverse reaction.

Chemical Equivalent

The weight (in grams) of a substance that combines with or displaces 1 g of hydrogen. It is found by dividing the formula weight by its valence.

Chemical Feeder

A device for dispensing a chemical at a predetermined rate for the treatment of water or wastewater. The change in rate of feed may be effected manually or automatically by flow rate changes. Feeders are designed for solids, liquids, or gases.

Chemical Gas Feeder

A feeder for dispensing a chemical in the gaseous state. The rate is usually graduated in gravimetric terms. Such devices may have proprietary names.

Chemical Oxidation

The oxidation of compounds in wastewater or water by chemical means. Typical oxidants include ozone, chlorine, and potassium permanganate.

Chemical Oxygen Demand (COD)

COD is the equivalent amount of oxygen consumed under specified conditions in the chemical oxidation of the organic and oxidizable inorganic matter contained in a wastewater corrected for the influence of chlorides. In American practice, unless otherwise specified, the chemical oxidizing agent is hot acid dichromate. The Chemical Oxygen Demand (COD) test is used to estimate the amount of organic matter in a sample. It is a measurement of the oxygen equivalent of the materials present in the sample subject to oxidation by a strong chemical oxidant. Chemical

Oxygen Demand (COD) is the amount of oxygen utilized in the chemical reactions that occur in water as a result of the addition of wastes. COD is a measure of the pollutional strength of chemical waste on dissolved oxygen in water.

Chemical Potential

In a thermodynamic system of several constituents, the rate of change of the Gibbs function of the system with respect to the change in the number of moles of a particular constituent.

Chemical Precipitation

(1) Formation of particulates by the addition of chemicals. (2) The process of softening water by the addition of lime or lime and soda to form insoluble compounds; usually followed by sedimentation or filtration to remove the newly created suspended solids.

Chemical Reaction

A transformation of one or more chemical species into other species resulting in the evolution of heat or gas, color formation, or precipitation. It may be initiated by a physical process such as heating, by the addition of a chemical reagent, or it may occur spontaneously.

Chemical Reagent

A chemical added to a system to induce a chemical reaction.

Chemical Sludge

Sludge obtained by treatment of water or wastewater with inorganic coagulants.

Chemical Solution Tank

A tank in which chemicals are added in solution before they are used in a water or wastewater treatment process.

Chemical Speciation Network (CSN)

The CSN was established to meet the regulatory requirements for monitoring speciated PM_{2.5} to determine the chemical composition of these particles. The purpose of the CSN is to determine, over a period of several years, trends in concentration levels of selected ions, metals, carbon species, and organic compounds in PM_{2.5}. The program began in 1999 with 54 Speciation Trends Network (STN) sites across the nation located primarily in or near larger Metropolitan Statistical Areas (MSAs) and has increased to 200 sites nationwide. In the database and in most of the references on the VIEWS website, this network is currently referred to as the “EPA PM_{2.5} Speciation - Daily” network.

Chemical Tank

A tank in which chemicals are stored before they are used in a water or wastewater treatment process.

Chemical Tracer

A chemical substance added to, or naturally present in water, to allow flow to be followed.

Chemical Treatment

A process involving the addition of chemicals to achieve a specific result. Any treatment process involving the addition of chemicals to obtain a desired result such as precipitation, coagulation, flocculation, sludge conditioning, disinfection, or odor control.

Chemical Vapor Deposition

A coating process, similar to gas carburizing and carbonitriding, whereby a reactant atmosphere gas is fed into a processing chamber where it decomposes at the surface of the work piece, liberating one material for either absorption by, or accumulation on the work piece. A second material is liberated in gas form and is removed from the processing chamber, along with excess atmosphere gas.

Chemical Water Quality Monitoring

The direct, quantitative measurement of physical parameters, of the quantity or concentration of specific chemical elements or compounds, or of chemical reaction rates in aquatic substrates; the medium evaluated may be water, sediment or biological tissues; the concept of chemical monitoring is based upon measures of the possible “causes” of environmental impairment.

Chemisorption

The binding of an adsorbate to the surface of a solid by forces whose energy levels approximate those of a chemical bond. Contrast with physisorption.

Chevron Pattern

A fractographic pattern of radial marks (shear ledges) that look like nested letters “V”; sometimes called a herringbone pattern. Chevron patterns are typically found on brittle fracture surfaces in parts whose widths are considerably greater than their thicknesses. The points of the chevrons can be traced back to the fracture origin.

Chloramines

Compounds of organic or inorganic nitrogen formed during the addition of chlorine to wastewater. See BREAKPOINT CHLORINATION.

Chlorination

The application of chlorine to water, sewage, or industrial wastes, generally for the purpose of disinfection, but frequently for accomplishing other biological or chemical wastewater treatment results.

Chlorination By-Products

Cancer-causing chemicals created when chlorine used for water disinfection combines with dirt and organic matter in water.

Chlorinator

Any metering device used to add chlorine to water or wastewater.

Chlorine

Term commonly used to describe a chlorine source such as sodium hypochlorite, a highly reactive chemical used as a disinfectant and oxidizing agent. Chlorine (Cl_2) is an element ordinarily existing as a greenish-yellow gas about 2.5 times heavier than air. At atmospheric pressure and a temperature of 230.1 °F (248 °C), the gas becomes an amber liquid about 1.5 times heavier than water. Its atomic weight is 35.457, and its molecular weight is 70.914.

Chlorine, Combined Available

Chlorine that has combined with ammonia in wastewater to form chloramines; although they are slow-reacting, chloramines also serve as disinfectants.

Chlorine Contact Chamber

A detention basin provided to diffuse chlorine through water or wastewater and to provide adequate contact time for disinfection. Also called a chlorination chamber or chlorination basin.

Chlorine Demand

The difference between the amount of chlorine added to a wastewater and the amount of chlorine remaining after a given contact time. Chlorine dosage is a function of the substances present in the water, temperature, and contact time.

Chlorine Detention Chamber

A Chlorine Detention Chamber' is a large concrete chamber designed to provide contact time for dissolved chlorine gas to kill bacteria in sewage. Chlorine Detention Chambers are typically found at Wastewater Treatment Plants, for final effluent treatment prior to discharge to environment.

Chlorine Dose

The amount of chlorine applied to a wastewater, usually expressed in milligrams per litre (mg/L) or pounds per million gallons (lb/mil. gal).

Chlorine Ice

A yellowish ice formed in a chlorinator when chlorine gas comes in contact with water at 49 °F (9 °C) or lower. Chlorine ice is frequently detrimental to the performance of a chlorinator if it is formed in quantities sufficient to interfere with the safe operation of float controls or to cause plugging of openings essential to flow indication, control, or rate of application.

Chlorine Residual

Total amount of chlorine (free and combined available forms) remaining in water, sewage, or industrial wastes at the end of a specified contact period after the chlorination process.

Chlorine Room

A separate room or building for housing chlorine and chlorination equipment, with arrangements for protecting personnel and plant equipment.

Chlorine Toxicity

The detrimental effects on biota caused by the inherent properties of chlorine.

Chlorofluorocarbons (CFCs)

These chemicals and some related chemicals have been used in great quantities in industry, for refrigeration and air conditioning, and in consumer products. CFCs and their relatives, when released into the air, rise into the stratosphere, a layer of the atmosphere high above the Earth. In the stratosphere, CFCs and their relatives take part in chemical reactions which result in reduction of the stratospheric ozone layer, which protects the Earth's surface from harmful effects of radiation from the sun. The 1990 Clean Air Act includes provisions for reducing releases (emissions) and eliminating production and use of these ozone-destroying chemicals. A family of inert, nontoxic, and easily liquefied chemicals used in refrigeration, air conditioning, packaging, insulation, or as solvents and aerosol propellants. Because CFCs are not destroyed in the lower atmosphere they drift into the upper atmosphere where their chlorine components destroy the ozone layer.

Chroma

Relative purity, strength, or saturation of a colour; directly related to the dominance of the determining wavelength of the light and inversely related to greyness; one of the three variables of color.

Chromatography

The generic name of a group of separation processes that depend on the redistribution of the molecules of a mixture between a gas or liquid phase in contact with one or more bulk phases. The types of chromatography are adsorption, column, gas, gel, liquid, thin-layer, and paper.

Chrome (Cr)

Chrome normally occurs in two forms, trivalent and hexavalent chrome. Trivalent chrome is both a health hazard and an allergen. Hexavalent chrome is thought to be able to cause cancer and is both a health hazard and an allergen (when it is inhaled). It is important to remember that the chrome that is extracted from a mine never disappears but will always be somewhere in the ecosystem. It could, for example, end up in the ground water under a landfill and then travel to the sea where it ends up in the fish we eat.

Chromadizing

Improving paint adhesion on aluminum or aluminum alloys, mainly aircraft skins, by treatment with a solution of chromic acid. Also called chromodizing or chromatizing. Not to be confused with chromating or chromizing.

Chromate Treatment

A treatment of metal in a solution of a hexavalent chromium compound to produce a conversion coating consisting of trivalent and hexavalent chromium compounds.

Chromatic Aberration

A factor which may affect tone and texture of aerial photographs. It is caused by the different refractive qualities of the various colors that make up white light.

As light rays pass through the lens of the camera, blue light is refracted more than red light and this results in the two colors failing to come into focus at a common point. Theoretically, this means that detail cannot be imaged perfectly sharply on the negative and this could affect the tonal and textural qualities. In modern survey cameras, the effects of chromatic aberration are compensated by using multiple converging and diverging lens assemblies.

Chromating

Performing a chromate treatment.

Chrome Pickle

(1) Producing a chromate conversion coating on magnesium for temporary protection or for a paint base. (2) The solution that produces the conversion coating.

Chromizing

A surface treatment at elevated temperature, generally carried out in pack, vapor, or salt bath, in which an alloy is formed by the inward diffusion of chromium into the base metal.

Chronic Exposure

Long-term exposure, usually lasting one year to a lifetime.

Chronic Health Effect

A health effect that occurs over a relatively long period of time (e.g., months or years).

Ciliated Protozoa

Protozoans with cilia (hair-like appendages) that assist in movement; common in trickling filters and healthy activated sludge. Free-swimming ciliates are present in the bulk liquid, stalked ciliates are commonly attached to solids matter in the liquid.

CIMA

The Cellulose Insulation Manufacturers Association is the trade association for the cellulose segment of the thermal/acoustical insulation industry.

CIMAC

The Cellulose Insulation Manufacturers Association of Canada is the trade association for the cellulose segment of the thermal/acoustical insulation industry.

Circuit

A conductor or a system of conductors through which an electrical current flows or is intended to flow.

Circuit Breaker

A device designed to open or close a circuit by nonautomatic means and open the circuit automatically on a predetermined overload of current without injury to itself.

Circumferential Cracking

Circumferential Cracking is the most common type of cracking found in water and sewer pipes.

Civil Society

The totality of voluntary civic and social organizations and institutions that form the basis of a functioning society as opposed to the force-backed structures of a state (regardless of that state's political system) and commercial institutions.

Clad Metal

A composite metal containing, two or more layers that have been bonded together. The bonding may have been accomplished by co-rolling, co-extrusion, welding, diffusion bonding, casting, heavy chemical deposition, or heavy electroplating.

Two metals rolled together so that the cheaper one forms a backing for the more costly one.

Claire

Computerized local air index reporting, Environmental Systems Corporation's computer software and hardware to enable the public to call in and listen to an automatically generated Air Quality Index (AQI) report and related information. APCD uses a CLAIRE system for the Louisville AQI.

Clarification

Any process or combination of processes the main purpose of which is to reduce the concentration of suspended matter in a liquid. Clarification is any process or combination of processes whose primary purpose is to reduce the concentration of suspended matter in a liquid; formerly used as a synonym for settling or sedimentation. In recent years, the latter terms are preferable when describing settling processes.

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. Clarifier is any large circular or rectangular sedimentation tank used to remove settleable solids in water or wastewater. A special type of clarifier, called an up flow clarifier, uses flotation rather than sedimentation to remove solids.

Class I Area

Under the Clean Air Act, an area in which visibility is protected more stringently than under the national ambient air quality standards; includes

national parks, wilderness areas, monuments, and other areas of special national and cultural significance.

Clay

(1) Soil separate consisting of particles <0.002 mm in equivalent diameter; (2) In reference to clay mineralogy, a naturally occurring material composed primarily of fine-grained minerals, which is generally plastic at appropriate water content and will harden when dried or fired. Soil material consisting of mineral particles less than 0.002 mm in equivalent diameter. This generally includes the chemically active mineral part of the soil. Many of the important physical and chemical properties of a soil depend on the type and quantity of clay it contains. Three broad classes of clay type are recognized, namely montmorillonite, kaolinite and illite. When used as a soil texture group such soil contains at least 35% clay and no more than 40%.

Clay Loam

A soil texture group representing a well-graded soil composed of approximately equal parts by weight of clay, silt and sand.

Clayoquot Sound

One of the last remaining unlogged watersheds on the west coast of Canada's Vancouver Island.

Claypan

A pan made up of a concentration of dense clays in the subsoil. The term is also used for the impermeable clay surface produced as a result of scalding, although this usage is colloquial.

Clean Air Act

Originally passed in 1963, although the 1970 version of the law is the basis of today's U.S. national air pollution program. The 1990 Clean Air Act Amendments are the most far-reaching revisions of the 1970 law, and are usually referred to as the 1990 Clean Air Act.

Clean Fuels

Low-pollution fuels that can replace ordinary gasoline. These are alternative fuels, including gasohol (gasoline-alcohol mixtures), natural gas, and LPG (liquefied petroleum gas).

Cleaning (After Clogging)

The removal of the deposit of solid or liquid particles which has produced clogging.

Cleaning Factor

The ratio of the quantity of pollutants entering a separator to the quantity leaving it.

Cleanout

Device designed to provide access for removal of deposited or accumulated materials, generally from a pipe.

Clean-Up

Treatment, remediation, or destruction of contaminated material.

Clear-Cutting

A logging technique in which all trees are removed from an area, typically 20 acres or larger, with little regard for long-term forest health.

Clear Water

Fraction of the wastewater stream including, but not limited to surface water, groundwater, condensate, ice machine drainage, and/or discharge from swimming pools, hot tubs, and water treatment devices.

Clear-Water Basin

A reservoir for the storage of filtered water of sufficient capacity to prevent the necessity of frequent variations in the rate of filtration with variations in demands. Also called filtered-water reservoir, clear-water reservoir, clear well.

Clear Zone

Volume or zone within a component that contains clarified wastewater; for example, after wastewater has had sufficient detention time in a septic tank, the clear zone lies between the scum and sludge layers.

Cleavage

Splitting (fracture) of a crystal on a crystallographic plane of low index.

Cleavage Fracture

A fracture, usually of polycrystalline metal, in which most of the grains have failed by cleavage, resulting in bright reflecting facets. It is associated with low-energy brittle fracture.

Climate

Climate is the prevalent long term weather conditions in a particular area. Climatic elements include precipitation, temperature, humidity, sunshine and wind velocity and phenomena such as fog, frost, and hail storms.

Climate Change (Also Referred to as 'Global Climate Change')

Sometimes used to refer to all forms of climatic inconsistency, but because the Earth's climate is never static, the term is more properly used to imply a significant change from one climatic condition to another. In some cases, 'climate change' has been used synonymously with the term, 'global warming'; scientists however, tend to use the term in the wider sense to also include natural changes in climate.

Climate Lag

The delay that occurs in climate change as a result of some factor that changes only very slowly. For example, the effects of releasing more carbon dioxide into the atmosphere occur gradually over time because the ocean takes a long time to warm up in response to a change in radiation.

Climate Model

A quantitative way of representing the interactions of the atmosphere, oceans, land surface, and ice. Models can range from relatively simple to quite comprehensive.

Climate Sensitivity

In Intergovernmental Panel on Climate Change (IPCC) reports, equilibrium climate sensitivity refers to the equilibrium change in global mean surface temperature following a doubling of the atmospheric (equivalent) CO₂ concentration. More generally, equilibrium climate sensitivity refers to the equilibrium change in surface air temperature following a unit change in radiative forcing (degrees Celsius, per watts per square meter, °C/Wm⁻²). One method of evaluating the equilibrium climate sensitivity requires very long simulations with Coupled General Circulation Models (Climate model). The effective climate

sensitivity is a related measure that circumvents this requirement. It is evaluated from model output for evolving non-equilibrium conditions. It is a measure of the strengths of the feedbacks at a particular time and may vary with forcing history and climate state.

Climate System (or Earth System)

The five physical components (atmosphere, hydrosphere, cryosphere, lithosphere, and biosphere) that are responsible for the climate and its variations.

Clod

A large compact and coherent soil aggregate produced artificially, usually by ploughing or digging soils that are either too wet or too dry for normal tillage operations.

Clogging

The deposition, progressive or otherwise, of solid or liquid particles on or within a filter medium, causing the flow to be obstructed.

Clogging Capacity

The particle mass that can be retained by equipment up to the point at which one of the specified operational limits is reached.

Closed Cell Foam

A material comprised predominantly of individual non-interconnecting cellular voids.

Closed Centrifugal Pump

A centrifugal pump having its impeller built with the vanes enclosed within circular disks.

Closed Conduit

Any closed artificial or natural duct for conveying fluids.

Closed Impeller

An impeller having the side walls extended from the outer circumference of the suction opening to the vane tips.

Closed Process

The purpose of this kind of process is to obtain zero emissions; this means that all the residual products are used in the process and no residual products are discharged into the environment. In practice, however, closed processes mean that residual products are conducted back into the process, but nonetheless some waste is produced and ends up in the environment.

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.

Coagulant Aids

Materials added to enhance the action of coagulants, generally by affecting the electrical balance of the particles.

Coagulant or Flocculants Aid

An insoluble particulate used to enhance solid-liquid separation by providing nucleating sites or acting as a weighting agent or sorbent; also used colloquially to describe the action of flocculants in water treatment.

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. The conversion of colloidal (0.001 mm) or dispersed (0.001–0.1 mm) particles into small visible coagulated particles (0.1–1 mm) by the addition of a coagulant, compressing the electrical double layer surrounding each suspended particle, decreasing the magnitude of repulsive electrostatic interactions between particles, and thereby destabilizing the particle. See also FLOCCULATION.

Coagulation Basin

A basin used for the coagulation of suspended or colloidal matter, with or without the addition of a coagulant, in which the liquid is mixed gently to induce agglomeration with a consequent increase in the settling velocity of particulates.

Coal Mine Methane

Coal mine methane is the subset of coal bed methane that is released from the coal seams during the process of coal mining.

Coal Bed Methane (Coal Seam Gas)

Coal bed methane is methane contained in coal seams, and is often referred to as virgin coal bed methane, or coal seam gas.

Coalescence

The action by which liquid particles in suspension unit to form larger particles.

Coarse Mode

A size range of particles between 2.5 microns and 10 microns. Coarse particles are mostly composed of soils. The sum of the masses of coarse and fine particles (all particles smaller than 10 microns) is called PM10.

Coast

The strip of land, of indefinite width, that extends from the seashore inland to the first major change in terrain and/or geology.

Coastal Erosion

Loss of sand, soil and rock material to the sea in response to wave action.

Coastal Pelagic

Fish that live in the open ocean at or near the water's surface but remain relatively close to the coast. Mackerel, anchovies, and sardines are examples of coastal pelagic fish.

Coastal Recession

Net loss of sand from the beach in response to off-shore sand movements.

Coastal Sand Drift

A broad term used to refer to the erosive processes affecting beach areas and related to the excessive movement of sand due to the instability of dune systems. The main cause of the drift is lack of stabilizing vegetation on the dunes which makes them highly susceptible to wind erosion.

Coating

A material applied to the inside or outside of a pipe, valve, or other fixture to protect it primarily against corrosion. Coatings may be of various materials.

Co-Benefit

The benefits of policies that are implemented for various reasons at the same time including climate change mitigation acknowledging that most policies designed to address greenhouse gas mitigation also have other, often at least equally important, rationales (e.g., related to objectives of development, sustainability, and equity).

Cocci

Sphere-shaped bacteria.

Codisposal

Joint disposal of wastewater sludge and municipal refuse in one process or facility. Disposal can be intermediate, as with incineration or composting, or final, as with placement in a sanitary landfill.

Codominant

A term used to indicate the joint dominance of two or more members of a grouping, over the other members. Typically used when mapping soils, vegetation, and other land resources.

Coefficient

A numerical quantity, determined by experimental or analytical methods, interposed in a formula that expresses the relationship between two or

more variables to include the effect of special conditions or to correct a theoretical relationship to one found by experiment or actual practice.

Coefficient of Haze (COH)

A measurement of the quantity of dust and smoke in the atmosphere in a theoretical 1000 linear feet of air. A COH of less than 1 is considered clean air and more than 3 is considered dirty air.

Coefficient of Viscosity

A numerical factor that is a measure of the internal resistance of a fluid to flow; the greater the resistance to flow, the larger the coefficient. It is equal to the shearing force in dynes per square centimetre (dyne/cm^2) transmitted from one fluid plane to another parallel plane 1 cm distant, and is generated by a difference in fluid velocities in the two planes of 1 cm/s in the direction of the force. The coefficient varies with temperature. Also called absolute viscosity. The unit of measure is the poise, a force of 1 dyne/cm^2 .

Coffee Rock

A type of brownish sand-rock formed where iron oxides and organic matter which have leached through the soil profile, are precipitated at, or above, a fluctuating water table, a typical feature of some older coastal sands in which podzols have formed.

Cohesion

The force of molecular attraction between the particles of any substance that tends to hold them together.

Coil

A set of windings with or without an iron core, shaped to produce a magnetic force when current flows through the windings. This force is used in relays and other electrical equipment to pull contacts together or to separate them.

Cold Climate Limitations

Cold temperatures, ice cover, plant dormancy, equipment performance, ice buildup and reduced microbial action create design challenges for cold weather wastewater treatment.

Cold Cracking

A type of weld cracking that usually occurs below $203 \text{ }^\circ\text{C}$ ($400 \text{ }^\circ\text{F}$). Cracking may occur during or after cooling to room temperature, sometimes with a considerable time delay. Three factors combine to produce cold cracks: stress (for example, from thermal expansion and contraction), hydrogen (from hydrogen-containing welding consumables), and a susceptible microstructure (plate martensite is most susceptible to cracking, ferritic and bainitic structures least susceptible). See also HOT CRACKING, LAMELLAR TEARING and STRESS-RELIEF CRACKING.

Cold Ironing

Cold Ironing or Shore power refers to providing electrical power to a vessel that is docked. The purpose of shore power is to allow the vessel operator to turn off the vessel's auxiliary engines, which would normally be providing the necessary electricity. Although there are emissions associated with the generation of electricity used for shore power, those emissions are much less than those from the auxiliary engines, which burn diesel fuel.

Cold Working

Deforming metal plastically under conditions of temperature and strain rate that induce strain hardening usually, but not necessarily, conducted at room temperature. Contrast with hot working.

Coliform Bacteria

Group of bacteria that constitute most of the intestinal flora of warm blooded animals (including the genera *Klebsiella* sp., *Enterobacter* sp., *Citrobacter* sp., or *Escherichia* sp.) and are used as water pollution indicator organisms.

Coliform Bacteria

Indicator bacteria common to the digestive systems of warm-blooded animals that is cultured in standard tests to indicate either contamination from sewage or the level of disinfection; generally measured as number of colonies/100 mL or most probably number (MPN).

Coliform-Group Bacteria

A group of bacteria predominantly inhabiting the intestines of man or animal, but also occasionally found elsewhere. It includes all aerobic and facultative anaerobic, Gram-negative, non-spore-forming, rod-shaped bacteria that ferment lactose with the production of gas. Also included are all bacteria that produce a dark, purplish-green metallic sheen by the membrane filter technique used for coliform identification. The two groups are not always identified, but they are generally of equal sanitary significance.

Coliform Organisms

A group of bacteria recognized as indicators of fecal pollution (see also *ESCHERICHIA COLIFORM*).

Coliform, Total (TC)

Measurement of water quality expressed as the number of colony-forming units (cfu) of coliform bacteria per unit volume.

Coliphage

Virus which uses coliform bacteria as its host cell; also known as a Bacteriophage.

Collar

A flange fitted round a pipe to prevent seepage of water along the outside of the pipe. Typically used in dams to prevent seepage along the outside of pipes passing through the wall.

Collection Efficiency

With regard to filters, dust separators and droplet separators, the ratio of the quantity of particles retained by a separator to the quantity entering it (generally expressed as a percentage).

Collection System

In wastewater, a system of conduits, generally underground pipes, that receives and conveys sanitary wastewater or stormwater; in water supply, a system of conduits or canals used to capture a water supply and convey it to a common point.

Colliery

A large coal mine including associated surface works.

Collimation Test

A test to check whether the line of sight—line of collimation—through the telescope of a level is horizontal when the vertical axis is truly vertical.

The level is centrally located between two points, approximately 100 meters apart, and staff readings are taken to determine the true height difference. It is then set up about 3 meters from one of the points. Staff readings are again taken and a new height difference calculated. Any variation between this difference and the true difference is the collimation error. A collimation error of less than 0.02 meters in 100 meters is acceptable for general soil conservation purposes.

Colloidal Material

The finest clay and organic material with a particle size generally less than 1/1000 mm in diameter. Such material represents the finest particles removed in an erosion event, and as such remains permanently in suspension, unless subject to flocculation.

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.

Colluvial

Describes material transported largely by gravity.

Colluvium

Unconsolidated soil and rock material, moved largely by gravity, deposited on lower slopes and/or at the base of a slope.

Colony

A discrete clump of microorganisms on a surface as opposed to dispersed growth throughout a liquid culture medium.

Colony-Forming Unit (CFU)

Term used to report the estimated number of live non-photosynthetic bacteria in a water sample

Colorimeter

An instrument that quantitatively measures the amount of light of a specific wavelength absorbed by a solution.

Colour

Any dissolved solids that impart a visible hue to water.

Color Contrast or Difference

Contrast between two adjacent scene element colors. Any difference in color hue, saturation, or brightness, between two perceived objects.

Colorimetric Analysis

Chemical analysis based on the colors of dyes formed by the reaction of the analysis with reagents.

Combined Available Chlorine

The concentration of chlorine that is combined with ammonia as chloramine or as other chloro derivatives, yet is still available to oxidize organic matter.

Combined Available Residual Chlorine

That portion of the total residual chlorine remaining in water or wastewater at the end of a specified contact period that will react chemically and biologically as chloramines.

Combined Carbon

The part of the total carbon in steel or cast iron that is present as other than free carbon.

Combined Heat and Power (CHP)

An approach to generating power and thermal energy from a single fuel source. CHP application involves the recovery of otherwise wasted thermal energy to produce additional power or useful thermal energy.

Combined Residual Chlorination

The application of chlorine to water or wastewater to produce, with natural or added ammonia or with certain organic nitrogen compounds, a combined chlorine residual.

Combined Sewer

Carries both sanitary sewage and storm water run-off. Sewer systems in which the storm water and sanitary waste are combined. A benefit is that non-point pollution flushed from the watershed during moderate rain is treated, but the system can be overwhelmed during severe storms, resulting in untreated waste being flushed into the receiving waters as a combined sewer overflow (CSO).

Combined Sewer Overflow (CSO)

Sewer systems that combine sanitary waste and stormwater in instances of heavy rains, usually untreated; cities with older systems often have CSOs.

Combined Wastewater

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

Combustible-Gas Indicator

An explosimeter; a device for measuring the concentration of potentially explosive fumes. The measurement is based on the catalytic oxidation of a combustible gas on a heated platinum filament that is part of a Whetstone bridge.

Combustion

Burning. Many important pollutants, such as sulfur dioxide, nitrogen oxides, and particulates are combustion products, often products of the burning of fuels such as coal, oil, gas, and wood.

Commercial Extinction

The depletion of a population to the point where fisherman cannot catch enough to be economically worthwhile.

Commercial Insulation

The insulation of commercial spaces like schools, colleges and metal buildings etc.

Commercial Water Use

Water used for motels, hotels, restaurants, office buildings, other commercial facilities, and institutions. Water for commercial uses comes both from public-supplied sources, such as a county water department, and self-supplied sources, such as local wells.

Commercially Dry Sludge

Sludge containing not more than 10% moisture by weight; the limit is 5% in the fertilizer trade.

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.

Community

Community is a group of organisms living in a common environment and interdependent.

Compaction

Rearrangement of soil grain particles that decrease void space and result in the degradation of soil structure and/or water infiltrative capacity. The process whereby the density of soils is increased by tillage, stock trampling and/or vehicular traffic, often resulting in the formation of plough-pans. Such compaction gives rise to Lower soil permeability and poorer soil aeration with resultant increases in erosion hazard and lowered plant productivity. Deep tipping and conservation tillage are used to alleviate the condition.

Compactor, Vibratory

Mechanical device such as a jumping jack that consolidates loose soil material.

Compartment

Space created by a physical partition within a pre-treatment component.

Compatibility

The ability of a given material to exist unchanged under certain condition and environment in the presence of some other material.

Complete Mix

Activated sludge process whereby wastewater is rapidly and evenly distributed throughout the aeration tank.

Competent Person

In accordance with OSHA standards, one who is capable of identifying existing and predictable hazards in the surroundings, or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

Complexation

The formation of complex chemical species by the coordination of groups of atoms termed ligands to a central ion, commonly a metal ion. Generally, the ligand coordinates by providing a pair of electrons that forms an ionic or covalent bond to the central ion. See also CHELATE, COORDINATION COMPOUND, and LIGAND.

Component

Subsection of a treatment train or system; a component may include multiple devices.

Composite Sample

A combination of individual samples of water or wastewater taken at preselected intervals to minimize the effect of the variability of the individual sample. Individual samples may be of equal volume or may be proportional to the flow at the time of sampling.

Compost

The product of the thermophilic biological oxidation of sludge or other materials.

Composting

Composting is the process which occurs when plant and food waste, in conditions in which oxygen is available, is broken down to produce soil (humus). Humus can be used in parks, gardens and agriculture. Large-scale composting requires the waste to be sorted to prevent the heavy metal content of compost humus being too high.

Compressive

Pertaining to forces on a body or part of a body that tend to crush or compress the body.

Compressive Strength

The maximum compressive stress a material is capable of developing. With a brittle material that fails in compression by fracturing, the compressive strength has a definite value. In the case of ductile, malleable, or semi viscous materials (which do not fail in compression by a shattering fracture), the value obtained for compressive strength is an arbitrary value dependent on the degree of distortion that is regarded as effective failure of the material. The property of an insulation material that resists any change in dimensions when acted upon by a compaction force.

Compressive Stress

A stress that causes an elastic body to deform (shorten) in the direction of the applied load. Contrast with tensile stress.

Computer Controlled Air/Fuel Management System

Maintains the air/fuel ratio in the correct operating range needed for complete combustion without an excess of either air or fuel, resulting in low engine-out emissions and maximized catalyst performance.

Concealed Spaces

Spaces not generally visible after the project is completed such as furred spaces, pipe spaces, pipe and duct shafts, spaces above ceilings, unfinished spaces, crawl spaces, attics and tunnels.

Concentration

The quantity of a solid, liquid or gaseous material expressed as a proportion of another material in which it is contained in the form of a mixture, a suspension or a solution. Concentration is (1) The amount of a given substance dissolved in a discrete unit volume of solution or applied to a unit weight of solid. (2) The process of increasing the dissolved solids per unit volume of solution, usually by evaporation of the liquid. (3) The process of increasing the suspended solids per unit volume of sludge as by sedimentation or dewatering.

Concentration Cell

An electrolytic cell, the EMF of which is caused by a difference in concentration of some component in the electrolyte. (This difference leads to the formation of discrete cathode and anode regions.)

Concentration Polarization

That portion of the polarization of a cell produced by concentration changes resulting from passage of current through the electrolyte.

Concentrator

A solids contact unit used to decrease the water content of sludge or slurry.

Condensate

Condensed steam from any heat exchanger.

Condensation

The process by which a substance changes from the vapor state to the liquid or solid state. Water that falls as precipitation from the atmosphere has condensed from the vapor state to rain or snow. Dew and frost are also forms of condensation. Changing a substance from a vapor to a liquid state by removing the heat. The condensate shows up on surfaces as a film or drops of water.

Condensation Counter Nuclei

An instrument that counts nucleation mode particles by causing them to grow in a humid atmosphere, and observing light reflections from the individual enlarged particles.

Condensation Nuclei

The small nuclei or particles with which gaseous constituents in the atmosphere (e.g., water vapor) collide and adhere.

Condenser

Any device for reducing gases or vapours to liquid or solid form.

Conditioned Space

Building area supplied with conditioned air that is heated or cooled to a certain temperature and may be mechanical controlled to provide a certain humidity level.

Conditioning

The chemical, physical, or biological treatment of sludges to improve their dewaterability.

Conduction

Transmission of energy (heat /sound) through a material or from one material to another by direct contact. Materials with low rates of conductive heat transfer make good insulation.

Conductivity, Thermal (Lambda Value)

The rate at which heat is transmitted through a material, measured in watts per square metre of surface area for a temperature gradient of one Kelvin per metre thickness, simplified to W/mK.

Conductor

A material that offers very little resistance to the flow of current and is, therefore, used to carry current or conduct electricity.

Conduit (Duct) Bank

A length of one or more conduits or ducts (which may be enclosed in concrete) that is designed to contain cables. Any channel intended for the conveyance of water, whether opened or closed.

Conductivity

The ratio of the electric current density to the electric field in a material. Also called electrical conductivity or specific conductance.

Confined Aquifer

An aquifer under greater than atmospheric pressure, bounded above and below by relatively impermeable formations.

Confined Animal Feeding Operation (CAFO)

A lot or facility, together with any associated treatment works, where (1) animals have been, are, or will be stabled or confined and fed or maintained for a total of 45 days or more in any 12-month period; and (2) crops, vegetation, forage growth or post-harvest residues are not sustained over any portion of the operation of the lot or facility (pertains to both operations that require a permit and non-permitted operations).

Confining Layer

A geologic formation exhibiting low permeability that inhibits the flow of water.

Conjunctive Use

The situation which may occur when the holder of a Licence pertaining to Regulated Surface Water also holds a Groundwater Licence which services the same property. When the Regulated Surface Water Allocation is less than 100%, under certain circumstances and subject to conditions, the shortfall may be made up from the Groundwater Work.

Connate Water

Interstitial water of the same geological age as the surrounding rock or bed, often of poor quality and unfit for normal use (for example potable purposes, industrial and agricultural use).

Conservation

Conservation is the planning and management of resources to secure their long term use and continuity and better their quality, value and diversity. It is the use of less energy, either by using more efficient technologies or by changing wasteful habits.

The management of human use of the biosphere so that it may yield the greatest sustainable benefit to present generations while maintaining its potential to meet the needs and aspirations of future generations. Thus conservation is positive, embracing preservation, maintenance! sustainable utilization, restoration, and enhancement of the natural environment. Living resource conservation is specifically concerned with plants, animals and micro-organisms, and with those non-living elements of the environment on which they depend. Living resources have two important properties the combination of which distinguishes them from nonliving resources: they are renewable if conserved; and they are destructible if not.

Conservation Farming

A system of farming which involves using the land in accordance with its capability and suitability and managing the land in accordance with the principles of conservation. Such a system would include contour farming, conservation tillage, crop and pasture rotation, judicious stocking management, pasture improvement, strip cropping, and soil/water conservation works and practices where appropriate. The aim of the system is to farm in such a way as to conserve soil, water and energy resources, whilst ensuring continued farm productivity and economic viability.

Conservation Tillage

A tillage system that creates a suitable soil environment for growing a crop and that conserves soil, water and energy resources. The essential elements of such a system are reduction in the intensity of tillage, and retention of plant residues.

Consolidated Soil

When a soil is subjected to an increase in pressure due to loading at the ground surface, a re-adjustment in the soil structure occurs.

The volume of space between the soil particles decreases and the soil tends to settle or consolidate over time.

Consolidation

The process of reducing the volume of wet material, such as slurry by gradual drainage.

The process whereby a newly formed earthen structure reduces its volume by natural settling.

Constituent

An essential part or component of a system or group: examples are an ingredient of a chemical system, or a component of an alloy.

Constructed Stormwater Wetlands

Areas intentionally designed and created to emulate the water quality improvement function of wetlands for the primary purpose of removing pollutants from stormwater.

Constructed Wetland

A wetland constructed for the purpose of pollution control and waste management. The flow rate, residence time and other factors are controlled to enhance the removal of BOD, SS, and N. A waterproof barrier is usually placed below the substrate to isolate the wastewater from the groundwater. Plants such as cattails, bulrushes and reeds provide a dense cover and an oxygenating substrate for bacteria in the root zone. An artificially created wetland usually with a waterproof lining for wastewater purification.

Detention, flow rates, types of plants and other parameters are controlled to improve BOD, SS and N removal. Typical riparian plants like cattails and reeds are used to provide bacteria with an oxygenating root zone.

Constructed Wetland System, Free Water Surface

Constructed wetland in which wastewater is exposed at the surface of the media.

Constructed Wetland System, Submerged Flow

Constructed wetland in which wastewater passes through the component below the surface of the media.

Construction

Activities related to the installation, alteration, extension, or repair of a wastewater treatment system, including all activities from disturbing the soils through connecting the system to the building or property served by the wastewater treatment system.

Construction Zone

Physical area occupied by personnel, equipment, and materials during the installation, alteration, extension, or repair of a wastewater treatment system.

Consumptive Use

That part of water withdrawn that is evaporated, transpired by plants, incorporated into products or crops, consumed by humans or livestock, or otherwise removed from the immediate water environment.

Contact Corrosion

A term primarily used in Europe to describe galvanic corrosion between dissimilar metals.

Contact Plating

A metal plating process wherein the plating current is provided by galvanic action between the work metal and a second metal, without the use of an external source of current.

Contact Potential

The potential difference at the junction of two dissimilar substances.

Contact Stabilization

Modification of the activated-sludge process involving a short period of contact between wastewater and sludge for rapid removal of soluble BOD by adsorption, followed by a longer period of aeration in a separate tank where sludge is oxidized and new sludge synthesized.

Contact Tank

A tank used in water or wastewater treatment to promote contact between treatment chemicals or other materials and the liquid treated.

Contact Time

The time that the material processed is exposed to another substance (such as activated sludge or activated carbon) for completion of the desired reaction. See also DETENTION TIME.

Contacts

Any set of points that may be joined manually or automatically to complete a circuit. Contacts are found in breakers, switches, relays, and starters.

Contaminant

Any physical, chemical, biological, or radiological substance or matter that has an adverse effect on air, water, or soil.

Contamination

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

Continuity Bond

A metallic connection that provides electrical continuity between metal structures.

Continuous Emission Monitor (CEM)

A type of air emission monitoring device installed to operate continuously inside of a smoke stack or other emission source

Continuous Emission Monitoring Systems (CEMS)

Machines that measure, on a continuous basis, pollutants released by a source. The 1990 Clean Air Act requires continuous emission monitoring systems for certain large sources.

Continuous-Flow Pump

A displacement pump within which the direction of flow of the water is not changed or reversed.

Continuous-Flow Tank

A tank through which liquid flows continuously at its normal rate of flow, as distinguished from a fill-and-draw or batch system.

Continuous Load

A load where the maximum current is expected to continue for 3 hours or more.

Continuous Sampling Device

An air analyser that measures air quality components continuously. (See also MONITORING, INTEGRATED SAMPLING DEVICE.)

Contour

Multiple points on the land surface that are of equal elevation.

Contour Ditch

A level excavated channel designed to hold and spread water on low slope country. The water accumulates and spreads along the length of the ditch, before spilling on a broad, even front. Typically used on marginal arable land of slope less than 3%, and constructed using a disc plough or grader blade. Also serves as a guide for contour farming. Normally dish-shaped in cross-section and of approximate dimensions 15–30 cm deep and 2–2.5 m wide.

Contour Farming

The performance of farming operations such as tillage, sowing and harvesting on the contour, largely for the purpose of reducing erosion hazard.

Contour Furrow (Pasture Furrow)

A small level channel designed to hold water on moderately steep grazing land. Such furrows aim to increase the retention of rainfall on the land, thereby reducing runoff and erosion hazard and

increasing pasture productivity. Constructed using single furrow mold board or disc ploughs, graders, modified rippers or specially designed implements. A treated area would have a series of such furrows down the slope at intervals which are calculated according to slope and rainfall data.

Contour Interval

Vertical distance between level surfaces forming the contours.

Contour Line

Line drawn on a map that connects points having the same elevation.

Contour Map

Map consisting of contour lines that illustrate the irregularities of the land surface.

Contour Ripping

Ripping that is carried out on the contour to promote infiltration of water into the soil thereby reducing run off and consequent erosion hazard.

Contracted Weir

A rectangular notched weir with a crest width narrower than the channel across which it is installed and with vertical sides extending above the upstream water level producing a contraction in the stream of water as it leaves the notch.

Control Panel

Component that contains electrical devices that provide information on system operation and may allow adjustment of settings for operation of electrical devices.

Control Technology; Control Measures

Equipment, processes, or actions used to reduce air pollution. The extent of pollution reduction varies among technologies and measures. In general, control technologies and measures that do the best job of reducing pollution will be required in the areas with the worst pollution. For example, the best available control technology/best available control measures (BACT, BACM) will be required in serious non-attainment areas for particulates, a criteria air pollutant. A similar high level of pollution reduction will be achieved with maximum achievable control technology (MACT) which will be required for sources releasing hazardous air pollutants.

Controlled Discharge

Regulation of effluent flowrates to correspond with flow variations in receiving waters to maintain established water quality.

Controlled Galvanic System

Cathodic protection system using sacrificial anodes controlled by means of resistors, fixed or variable.

Controller

A device or group of devices, that serve to govern, in some predetermined measure, the electrical power delivered to the apparatus to which it is connected.

Controls

Group of sensors that provide information on and allow adjustment of system settings.

Convection

In physics, mass motions within a fluid resulting in the transport and mixing of the properties of that fluid, caused by the force of gravity and by differences in density resulting from non-uniform temperature. In meteorology, atmospheric motions that are predominantly vertical, resulting in vertical transport and mixing of atmospheric properties; sometimes caused when large masses of air are heated by contact with a warm land surface. Transmission of energy (heat /sound) from one place to another by movement of a fluid such as air or water.

Conventional Aeration

Process design configuration whereby the aeration tank organic loading is higher at the influent end than at the effluent end. Flow passes through a serpentine tank system, typically side-by-side, before passing on to the secondary clarifier. Also called plug flow.

Conventional System

Refers to a typical onsite wastewater treatment system (OWTS) as defined at the local or regional level.

Conventional Tillage (Conventional Cultivation)

A tillage system using cultivation as the major means of seedbed preparation and weed control, and traditionally used for a given crop in a given geographical area. Typically includes a sequence of soil workings, such as ploughing, discing and harrowing, to produce a fine seedbed, and also the removal of most of the plant residue from the previous crop. In this context the terms cultivation and tillage are synonymous, with emphasis on soil preparation.

Conventional Treatment

Well-known or well-established water or wastewater treatment processes, excluding advanced or tertiary treatment; it generally consists of primary and secondary treatment.

Conversion Factor

A numerical constant by which a quantity with its value expressed in units of one kind is multiplied to express the value in units of another kind.

Conveyance Loss

Water that is lost in transit from a pipe, canal, or ditch by leakage or evaporation. Generally, the water is not available for further use; however, leakage from an irrigation ditch, for example, may percolate to a ground-water source and be available for further use.

Cooling Coil

A coil of pipe or tubing containing a stream of hot fluid that is cooled by heat transfer to a cold fluid outside. Conversely, the coil may contain a cold fluid to cool a hot fluid in which the coil is immersed.

Copper (Cu)

An important trace element for human beings, although we only need the tiniest concentrations. Copper is included in a number of important enzymes, for example. Copper salts have a negative effect on algae and disrupt their photosynthesis and nitrogen fixation. Increased copper levels have been found in acidified ground water.

Coral Bleaching

The process in which a coral colony, under environmental stress expels the microscopic algae (zooxanthellae) that live in symbiosis with their host organisms (polyps). The affected coral colony appears whitened.

Core

The central compacted mass of impervious soil material incorporated in an earth embankment to prevent seepage through it.

Core Sampler

A long, slender pole with a foot valve at the bottom end that allows the depth of the sludge blanket to be measured. Sometimes called a sludge judge.

Core Trench

The excavation which is filled with impervious core material in the construction of an earth embankment.

Cork

The elastic, tough outer tissue of the cork oak that is used specially for stoppers and insulation.

Cork Board

Performed material composed of granulated cork bonded by heating under pressure, with or without added adhesive.

Corrasion

That part of natural erosion processes in which earth and rock materials are worn away due to their abrasion when carried in flows of water, air or ice.

Correction Area

A triangular area which may have to be incorporated into a strip cropping plan to allow for variation in contours. Where contours are markedly uneven, successive sets of strips down the slope cannot be put in parallel and a triangular correction area between them is unavoidable.

Correction Chamber

A Correction Chamber is a large concrete chamber designed to provide a dosing point for pH correction of treated water at a Water Treatment Plant.

Correlation

(1) A mutual relationship or connection. (2) The degree of relative correspondence, as between two sets of data.

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. The gradual deterioration or destruction of a substance or material by chemical action, frequently induced by electrochemical processes. The action proceeds inward from the surface.

Conversion Coating

A coating consisting of a compound of the surface metal, produced by chemical or electrochemical treatments of the metal. Examples include chromate coatings on zinc, cadmium, magnesium, and aluminum and oxide and phosphate coatings on steel. See also CHROMATE TREATMENT and PHOSPHATING.

Coordination Compound

A compound with a central atom or ion bound to a group of ions or molecules surrounding it. Also called coordination complex. See also CHELATE, COMPLEXATION, and LIGAND.

Copper-Accelerated Salt-Spray (CASS) Test

An accelerated corrosion test for some electrodeposits for anodic coatings on aluminum.

Copper Ferrule

A ring or cap of copper put around a slender shaft (as a cane or tool handle) to strengthen it or prevent splitting.

Corrodkote Test

An accelerated corrosion test for electrodeposits.

Corrosion

The destruction of a substance; usually a metal, or its properties because of a reaction with its surroundings (environment) i.e. physiochemical interaction between a metal and its environment which results in changes in the properties of the metal and which may often lead to

impairment of the function of the metal, the environment, or the technical system, of which these form a part.

Corrosion Control

(1) In water treatment, any method that keeps the metallic ions of a conduit from going into solution, such as increasing the pH of the water, removing free oxygen from the water, or controlling the carbonate balance of the water. (2) The sequestration of metallic ions and the formation of protective films on metal surfaces by chemical treatment.

Corrosion Damage

Corrosion effect which is considered detrimental to the function of the metal, the environment or the technical system, of which these form a part.

Corrosion Effect

A change in any part of the corrosion system caused by corrosion.

Corrosion Embrittlement

The severe loss of ductility of a metal resulting from corrosive attack, usually inter-granular and often not visually apparent.

Corrosion Engineer

The person or persons responsible for carrying out the corrosion monitoring and interpretation of data produced.

Corrosion Fatigue

The process in which a metal fractures prematurely under conditions of simultaneous corrosion and repeated cyclic loading at lower

stress levels or fewer cycles than would be required in the absence of the corrosive environment.

Corrosion Fatigue Limit

The maximum cyclic stress value that a metal can withstand for a specified number of cycles or length of time in a given corrosive environment. See CORROSION FATIGUE STRENGTH.

Corrosion Fatigue Strength

The maximum repeated stress that can be endured by a metal without failure under definite conditions of corrosion and fatigue and for a specific number of stress cycles and a specified period of time.

Corrosion Inhibitor

An inhibitor is a substance which retards or slows down a chemical reaction. Thus, a corrosion inhibitor is a substance which, when added to an environment, decreases the rate of attack by the environment on a metal. Corrosion inhibitors are commonly added in small amounts to acids, cooling water, oil wells and other environments, either continuously or intermittently to prevent serious corrosion.

Corrosion Potential

The potential of a corroding surface in an electrolyte, relative to a reference electrode.

Corrosion Product

Substance formed as a result of corrosion.

Corrosion Protection

Modification of a corrosion system so that corrosion damage is mitigated.

Corrosion Rate

The rate at which corrosion proceeds, expressed by inches of penetration per year (ipy); mils penetration per year (mpy); milligrams weight loss per square decimetre per day (mdd); microns per year ($\mu\text{m}/\text{year}$) or millimetres per year (mmpy). One micron is equal to 0.0395 mils.

Corrosion Resistance

Ability of a metal to withstand corrosion in a given corrosion system.

Corrosion System

System consisting of one or more metals and all parts of the environment that influence corrosion.

Corrosive

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

Corrosive Agent

Substance which when in contact with a given metal will react with it.

Corrosive Environment

Environment that contains one or more corrosive agents.

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.

Corrosivity

Tendency of an environment to cause corrosion in a given corrosion system.

Conventional Pollutants

Pollutants typical of municipal sewage, and for which municipal secondary treatment plants are typically designed; defined by Federal Regulation [40 CFR 401.16] as BOD, TSS, fecal coliform bacteria, oil and grease, and pH.

Conventional Septic System

A wastewater treatment system consisting of a septic tank and a typical trench or bed subsurface wastewater infiltration system.

Costean

A shallow, steep-sided trench cut across the line of an orebody or deposit to expose it during prospecting operations.

Cost-Effectiveness

The cost of an emission control measure assessed in terms of dollars-per-pound, or dollars-per-ton, of air emissions reduced.

Counter, Alarm

Device used to record the number of times an alarm has been activated.

Counter, Cycle

Device used to record the number of times a component or device has been activated (e.g., activation of a pump followed by deactivation is one cycle).

Counter, Event

Device used to record the number of times a component or device has been activated or deactivated (e.g., pump activation is one event and pump deactivation is a second event).

Couple (Corrosion)

A cell developed in an electrolyte resulting from electrical contact between two dissimilar metals. See GALVANIC CORROSION.

Coupons

Specimens of materials exposed to tests or real environments to assess the effect of degradation on the material.

Cover

To place insulation and/or finish materials on, over or around a surface so as to insulate, protect or seal.

Covered Filler Rod

A filler rod having a covering of flux.

Covering Power

The ability of a solution to give satisfactory plating at very low current densities. A condition that exists in recesses and pits. This term suggests an ability to cover, but not necessarily to build up, a

uniform coating, whereas throwing power suggests the ability to obtain a coating of uniform thickness of an irregularly shaped object.

Cracking

When a metal part fails by cracking, it is generally obvious that it cracked, but the exact type of cracking and the cause are less obvious. To determine the type of cracking, microscopic examination is necessary. In some instances the environment plays a minor role, while in others its role is major.

Cracking (of Coating)

Breaks in a coating that extend through to the underlying surface.

Crawl Space

A shallow open area between the floor of a building and the ground, normally enclosed by the foundation wall.

Crazing

A network of checks or cracks appearing on the surface.

Creep

Time-dependent strain occurring under stress. The creep strain occurring at a diminishing rate is called primary creep; that occurring at a minimum and almost constant rate, secondary creep; and that occurring at an accelerating rate, tertiary creep.

Creep-Rupture Embrittlement

Embrittlement under creep conditions of, for example, aluminum alloys and steels that results in abnormally low rupture ductility. In aluminum

alloys, iron in amounts above the solubility limit is known to cause such embrittlement; in steels, the phenomenon is related to the amount of impurities (for example, phosphorus, sulfur, copper, arsenic, antimony, and tin) present. In either case, failure occurs by intergranular *cracking* of the embrittled material.

Creep-Rupture Strength

The stress that will cause fracture in a creep test at a given time in a specified constant environment. Also called stress-rupture strength.

Crevice Corrosion

Crevice corrosion is a special type of pitting. The anode of a corrosion cell is fixed by the geometry in a crevice or under a deposit. To function as a corrosion site, a crevice must be wide enough to permit entry of the liquid, but narrow enough to maintain a stagnant zone. Metals or alloys that depend on oxide films or passive layers for corrosion resistance are particularly susceptible to crevice corrosion.

Criteria Air Pollutants

A group of very common air pollutants regulated by EPA on the basis of criteria (information on health and/or environmental effects of pollution). Criteria air pollutants are widely distributed all over the country. A National Ambient Air Quality Standard exists for each criteria pollutant (particulate matter, sulfur dioxide, nitrogen dioxide, ozone, carbon dioxide, and lead). Criteria Air Pollutants—as required by the Clean Air Act, the EPA identifies and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, particulate matter (PM10), sulfur dioxide, lead, and nitrogen oxide. The term “criteria pollutants” derives from the requirement

that the EPA must describe the characteristics and potential health and welfare effects of these pollutants. EPA periodically reviews new scientific data and may propose revisions to the standards as a result.

Critical Anodic Current Density

The maximum anodic current density observed in the active region for a metal or alloy electrode that exhibits active-passive behavior in an environment.

Critical Depth

The depth of water flowing in an open channel or partially filled conduit corresponding to one of the recognized critical velocities.

Critical Flaw Size

The size of a flaw (defect) in a structure that will cause failure at a particular stress level.

Critical Flow

(1) A condition of flow in which the mean velocity is at one of the critical values, ordinarily at Belanger’s critical depth and velocity; also used in reference to Reynolds’ critical velocities, which define the point at which the flow changes from streamline or nonturbulent flows. (2) The maximum discharge of a conduit that has a free outlet and has the water ponded at the inlet.

Critical Humidity

The Relative Humidity (RH) at and above which the atmospheric corrosion rate of metal increases markedly.

Critical Pitting Potential (E_{cp} , E_p , E_{pp})

The lowest value of oxidizing potential at which pits nucleate and grow. It is dependent on the test method used.

Critical Radiant Heat Flux

A test used to simulate conditions in a hot attic, designed to test the surface burning characteristics of insulation. The process of wearing away gradually, usually by chemical action.

Critical Success Factors (CSFs)

Are parameters that influence the likelihood of success of a particular method.

Cross Braces

Horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or wales.

Cross Connection

A connection between pipes which may cause the transfer of polluted water into a potable water supply with consequent hazard to public health. This term is also used to describe a legitimate connection between different distribution systems. Cross connection is (1) A physical connection through which a supply of potable water could be contaminated or polluted. (2) A connection between a supervised potable water supply and an unsupervised supply of unknown portability.

Cross Section

Vertical section of the surface of the ground at right angles to a base line or center line; side view of a cutaway of the earth's surface.

Cross-Over Pipe

Non-perforated pipe used in serial or sequential distribution to connect a series of trenches at the same elevation.

Crumb

A soft, porous, more or less rounded soil aggregate from 1 to 5 mm in diameter.

Crumb Structure

A soil structural condition in which most of the soil aggregates are soft, porous and more or less rounded units from 1 to 5 mm in diameter. The typical surface condition of medium-textured soils recently cultivated after a period of well-managed pasture.

Cryogenic Insulation

Insulation for extremely low-temperature processes surfaces from -100°F to -459°F (absolute zero).

Cryosphere

One of the interrelated components of the Earth's system, the cryosphere is frozen water in the form of snow, permanently frozen ground (permafrost), floating ice, and glaciers. Fluctuations in the volume of the cryosphere cause changes in ocean sea level, which directly impact the atmosphere and biosphere.

Cryptosporidium

A protozoan (single-celled organism) that can infect humans, usually as a result of exposure to contaminated drinking water.

Cubic Feet per Second (cfs)

A rate of the flow, in streams and rivers, for example. It is equal to a volume of water one foot high and one foot wide flowing a distance of one foot in one second. One "cfs" is equal to 7.48 gallons of water flowing each second. As an example, if your car's gas tank is 2 feet by 1 foot by 1 foot (2 cubic feet), then gas flowing at a rate of 1 cubic foot/second would fill the tank in two seconds.

Cultivation

The growing crops requiring the mechanical preparation of the soil. It typically involves a series of soil workings for seedbed preparation. While the term is often used synonymously with tillage. It also embraces the broader concept of crop production as distinct from just soil preparation. Pasture production is not regarded as part of this broader concept.

Culture Media

Substances used to support the growth of microorganisms in analytical procedures. Cyclone separator A conical unit used for separating particles by centrifugal force.

Culvert

Manmade construction that diverts the natural flow of water.

Current

The net transfer of electric charge per unit time. Also called electric current.

Current Density

Denotes the average current flowing in the electrolyte expressed in amperes per square foot (A/ft^2), amperes per square decimetre (A/dm^2), amperes per square centimetre (A/cm^2) or milliamperes per square centimetre (mA/cm^2) of cathode or, more occasionally, of anode surface.

Current Efficiency

The ratio of the electrochemical equivalent current density for a specific reaction to the total applied current density.

Curtailment Programs

Restrictions on operation of fireplaces and woodstoves in areas where these home heat sources make major contributions to pollution.

Cut and Fill

Process of using excavated material removed from one location as fill material in another location on the same site.

Cycle

There are many cycles in the environment and the basic one involves green plants producing oxygen and sugar from carbon dioxide and water during photosynthesis. Animals use the nutrition in plants by eating plants or other animals. In the cells of plants and animals, cell respiration transforms the sugar and oxygen into energy, carbon dioxide and water. The cycle ends when the plants absorb the carbon dioxide and water again. In a cycle, all the residual products from a process are used again and no useless waste is left.

To create cycles in industrial processes, residual products have to be re-used so that no waste is produced.

pollution abatement device that removes heavy particles from an air stream through centrifugal force.

Cyclone

A dust separator or droplet separator utilizing essentially the centrifugal force derived from the motion of the gas. Cyclone is an air

Cyclone Collector

A device that uses centrifugal force to remove large particles from polluted air.

D

DAF Unit

A DAF Unit or Dissolved Air Flotation Unit is a device that removes suspended matter such as oil or solids, from water, by dissolving air in the water under pressure and then releasing the air at atmospheric pressure in a flotation tank or basin.

Daily Discharge

The discharge of a pollutant measured during any 24-hour period that reasonably represents a calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged during the day. For pollutants with limitations expressed in other units of measurement (e.g., concentration) the daily discharge is calculated as the average measurement of the pollutant throughout the day.

Dam

A barrier, embankment or excavated earth structure, generally built in or near a flowline, which has the primary function of impounding water for storage. The stored water is used for such purposes as stock watering, domestic supply, irrigation and firefighting.

Dams used for water conservation on the farm are normally built of compacted soil and are called earth dams. Dams may also be used in conjunction with the diversion of water, creation of a hydraulic head, sediment retention or for soil erosion control. When their primary function is for gully erosion control the term gully control structure is used. When their primary function is for sediment retention the term sediment basin is used.

The siting of a dam may depend on; the availability of water-holding materials which are also suitable for construction purposes; the achievement of a high storage/excavation ratio; the need to locate it near a water source; the location of fencing and the possible role of the structure as a watering point for stock; and/or the need to locate it in relation to buildings to be supplied with water, areas to be irrigated, or areas to be protected in fire situations. The design of such a structure is dependent on; its location; the size of the catchment above it and the associated land use; availability of a suitable site for the spillway and disposal of overflow; the nature of the site selected and the construction materials available there: and/or its relationship to soil conservation structures.

The construction of a dam involves on-site consideration of: the nature of the site chosen: the nature and moisture content of soil materials available if used in construction: the conditions occurring at the time of construction: and the equipment available in relation to the size of structure

required. Important factors in the construction of an effective earth dam include: compaction of the material in the wall at or near optimum moisture content: keying of the wall by way of a core trench in suitable material: top soiling and seeding of the final wall and surrounding areas above top water level: and adequate spillway installation.

Dam Spill Reduction

An Announced Reduction in a previously Announced Carryover percentage due to spillage of water from the primary storage. The Reduction is enforced because the water making up the Carryover was allocated in a previous season or Water Year and licence holders were given the opportunity to take it during that year. If the dam spills (because its storage capacity has been exceeded), the volume of the spill will be greater because of the Carryover.

Damming

The use of a substance to support fire stopping materials until cured.

Data

Records of observations and measurements of physical facts, occurrences, and conditions reduced to written, graphical, or tabular form.

Data Quality Objectives (DQOs)

Qualitative and quantitative statements of the overall level of uncertainty that a decision-maker will accept in results or decisions based on environmental data. They provide the statistical framework for planning and managing environmental data operations consistent with user's needs.

Datum

Level surface to which elevations are referenced; for example, mean sea level.

Daylight

Come to grade, as with drainage piping.

Days with Exceedences

The number of days with exceedences is the number of days on which at least one period has a concentration greater than, or equal to, the relevant air quality standard (the averaging period will be that defined by that Standard). Since the National Air Quality Standards cover different time periods (15 min average, 24 hour running mean etc.), this gives a useful way of comparing data for different pollutants.

DDT

DDT is a highly environmentally-hazardous and toxic insecticide which is banned in many countries. For more details, see PCB, which has similar properties.

Deactivation

The process of prior removal of the active corrosive constituents usually oxygen, from a corrosive liquid by controlled corrosion of expendable metal or by other chemical means, thereby making the liquid less corrosive.

Dealloying

The selective corrosion of one or more components of a solid solution alloy, usually in the form of ions. Also called parting or selective leaching.

Dealuminization

The selective leaching or corrosion of a specific constituent (Al, Ni, Mo, Ni) from an alloy.

Decarburization

Loss of carbon from the surface layer of a carbon-containing alloy due to reaction with one or more chemical substances in a medium that contacts the surface.

Debris

Generally, solid wastes from natural and man-made sources deposited indiscriminately on land and water. Loose and unconsolidated material arising from the disintegration of rocks, soil, vegetation or other material transported and deposited in an erosion event. It is generally surficial and contains a significant proportion of coarse material. In the classification of mass movement, debris refers to material in which 20–80% of the fragments are greater than 2 mm in size and the remainder of the material is less than 2 mm. This distinguishes it from earth type movements, where about 80% or more of the material must be smaller than 2 mm in size.

Decant

Act of transferring effluent slowly so as to separate liquid from solid after a previous settling process.

Decantation

The withdrawal of the supernatant liquor after settlement of suspended solids, or after separation from a liquid of higher density. Decantation is Separation of a liquid from solids or from a liquid of higher density by drawing off the upper layer after the heavier material has settled.

Dechlorination

The partial or complete reduction of residual chlorine by any chemical or physical process. Sulfur dioxide is frequently used for this purpose.

Declining Growth Phase

Period of time between the log-growth phase and the endogenous phase, where the amount of food is in short supply, leading to ever-slowing bacterial growth rates.

Decobaltification

Corrosion in which cobalt is selectively leached from cobalt-base alloys, such as Stellite, or from cemented carbides. See also DEALLOYING and SELECTIVE LEACHING.

Decomposition

The breakdown of complex material into simpler substances by chemical or biological processes.

Decomposition of Wastewater

(1) The breakdown of organic matter in wastewater by bacterial action, either aerobic or anaerobic. (2) Chemical or biological transformation of the organic or inorganic materials contained in wastewater.

Decomposition Potential (or Voltage)

The potential of a metal surface necessary to decompose the electrolyte of a cell or a component/substance thereof.

Deep Ground Bed

One or more anodes installed vertically at a nominal depth of 15 m (50 ft) or more below the earth's surface in a drilled hole for the purpose of supplying *cathodic protection* for an underground or submerged metallic structure.

Deflection

Any change in the inside diameter of piping resulting from installation and imposed loads; deflection may be either vertical or horizontal and is usually reported as a percentage of the base (undeflected) inside piping diameter.

Deflocculation

The process by which masses of colloidal, or very fine clay particles or 'flocs, separate in water into their constituent particles which go into suspension. It depends on the balance between exchangeable cations on the clay and in solution and on the overall ionic strength of the solution. Clays high in sodium deflocculates readily.

Defoamer

A material having low compatibility with foam and a low surface tension. Defoamers are used to control, prevent, or destroy various types of foam, the most widely used being silicone defoamers. A droplet of silicone defoamer contacting a bubble of foam will cause the bubble to undergo a local and drastic reduction in film strength, thereby breaking the film. Unchanged, the defoamer continues to contact other bubbles, thus breaking up the foam. A valuable property of most defoamers is their effectiveness in extremely low concentration. In addition to silicones, defoamers for special purposes are based on polyamides, vegetable oils, and stearic acid.

Deforestation

Deforestation is the practice or process that result in the long-term change in land-use to non-forest uses. This is often cited as one of the major causes of the enhanced greenhouse effect for two reasons: the burning or decomposition of the wood releases carbon dioxide; and trees that once removed carbon dioxide from the atmosphere in the process of photosynthesis are lost.

Degradation

Decline in the quality of natural resources commonly caused by human activities.

Deodorizer

Concentrated scented liquid introduced to the exhaust air at the muffler or into the vacuum pump oil reservoir to reduce odors.

Degasification

- (1) The removal of a gas from a liquid medium.
- (2) In water treatment, the removal of oxygen from water to inhibit corrosion. It may be accomplished by mechanical methods, chemical methods, or a combination of both.

Degreaser

Equipment which removes grease, dirt or unwanted materials from any part or product. Degreasers typically use solvents, as liquid baths or condensing vapours, to remove such material.

Degreasing

- (1) The process of removing greases and oils from waste, wastewater, sludge, or solids.
- (2) The industrial process of removing grease and oils from machine parts or iron products.

Degree

(1) On the centigrade or Celsius thermometer scale, 1/100 of the interval from the freezing point to the boiling point of water under standard conditions; on the Fahrenheit scale, 1/180 of this interval. (2) A unit of angular measure; the central angle subtended by 1/360 of the circumference of a circle.

Delamination

The separation of the layers of material in a laminate.

Delta

An extensive area of alluvial material formed where a river enters a large body of quieter water, such as a sea or lake. It is typically triangular in shape, and may be traversed by distributary channels.

Demand

The rate at which electrical energy is delivered to a piece of power-consuming equipment or system.

Demand Average

The demand on an electrical system or any of its parts over an interval of time, as determined by dividing the total number of watt-hours by the number of hours (units of time) in the interval.

Demand Coincident

The sum of two or more demands that occurs in the same demand interval.

Demand Factor

The ratio of the maximum demand of the system or part of a system to the total connected load of the system or part of the system under consideration.

Demand Instantaneous Peak

The maximum demand at the instant of greatest load.

Demand Interval

The period of time that electrical energy flows is averaged to determine demand, such as 60 minutes, 15 minutes, or instantaneous.

Demand Maximum

The greatest of all demands of the load under consideration that occurs during a specified period of time.

Demand Noncoincident

The sum of two or more individual demands that do not occur in the same demand interval, which is meaningful only when considering demands within a limited period of time, such as a day, week, month, and a heating or cooling season.

Demersal

Fish that live on or near the ocean bottom. They are often called benthic fish, groundfish, or bottom fish.

Demineralization

Removal of dissolved mineral matter, generally from water.

Dendrite

A crystal that has a treelike branching pattern, being most evident in cast metals, slowly cooled through the solidification range.

Denickelification

Corrosion in which nickel is selectively leached from nickel-containing alloys. Most commonly observed in copper-nickel alloys after extended service in fresh water.

Denitrification

The anaerobic biological reduction of nitrate nitrogen to nitrogen gas; also, removal of total nitrogen from a system. See also NITRIFICATION.

Density (of Gases)

The mass of a unit volume of a gas at a stated temperature and pressure.

Density (of Solids and Liquids)

The mass of unit volume of a material at a specified temperature. Determined by the weight expressed in kg of a cubic meter of a material.

Density Current

A flow of water through a large body of water that retains its unmixed identity because of a difference in density.

Denudation

The process whereby animal and plant life in an area is seriously reduced by physical, chemical or biotic factors. The process whereby the surface of the earth is worn away or eroded.

Deoxidizing

(1) The removal of oxygen from molten metals by use of suitable deoxidizers. (2) Sometimes refers to the removal of undesirable elements other than oxygen by the introduction of elements or compounds that readily react with them. (3) In metal finishing, the removal of oxide films from metal surfaces by chemical or electrochemical reaction.

Deoxygenation

The depletion of the dissolved oxygen in a liquid either under natural conditions associated with the biochemical oxidation of the organic matter present or by addition of chemical reducing agents.

Deoxygenation Constant

A constant that expresses the rate of the biochemical oxidation of organic matter under aerobic conditions. Its value depends on the time unit involved (usually 1 day) and varies with temperature and other test conditions.

Departure

The difference between any single observation and the normal.

Depletion

Depletion is the result of the extraction of abiotic resources (non-renewable) from the environment or the extraction of biotic resources (renewable) faster than they can be renewed.

Depolarization

The elimination or reduction of polarization by physical or chemical means; depolarization results in increased corrosion.

Depolarizer

A substance that produces depolarization.

Deposition

The act or process of settling solid material from a fluid suspension.

Deposit

A foreign substance which comes from the environment, adhering to a surface of a material.

Deposit Attack

Pitting corrosion resulting from deposits on a metal surface which cause concentration cells.

Deposit Control Additives

Substances added to motor vehicle fuel to reduce and prevent deposits in the fuel delivery system and engine intake valves.

Deposit Corrosion

Corrosion occurring under or around a discontinuous deposit on a metallic surface. Also called poulitce corrosion.

Deposited Metal

Filler metal after it becomes part of a weld or joint.

Deposition

Loose material accumulated as a result of a reduction in the velocity of the transporting agent.

Depositional Site

An area where the processes of lateral surface movement and sorting are dominant. Sub-surface in situ processes are minimal or absent at these sites. Examples of depositional sites include foot slopes, drainage plains and floodplains.

Depression Storage

The amount of water stored in depressions in the land surface. It results from runoff which collects in such depressions and therefore does not contribute to overland flow lower down the catchment

Depth of Blanket

Level of sludge in the bottom of a secondary clarifier, typically measured in feet.

Desalination

The removal of salts from saline water to provide freshwater. This method is becoming a more popular way of providing freshwater to populations.

Descaling

Removing the thick layer of oxides formed on some metals at elevated temperatures.

Desertification

Desertification are the progressive destruction or degradation of existing vegetative cover to form desert. This can occur due to overgrazing, deforestation, drought and the burning of extensive areas. Once formed, desert can only support a sparse range of vegetation. Climatic effects associated with this phenomenon include increased albedo, reduced atmospheric humidity and greater atmospheric dust loading, which

can cause wind erosion and/or atmospheric pollution.

Land degradation in arid, semi-arid, and dry sub-humid areas resulting from various factors, including climatic variations and human activities. Further, the UNCCD (The United Nations Convention to Combat Desertification) defines land degradation as a reduction or loss, in arid, semi-arid, and dry sub-humid areas, of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest, and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (1) soil erosion caused by wind and/or water; (2) deterioration of the physical, chemical and biological or economic properties of soil; and (3) long-term loss of natural vegetation. Conversion of forest to non-forest.

Design

(1) Process of selecting, sizing, locating, specifying, and configuring treatment train components that match site characteristics and facility use as well as creating the associated written documentation; (2) Written documentation of size, location, specification and configuration of a system.

Design Capacity

The calculated volume and/or discharge rate of a soil conservation structure. It is based on a given set of hydrological conditions applicable to the site and the requirements of the structure, e.g. water storage or diversion. Following its construction a structure's capacity should be checked to ensure it meets the design requirements. If the design capacity is not achieved, the structure may fail.

Design Criteria

(1) Engineering guidelines specifying construction details and materials. (2) Objectives, results, or limits that must be met by a facility, structure, or process in performance of its intended functions.

Design Flow

Engineering guidelines that typically specify the amount of influent flow that can be expected on a daily basis over the course of a year. Other design flows can be set for monthly or peak flows.

Design Life

The period of time for which a soil conservation structure is designed to perform its intended function.

Design Loadings

Flow rates and constituent concentrations that determine the design of a process unit or facility necessary for proper operation.

Design Peak Discharge

The maximum discharge, calculated for a given set of hydrological conditions, which is used in the design of a hydrologic structure that can cope with those conditions.

Design Rainfall Intensity

The calculated rainfall intensity for a selected design return period and design storm duration, determined to enable design of a hydrologic structure.

Design Return Period (hyd)

The return period selected in order to design specific soil conservation or hydrologic structures in relation to their desired lifetime and the acceptable probability of the structure not failing within this period. For example, a graded bank may be designed to handle a once in five year storm. A more severe event may cause damage, but it could be more expedient and/or economic to repair this than to build a larger bank in the first place. A gully control structure would normally be built with a much longer design return period (e.g. 2050 years).

Design Storm Duration (hyd)

The storm duration selected in order to design specific soil conservation or hydrologic structures, normally taken as being equal to the time of concentration of the catchment concerned.

Design Value

The pollutant concentration used by air quality managers as the basis for determining attainment of an air quality standard, generally by using an air quality model. The design value may or may not be the same as the designation value.

Designation Value

The pollutant concentration used by air quality managers for designating attainment status of an air district with respect to the state and federal ambient air quality standards. Generally, the designation value is the highest concentration that remains after excluding certain qualifying values. For a specific pollutant, the designation value for the state and federal standards may not be the same.

Design Voltage

The nominal voltage for which a line or piece of equipment is designed. This is a reference level of voltage for identification and not necessarily the precise level at which it operates.

Designer

Service provider who creates plans for the installation, alteration, extension, or repair of a wastewater treatment system.

Desilt

To remove sediment from water storage and soil conservation structures. It is a necessary maintenance procedure in instances where the accumulation of sediment affects the capacity or efficiency of a structure.

Detachment

The breaking away from the soil mass, or from clods and large peds, of small soil particles capable of being moved by erosive processes. ABRASION DETACHMENT results from the action of wind-borne particles.

Detachment Capacity (gen)

The ability of water or wind to detach and entrain soil particles from the soil mass over which it is moving.

Detention

Temporary impoundment or holding of stormwater runoff.

Detention Basin

A stormwater management facility that temporarily impounds runoff and discharges it through a hydraulic outlet structure to a downstream conveyance system.

Detention Storage

The amount of water temporarily stored by a detention structure for a given runoff event.

Detention Structure (Retardation Structure)

A structure used to temporarily hold storm runoff in order to reduce peak flows. Such a structure may incorporate excavated, constructed or natural landscape features. The ponded water is allowed to drain at a controlled rate during and after the runoff event, thereby emptying the structure in readiness for the next event. Where large volumes of water are temporarily stored, the pondage is commonly referred to as a detention basin.

Detention Time

The period of time that a water or wastewater flow is retained in a basin, tank, or reservoir for storage or completion of physical, chemical, or biological reaction. See also CONTACT TIME, RETENTION TIME.

Detergent

(1) Any of a group of synthetic, organic, liquid, or water-soluble cleaning agents that are inactivated by hard water and have wetting and emulsifying properties but, unlike soap, are not prepared from fats and oils. (2) A substance that reduces the surface tension of water.

Detoxification

Treatment to modify or remove a toxic material.

Detritus

In a biological context, organic particulate matter. In the context of sewage treatment practice, coarse debris denser than water but capable of being transported in moving water. Loose material arising from the mechanical weathering of rocks and transported and deposited in an erosion.

Dechlorination

Removal of the free and combined chlorine residual to reduce the potentially toxic effects of chlorinated effluents.

Decibel, dB

It is measurement unit of sound, represented by dB.

Degradation

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

De Minimis

In general, a level of emissions, etc., below which a particular process or activity is exempted or not regulated.

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.

Desalination Plant

A Desalination Plant is a facility for removing salt and other minerals from sea water to produce fresh water for human consumption or irrigation.

Design Population

Design population means the minimum and maximum number of persons (resident and non-resident) to be served.

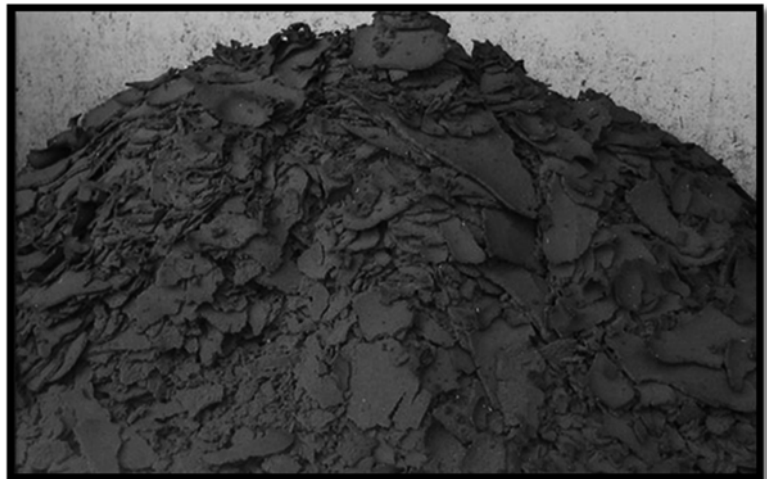
Detention Time

(Retention time; residence time) The average period of time wastewater stays in a treatment system. Detention times vary for different types of wastewater treatment systems and can range from hours to weeks.

Development

(1) A developed tract of land (with houses or structures); (2) the act, process or result of developing.

Fig.8 Dewatered sludge cake



Device

Subunit of a component; a device often includes multiple components.

Dew Point

The temperature at which a vapor begins to condense out of the air.

Dewater

(1) To extract a portion of the water present in a sludge or slurry. (2) To drain or remove water from an enclosure. A river bed may be dewatered so that a dam can be built; a structure may be dewatered so that it can be inspected or repaired.

Dewatered Sludge Cake

The sludge after dewatering that is cake like, compressed (Fig. 8). The lower the water content the better for wastewater treatment purposes.

Dewatering

Removing water from sludge or other solids. The process whereby wet sludge, usually conditioned by a coagulant, has its water content reduced by physical means.

Dew Point

The temperature to which air with a given concentration of water vapor must be cooled to cause condensation of the vapor. Dew Point is the temperature at which droplets of water condense from air (dependent on the prevailing humidity).

Dezincification

Corrosion in which zinc is selectively leached from zinc-containing alloys. Most commonly found in copper-zinc alloys containing less than 83% copper after extended service in water containing dissolved oxygen; the parting of zinc from an alloy (in some brasses, zinc is lost leaving a weak, brittle, porous, copper rich residue behind).

Dialysis

The selective separation of dissolved or colloidal solids on the basis of molecular size by diffusion through a semipermeable membrane.

Diatomaceous Silica

Insulation composed principally of diatomaceous earth with or without binders, and which usually contains reinforcing fibers.

Dichromate Treatment

A chromate conversion coating produced on magnesium alloys in a boiling solution of sodium dichromate.

Dielectric Shield

In a *cathodic protection* system, in electrically nonconductive material, such as a coating, plastic sheet or pipe that is placed between an anode and

an adjacent cathode to avoid current wastage and to improve current distribution, usually on the cathode.

Dielectric Strength

Degree of electrical non-conductance of a material; the maximum electric field a material can withstand without breakdown.

Diesel Emissions Reduction Act (DERA)

Law that appropriates funds to federal and state loan programs to either rebuild diesel-powered vehicle engines to more stringent emission standards or install emission reduction systems, notify affected parties, and share the technological information with countries that have poor air quality standards.

Diesel Engine

A type of internal combustion engine that uses low-volatility petroleum fuel and fuel injectors and initiates combustion using compression ignition (as opposed to spark ignition that is used with gasoline engines).

Differential Aeration Cell

An electrolytic cell, the electromotive force of which is due to a difference in air (oxygen) concentration at one electrode as compared with that at another electrode of the same material; an oxygen concentration cell (a cell resulting from a potential difference caused by different amounts of oxygen dissolved at two locations).

Differential Levelling

Method of levelling used to find the difference in elevation (vertical distance) between two points.

Differential Plunger Pump

A reciprocating pump with a plunger so designed that it draws the liquid into the cylinder on the upward stroke but is double-acting on the discharge stroke.

Diffused Aeration

Injection of air under pressure through submerged porous plates, perforated pipes, or other devices to form small air bubbles from which oxygen is transferred to the liquid as the bubbles rise to the water surface.

Diffused Air

Small air bubbles formed below the surface of a liquid to transfer oxygen to the liquid.

Diffuser

Part or device that injects air under pressure into wastewater (e.g., submerged porous plate, perforated pipe, or orifice). Diffuser is a porous plate, tube, or other device through which air is forced and divided into minute bubbles for diffusion in liquids. In the activated sludge process, it is a device for dissolving air into mixed liquor. It is also used to mix chemicals such as chlorine through perforated holes.

Diffusion

(1) The transfer of mass from one fluid phase to another across an interface, for example liquid to solid or gas to liquid. (2) The spatial equalization of one material throughout another. The movement of water vapor from regions of high relative humidity (RH) toward regions of lower

RH driven by a higher to lower temperature differential.

Diffusion Aerator

An aerator that blows air under low pressure through submerged porous plates, perforated pipes, or other devices so that small air bubbles rise continuously through the water or wastewater.

Diffusion Coating

Application of metallic coating, the chemical composition of which was modified by diffusing this at melting temperature into the substrate. Any process whereby a base metal or alloy is either (1) coated with another metal or alloy and heated to a sufficient temperature in a suitable environment or (2) exposed to a gaseous or liquid medium containing the other metal or alloy, thus causing diffusion of the coating or of the other metal or alloy into the base metal with resultant changes in the composition and properties of its surface.

Diffusion Coefficient

A factor of proportionality representing the amount of substance diffusing across a unit area through a unit concentration gradient in unit time.

Diffusion-Limited Current Density

The current density, often referred to as limiting current density, that corresponds to the maximum transfer rate that a particular species can sustain because of the limitation of diffusion.

Diffusion Tube Samplers

Passive diffusion tube samplers collect nitrogen dioxide and other pollutants by molecular diffusion along an inert tube to an efficient chemical absorbent. After exposure for a known time, the absorbent material is chemically analysed and the concentration calculated.

Digested Solids

Solids digested under either aerobic or anaerobic conditions until the volatile content has been reduced to the point at which the solids are relatively nonputrescible and inoffensive.

Digester

A Digester is a vessel that provides for the process of anaerobic digestion. It is commonly made of concrete and houses anaerobic bacteria. Sewerage sludge is normally pumped in at regular intervals to maintain a food supply for the population of anaerobic bacteria. Anaerobic digestion is a process in which microorganisms break down biodegradable material in the absence of oxygen. The process is widely used to treat wastewater sludge and organic wastes because it provides volume and mass reduction of the input material. A conical floor can be included in the digester design to facilitate product removal and cleaning. Some form of mixing equipment is also normally used to promote the digestion process. Digesters are typically found at Wastewater Treatment Plants.

Digester Coils

A system of hot water or steam pipes installed in a digestion tank to heat the digester contents.

Digestion

The breaking down of sludge and other waste biologically by microorganisms. Results in by-products such as methane gas, carbon dioxide,

sludge solids and water. Aerobic digestion requires oxygen, anaerobic digestion the absence of oxygen.

Diluent

Any liquid or solid material used to dilute or carry an active ingredient.

Dimple Rupture

A fractographic term describing ductile fracture that occurs through the formation and coalescence of micro voids along the fracture path. The fracture surface of such a ductile fracture appears dimpled when observed at high magnification and usually is most clearly resolved when viewed in a scanning electron microscope.

Dioxin

A man-made chemical by-product formed during the manufacturing of other chemicals and during incineration. Studies show that dioxin is the most potent animal carcinogen ever tested, as well as the cause of severe weight loss, liver problems, kidney problems, birth defects, and death.

Disbandment

The destruction of adhesion between a coating and the surface coated.

Discarded Material

Discarded material is used or spent material which is not reused in any way and this is committed to final disposition.

Discharge

The flow or rate of flow from a canal, conduit, pump, stack, tank, or treatment process. See also EFFLUENT. The instantaneous flow rate at a

specific location in a flow line or hydrologic structure. Specifically it relates to the volume of water flowing through a cross section of the flow line or structure in unit time.

Discharge Area

The cross-sectional area of a waterway. Used to compute the discharge of a stream, pipe, conduit, or other carrying system.

Discharge Assembly

All piping and parts between the point of pump discharge to the point at which the supply line exits the tank.

Discharge Capacity

The maximum rate of flow that a conduit, channel, or other hydraulic structure is capable of passing.

Discharge Head

A measure of the pressure exerted by a fluid at the point of discharge, usually from a pump.

Discharge Rate

(1) The determination of the quantity of water flowing per unit of time in a stream channel, conduit, or orifice at a given point by means of a current meter, rod float, weir, pitot tube, or other measuring device or method. The operation includes not only the measurement of velocity of water and the cross-sectional area of the stream of water, but also the necessary subsequent computations. (2) The numerical results of a measurement of discharge, expressed in appropriate units.

Disconnecting Means

A device, group of devices, or other means whereby the conductors of a circuit can be disconnected from the source of power.

Discontinuity

Any interruption in the normal physical structure or configuration of a part, such as cracks, laps, seams, inclusions, or porosity. A discontinuity may or may not affect the usefulness of the part.

Discrete Sedimentation

Sedimentation in which removal of suspended solids is a function of terminal settling velocity.

Disinfectant

A substance used for disinfection and in which disinfection has been accomplished.

Disinfected Wastewater

Wastewater to which a disinfecting agent has been added.

Disinfection

(1) The killing of waterborne fecal and pathogenic bacteria and viruses in potable water supplies or wastewater effluents with a disinfectant; an operational term that must be defined within limits, such as achieving an effluent with no more than 200 colonies fecal coliform/100 mL. (2) The killing of the larger portion of microorganisms, excluding bacterial spores, in or on a substance with the probability that all pathogenic forms are killed, inactivated, or otherwise rendered nonvirulent.

The use of chemicals to kill any disease causing organisms in the polished wastewater. UV light can also be used.

Disinfection

Chlorine: Process used to inactivate microorganisms by the addition of chlorine in the form of sodium hypochlorite; see also CHLORINATOR and CHLORINE.

Disinfection, Ozone

Process used to inactivate microorganisms via the application of ozone to wastewater; see also OZONE.

Disinfection, Ultraviolet (UV)

Process used to inactivate microorganisms by irradiating them with ultraviolet light to disrupt their metabolic activity, thus rendering them incapable of reproduction.

Dislocation

A linear imperfection in a crystalline array of atoms. Two basic types are recognized: (1) an edge dislocation corresponds to the row of mismatched atoms along the edge formed by an extra, partial plane of atoms within the body of a crystal; (2) a screw dislocation corresponds to the axis of a spiral structure in a crystal, characterized by a distortion that joins normally parallel planes together to form a continuous helical ramp (with a pitch of one interplanar distance) winding about the dislocation. Most prevalent is the so-called mixed dislocation, which is any combination of an edge dislocation and a screw dislocation.

Dispersal

Spreading of effluent over and into the final receiving environment.

Dispersion Percentage

A measure of soil dispersibility representing the proportion of clay plus fine silt (<.005 mm approx.) in a soil which is dispersible, expressed as a percentage. It is determined in the laboratory by comparing the amount of fine material, in a soil sample, dispersed by a 10 minute shaking in water, to the amount dispersed by a 120 minute shaking in water containing dispersant. Highly dispersible clays have a high dispersion percentage.

Dispersible Soil

A structurally unstable soil which readily disperses into its constituent particles (clay, silt, sand) in water. Highly dispersible soils are normally highly erodible and are likely to give problems related to held and earthwork tunneling.

Dispersion

(1) Scattering and mixing. (2) The mixing of polluted fluids with a large volume of water in a stream or other body of water. (3) The repelling action of an electric potential on fine particles in suspension in water, as in a stream carrying clay. This dispersion usually is ended by contact with ocean water causing flocculation and precipitation of the clay, a common cause of shoaling in harbors. (4) In a continuous-flow treatment unit, the phenomenon of short-circuiting. (5) Repellent action of an electric potential on fine particles in suspension in water, as in a stream carrying clay. (6) An operation as a result of which solid particles or liquid particles are distributed in a fluid. Also applied to a two-phase system in which one phase, known as the "dispersed medium", is distributed throughout the other, known as the "dispersion medium".

Dispersion Model

A dispersion model is a means of calculating air pollution concentrations using information about the pollutant emissions and the nature of the

atmosphere. In the action of operating a factory, driving a car, or heating a house, a number of pollutants are released into the atmosphere. The amount of pollutant emitted can be determined from a knowledge of the process or actual measurements. Air Quality Objectives are set in terms of concentration values, not emission rates. In order to assess whether an emission is likely to result in an exceedence of a prescribed objective it is necessary to know the ground level concentrations which may arise at distances from the source. This is the purpose of a dispersion model.

Displacement Pump

A type of pump in which the water is induced to flow from the source of supply through an inlet pipe and valve and into the pump chamber by a vacuum created therein by the withdrawal of a piston or piston-like device which, on its return, displaces a certain volume of the water contained in the chamber and forces it to flow through the discharge valves and discharge pipes.

Disposal

Disposal is the discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into or on any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment, be emitted into the air, or be discharged into any waters, including ground waters. Therefore, waste deposited in a landfill, land farmed wastewater discharged to a basin or surface impoundment, or stormwater run-off diverted to a percolation or settling pond is disposal.

Disposal Well

Disposal well is a deep well used for the disposal of liquid wastes.

Dissolved Air Flotation (DAF)

A separation process in which air bubbles emerging from a supersaturated solution become attached to suspended solids in the liquid undergoing treatment and float them up to the surface. See also DIFFUSED AIR.

Dissolved Oxygen (DO)

Dissolved Oxygen (DO) is the oxygen dissolved in sewage, water, or other liquid, usually expressed in milligrams per liter or percent of saturation. It is the test used in BOD determination. oxygen dissolved in water and readily available to fish and other aquatic organisms. The oxygen dissolved in liquid, usually expressed in milligrams per litre (mg/L) or percent saturation.

Dissolved Solids

Solids in solution that cannot be removed by filtration; for example, NaCl and other salts that must be removed by evaporation. See also TOTAL DISSOLVED SOLIDS. Solids physically suspended in sewage that cannot be removed by proper laboratory filtering.

Distrometer

An electronic instrument used to measure the size distribution of raindrops. Typically comprises a conical sensor which produces an electrical output related to drop velocity and mass. This output is electronically recorded for subsequent analysis.

Distributor

A device used to apply liquid to the surface of a filter or contact bed. Distributors are of two general types: fixed and movable. The fixed type

consists of perforated pipes, notched troughs, sloping boards, or sprinkler nozzles. The movable type consists of rotating, reciprocating, or traveling perforated pipes or troughs applying a spray or a thin sheet of liquid.

Distribution

Process of conveying wastewater or effluent to one or more components or devices.

Distribution, Drip

Application of effluent over an infiltrative surface via pressurized emitters and associated devices and parts (pump, filters, controls, and piping).

Distribution, Gravity

Using the force of gravity to convey wastewater or effluent to one or more components or devices; gravity distribution to trenches may be parallel, sequential or serial.

Distribution, Low Pressure (LPD)

(1) Application of effluent over an infiltrative surface via pressurized orifices and associated devices and parts (including pump, filters, controls, and piping). (2) Distribution via a network of small diameter laterals (typically 1¼-inch) with small orifices (typically 1/8- to 3/16-inch) installed in a soil treatment area; also called low-pressure-pipe (LPP) distribution.

Distribution, Parallel

Pressure or gravity distribution of effluent that proportionally and simultaneously loads multiple sections of a final treatment and dispersal component.

Distribution, Pressure

Using a pump or siphon to convey wastewater effluent under pressure to one or more components or devices.

Distribution, Pressure-Dosed Gravity

Gravity distribution of effluent over an infiltrative surface via one or more trenches or a bed following pressure dosing to a manifold or other flow splitter; also known as 'pump to gravity'.

Distribution, Sequential

Distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench; the effluent does not pass through the distribution media before it enters succeeding trenches.

Distribution, Serial

Distribution method in which effluent is loaded into one trench and fills it to a predetermined level before passing through a relief line or device to the succeeding trench; effluent passes through the distribution media before entering succeeding trenches which may be connected to provide a single uninterrupted flow path.

Distribution, Spray

Application of effluent over an infiltrative surface via pressurized nozzles and associated devices and parts (including pump, filters, controls and piping).

Distribution Box (D-Box)

Level, watertight structure that receives septic tank effluent and distributes it via gravity in approximately equal portions to two or more trenches or two or more laterals in a bed.

Distribution Device

Device that receives effluent from one component, and conveys it to a subsequent component(s), (e.g., a distribution box, drop box, or manifold).

Distribution System

Entire network of components that transport wastewater or effluent within a system.

Distribution Uniformity

Variability of effluent delivery.

Disturbed Area

An area which is susceptible to erosion because the vegetative soil cover has been removed or altered. This may be accompanied by mixing or removal of some soil horizons.

Disturbed Terrain

An area of land in which the components have been permanently altered from their original state as a result of human activities. It includes mining or quarrying pits and construction sites. Artificial landforms may be specifically created on disturbed terrain to serve various construction purposes. Such landforms include embankments, mounds, cut faces, cut-over surfaces and fill tops.

Diurnal

(1) Occurring during a 24-hour period; diurnal variation. (2) Occurring during the day (as opposed to night). (3) In tidal hydraulics, having a period or cycle of approximately 1 tidal day.

Diversion Channel

An earth channel traversing a slope designed to protect adjacent lower slopes or development works by intercepting surface water and diverting it to a stable outlet. The channel may have a minor ridge on its tower side to help contain flows. Where flows are too large to be contained by a simple channel, a diversion bank is constructed.

Diversion channels should be parabolic or trapezoidal in cross section to permit maintenance of their protective vegetative cover. Such channels are typically graded.

Diversity

The characteristic or variety of electrical loads whereby individual maximum demands usually occur at different times. Diversity among equipment loads results in diversity among the loads of transformers, feeders, and substations.

Diversity Factor

The ratio of the sum of the coincident demands of two or more loads to their maximum demands for the same period.

Domestic Consumption

The consumption of water for normal household purposes in domestic premises situated on the land.

Domestic Wastewater

Wastewater derived principally from dwellings, business buildings, institutions, and the like. It may or may not contain groundwater, surface water, or stormwater.

Domestic Water Use

Water used for household purposes, such as drinking, food preparation, bathing, washing clothes, dishes, and dogs, flushing toilets, and watering lawns and gardens. About 85% of domestic water is delivered to homes by a public-supply facility, such as a county water department.

Dose

The amount of a pollutant that is absorbed. A level of exposure that is a function of a pollutant's concentration, the length of time a subject is exposed, and the amount of the pollutant that is absorbed. The concentration of the pollutant and the length of time that the subject is exposed to that pollutant determine dose.

Dose Cycle

Period between the initiation of one dosing event and the next; the period includes both the time "on" and the time "off".

Dosing, Demand

Configuration in which a specific volume of effluent is delivered to a component based upon patterns of wastewater generation from the source.

Dose-Response

The relationship between the dose of a pollutant and the response (or effect) it produces on a biological system.

Dosing, Demand

Configuration in which a specific volume of effluent is delivered to a component based upon patterns of wastewater generation from the source.

Double Layer

The interface between an electrode or a suspended particle and an electrolyte created by charge-charge interaction (charge separation) leading to an alignment of oppositely charged ions at the surface of the electrode or particle. The simplest model is represented by a parallel plate condenser of 2×10^{-8} cm in thickness. In general the electrode will be positively charged with respect to the solution.

Double-Suction Impeller

An impeller with two suction inlets, one on each side of the impeller.

Double-Suction Pump

A centrifugal pump with suction pipes connected to the casing from both sides.

Dosing Device

Pump, siphon, or other device that delivers effluent to a subsequent component in a treatment train.

Dosing Tank

Any tank used in applying a dose; specifically used for intermittent application of wastewater to subsequent processes.

Dosing, Timed

Configuration in which a specific volume of effluent is delivered to a component based upon a prescribed interval, regardless of facility water use.

Double Sided

Reflective foil on both faces of reflective insulation.

Down Gradient

In the direction of decreasing static head.

DPD Method

An analytical method for determining chlorine residual using the reagent DPD (n-diethyl-p-phenylenediamine). This is the most commonly and officially recognized test for free chlorine residual.

Drag

The resistance offered by a liquid to the settlement or deposition of a suspended particle.

Drag Coefficient

A measure of the resistance to sedimentation or flotation of a suspended particle as influenced by its size, shape, density, and terminal velocity.

It is the ratio of the force per unit area to the stagnation pressure and is dimensionless. See also FRICTION FACTOR.

Drain

(1) A conduit or channel constructed to carry off, by gravity, liquids other than wastewater, including surplus underground, storm, or surface water. It may be an open ditch, lined or unlined, or a buried pipe.

(2) In plumbing, any pipe that carries water or wastewater in a building drainage system.

(3) A channel for the purpose of interception and removal of excess surface or sub-surface water to a stable outlet, Surface drains, excavated for runoff control and in common use for soil conservation purposes are:

Berm Drain

A drain along a constructed ledge between the top and bottom of a batter. See also BERM.

Catch Drain

A drain adjacent to a batter or embankment for the purpose of intercepting runoff flowing onto or away from it.

Catchment Drain (tDI Version Drain)

A drain extending beyond the natural catchment of a dam in order to augment the supply of runoff to it.

Contour Drain

A drain excavated along the contour.

Cross Drain

A drain of various form that baulks the flow of water down a road, trail or other access-way and diverts it across the roads surface. Cross drains are required where runoff cannot be controlled by cross fall drainage.

Mitre Drain (Spur Drain)

A drain to conduct runoff from a road shoulder to a disposal area away from the road alignment.

Open Unlined Drain

An open drain with no stabilizing material to protect its floor or sides.

Residual Flow Drain

A drain designed to carry trickle flows, such as might be used in conjunction with a strip cropping scheme.

Seepage Interceptor Drain

A drain with a channel cut deep enough to intercept sub-surface seepage, and convey it to a safe outlet. When used in conjunction with a bank on the upslope side it is known as a REVERSES BANK SEEPAGE INTERCEPTOR DRAIN. This system allows surface runoff to be safely dealt with as well as enhancing the drainage of shallow seepage water.

Spoon Drain

A drain with semi-circular cross-section having no associated ridge of soil. Its capacity is solely defined by the excavated channel dimensions, and it is only effective on low slopes.

Table Drain

The side drain of a road running adjacent and parallel to the shoulders, and comprising part of the road formation. Its purpose, when properly stabilized, is to conduct runoff safely away from the road area. Usually associated with miter drains.

Tank Drain

A drain used to intercept runoff and feed it into a tank.

Windrow Drain

A drain formed by a windrow along the edge of a trail, which may be useful in directing runoff flowing across the trail to a stable outlet. Sub-surface drains provide a channel for free water movement through the soil. They are generally used where site drainage is poor or where high water tables are a problem. Several common types are:

Mole Drain

An unlined drain used for draining clay soils. The channel is formed by pulling a torpedo-shaped cylinder through the subsoil, and only lasts as long as the clay material surrounding the hole remains stable.

Rubble Drain

A drain formed by placing gravel, broken rock or concrete, or similar material, in an excavated trench and covering it with soil.

Tile Drain

A lined drain formed by placing a pipe along the bottom of an excavated trench and covering it with soil. Such pipes are usually made of pervious clay or perforated plastic and are bedded in an envelope of coarse sand.

Drain, Interceptor

Subsurface drain used to intercept and divert laterally moving groundwater or perched water away from the soil treatment area or other system component to an effective outlet.

Drain, Perimeter

Subsurface drain installed around and outside of an individual soil treatment area or zone and designed to actively or passively lower the water table.

Drainage

Network of natural or artificial groundwater or surface water features including agricultural drain tile, cut banks, and ditches which intercept and divert surface water and/or lower groundwater. The interception and removal of excess surface and/or subsurface water from land, using artificial or natural means.

Drainage (Corrosion)

Conduction of electric current from an underground metallic structure by means of a metallic conductor. Forced drainage is that applied to underground metallic structures by means of an applied electromotive force or sacrificial anode. Natural drainage is that from an underground structure to a more negative (more anodic) structure, such as the negative bus of a trolley substation.

Drainage Basin

Land area where precipitation runs off into streams, rivers, lakes, and reservoirs. It is a land feature that can be identified by tracing a line along the highest elevations between two areas on a map, often a ridge. Large drainage basins, like the area that drains into the Mississippi River contain thousands of smaller drainage basins. Also called a “watershed”.

Drainage Class (Natural)

Group of soils defined by frequency and duration of wet periods similar to those under which the soil developed.

Drainage Depression

A level to gently inclined, shallow, open depression with smoothly concave cross-section, rising to moderately inclined hill slopes, that conveys runoff only during or immediately after periods of heavy rainfall. Drainage depressions typically occur at the upstream end of a flow path within any given catchment. They are commonly eroded or aggraded by sheet wash but because of their tendency to concentrate flows, the potential for gully erosion may also be high. Drainage depressions may be subject to seasonal water logging or spring activity and vegetation type often indicates a wetter micro-environment than the surrounding country.

Drainage Easement

A corridor through private land, that is reserved and controlled by a local government authority, facilitating storm water flows. It typically follows a natural flow path and incorporates a natural or constructed open channel of defined capacity, based on catchment characteristics, and an adjacent floodway to carry excess flows. Natural channels may require channel improvement to provide stability and enable efficient

maintenance programs to be adopted. Buildings, fences or other structures should not encroach onto the easement, so that it can provide for unimpeded flow of storm runoff. Ideally, the channel and floodway should be formed and stabilized before any major development occurs in its catchment.

Drainage Line

A channel down which surface water naturally concentrates and flows, conveying water only during and/or immediately after periods of heavy rainfall. Drainage lines may be stable, as in a well-grassed depression, or unstable, as in an active gully. Stable drainage lines are often used in association with soil conservation programs for water disposal.

Drainage Plain

A longitudinally extensive, level or gently inclined area of sediment, adjacent to a drainage line, built up by alluvial deposition during the current regime of the drainage line. Such areas are subject to periodic overland flow of water, may be subject to seasonal water logging and have vegetation types that often indicate a wetter micro-environment than the surrounding country.

Drainage Reserve

A dedicated public reserve incorporating a natural or constructed open channel that carries storm water flows. The channel must have a defined capacity commensurate with expected flows and an adjacent floodway to carry excess flows. Natural channels may require channel improvement to provide stability and enable efficient maintenance programs to be adopted.

Buildings, fences or other structures should not encroach onto the reserve, so that it can provide for unimpeded flow of storm runoff. Ideally, the channel and floodway should be formed and stabilized before any major development occurs in its catchment.

As an alternative to piping and masonry channels, vegetated drainage reserves and vegetated drainage easements have significant advantages in regard to cost, capacity and potential for detention storage. Flow velocities are usually low, resulting in a longer time of concentration and lower flood peaks downstream. They also encourage filtration and/or settlement of pollutants, washed from urban areas, which may flow through storm water pipes or lined channels.

Drainage, Tile

Large-scale subsurface drainage system designed for lowering groundwater for agricultural purposes.

Drain Back

Backflow of effluent into a pump tank after a dosing event.

Drain Down

Movement of effluent out of a lateral by infiltration into the soil treatment area following a dosing event.

Drains

Drains are small sewer connections discharging through a sealed connection to the nearest catch basin from points such as pump bases, equipment drips, low points of floors, funnels, etc.

Draught Proofing

A way to stop heat from escaping a home, for example by sealing window frames and using draught excluders under doors.

Drawdown

(1) The magnitude of the change in surface elevation of a body of water as a result of the withdrawal of water. (2) The magnitude of the lowering of the water surface in a well, and of the water table or piezometric surface adjacent to the well, resulting from the withdrawal of water from the well by pumping. (3) In a continuous water surface with accelerating flow, the difference in elevation between downstream and upstream points. Drop in the liquid level of a tank as a result of some phase of operation. Lowering of the water table due to withdrawal of groundwater from a well.

Drawdown Test

Measurement of the drop in liquid level in a dosing tank measured over time to calculate dosing/delivery rate; may be expressed as a pump delivery rate (PDR) or siphon delivery rate.

Dredge

To remove sediments from a stream bed to deepen or widen the channel.

Drift

Material moved by wind action and subsequently deposited in sheltered areas.

A passage driven through country rock to gain access to a mineral seam or vein.

Driftnet

A huge net stretching across many miles that drifts in the water; used primarily for large-scale commercial fishing.

Drilling

An operation to locate and develop underground water supplies, or to determine the characteristics of subsoil or underground geological formations for a variety of purposes, including investigation of sites for earth dams or tanks.

Drinking Water Potable Water

Water of a quality suitable for drinking purposes.

Drinking Water Scheme

A Drinking Water Scheme is the infrastructure owned by a drinking water service provider for single or multiple combinations of the individual components of treatment, transmission, reticulation, or the storage of recycled water to augment a drinking water supply.

Drip Emitter

Drip distribution device that dispenses effluent to the infiltrative surface at a predictable rate.

Drip Field

Above or below grade soil treatment area where final treatment and dispersal occurs via application of effluent to the infiltrative surface via pressurized drip tubing utilizing emitters.

Drip Field, Subsurface

Drip field designed and installed such that the drip tubing is located at least 6" below finished grade of native soil.

Drip Field, Surface

Drip field designed and installed such that the drip tubing is located at the finished grade of the soil surface.

Drip Irrigation

A common irrigation method where pipes or tubes filled with water slowly drip onto crops. Drip irrigation is a low-pressure method of irrigation and less water is lost to evaporation than high-pressure spray irrigation.

Drip Lateral

Length of drip tubing extending from the supply manifold to the return manifold.

Drip System

Drip system is a separate drain system for recovery of oil from contaminated fluids.

Drip Tubing

Small diameter flexible plastic tubing manufactured with emitters uniformly spaced along its length.

Drip Zone

Component of a drip distribution system made up of a group of drip laterals that is managed as a single unit.

Drop Box

(1) Device used for serial or sequential distribution of effluent by gravity flow to a lateral of a final treatment and dispersal component; addition of such a device adds a means of system management; (2) device used to lower piping elevation.

Drop Structure

A hydraulic structure for allowing water to fall to a lower level. The term may be applied to an entire structure incorporating an inlet, drop and

outlet, which facilitates the entry and exit of water between two levels without causing erosion: or to a section of a hydraulic structure such as in a drop inlet culvert. The drop is typically vertical but may be inclined provided the nappe does not touch the structure. Where a nappe is not formed the structure is referred to as a chute. For soil conservation purposes a drop structure should include an energy dissipater.

Droplet

A liquid particle of small mass, capable of remaining in suspension in a gas. In some turbulent systems, for example clouds, its diameter can reach 200 μm .

Droplet Separator

An apparatus for separating liquid particles from a gas stream in which they are suspended.

Drought Suspense Sub-Account Balance

The amount of water that has been suspended on an access licence due to continuing drought conditions. As conditions improve, water is re-credited to the access licence for use. This sub account is only operational during suspension of Water Sharing Plans.

Drum Screen

A screen in the form of a cylinder or truncated cone that rotates on its axis.

Dry-Bulb Temperature

The temperature of air measured by a conventional thermometer.

Dry Corrosion

Gaseous corrosion.

Dry Feeder

A feeder for dispensing a chemical or other fine material to water or wastewater at a rate controlled manually or automatically by the rate of flow. The constant rate may be either volumetric or gravimetric.

Dry Soil

Soil that exhibits no visible signs of moisture content.

Dry Suspended Solids

The weight of the suspended matter in a sample after drying for a specified time at a specific temperature.

Dry Weather Flow

(1) The flow of wastewater in a combined sewer during dry weather. Such flow consists mainly of wastewater, with no stormwater included. (2) The flow of water in a stream during dry weather, usually contributed entirely by groundwater.

Dry Land Farming

A technique that uses soil moisture conservation and seed selection to optimize production under dry conditions.

Dual-Fuel

Engines that operate on a combination of natural gas and diesel fuel.

Drying Beds

Confined, shallow layers of sand or gravel on which wet sludge is distributed for draining and air drying; also applied to under drained, shallow, dyked, earthen structures used for drying sludge.

Drying Oil

An oil capable of conversion from a liquid to a solid by slow reaction with oxygen in the air.

Drywell

Partially lined underground pit (regardless of geometry) into which drainage from roofs, basement floors or other such sources is discharged and from which the liquid seeps into the surrounding soil; if effluent (such as that from a septic tank) is discharged to such a component, it is considered a seepage pit.

Dual-Media Filters

Deep-bed filters using discrete layers of dissimilar media, such as anthracite and sand, placed one on top of the other.

Duct

An enclosed structure through which gases travel from one point to another. A passageway made of sheet metal or other suitable material used for conveying air or other gas.

Ductile Fracture

Fracture characterized by tearing of metal accompanied by appreciable gross plastic deformation and expenditure of considerable energy. Contrast with brittle fracture.

Ductility

The ability of a material to deform plastically without fracturing, measured by elongation or reduction of area in a tensile test, by height of cupping in an Erichsen test, or by other means.

Dummy Cathode

(1) A cathode, usually corrugated to give variable current densities, that is plated at low current densities to preferentially remove impurities from a plating solution. (2) A substitute cathode that is used during adjustment of operating conditions.

Dummying

Plating with dummy cathodes.

Dump Sites

Waste disposal grounds.

Dumping

Disposing of waste illegally by not using bins or official recycling centres, civic amenity sites or landfills.

Dune

A moderately inclined to very steep ridge or hill-ock built up by wind action. Dune formation may be initiated by the entrapment of transported material by wind reducing vegetation or structures. Various types of coastal dunes recognized are:

Incipient Dune

An area above the swash zone which has developed a slight convexity of profile from the addition of wind-blown sand. It is the first stage in the development of a new fore dune, which generally

is encouraged by the growth of primary stabilising species.

Foredune (Primary Dune)

The first dune immediately landward of. And parallel to, the beach: ridge and built up by onshore winds. It is the most seaward location of sand-trapping vegetation.

Frontal Dune

A fore dune which has endured to develop a cover of permanent vegetation but remains exposed to unobstructed on-shore winds.

Secondary Dune

A dune immediately landward of the fore dune.

Rind Dune

Any dunal area landward of the frontal dune, including the secondary dune.

Series of parallel dunes are known as DUNE RIDGES. In the coastal environment dune ridges develop during periods of sea-level fall. Dunes are normally linear in form. However, when a blowout proceeds unchecked a U-shaped dune results.

This is known as a PARABOLIC DUNE (U-DUNE).

Dune-Building Fence

A brush fence or similar structure designed and installed to trap drifting sand and create a dune. The dune so formed can subsequently be stabilized with vegetation.

Dune Shaping

The mechanical rebuilding of dunes in order to create a shape, size and orientation to facilitate their permanent stabilization with vegetation.

Dunefield

A level to rolling landform of low relief without stream channels, built up or locally excavated, eroded or aggraded by wind action. Components include dunes, swales and blowouts.

Duplex Pump

A reciprocating pump consisting of two cylinders placed side by side and connected to the same suction and discharge pipe; the pistons move so that one exerts suction while the other exerts pressure resulting in continuous discharge from the pump.

Duplex Soil

A soil in which there is a sharp change in soil texture between the A and B horizons (e.g. loam overlying clay). The soil profile is dominated by the mineral fraction with a texture contrast of 1½ soil texture groups or greater between the A and B horizons.

Horizon boundaries are clear to sharp. The texture change from the bottom of the A horizon to the top of the B horizon occurs over a vertical distance of 10 cm or less.

Duplex System

Control that operates two usually identical devices in a system (e.g., a duplex pump system).

Dust

Small solid particles conventionally taken as those particles below 75 µm in diameter which settle out under their own weight but which may remain suspended for some time ... (see DUST and GRIT): A general term applied to solid particles of different dimensions and origin generally remaining suspended in a gas for a certain time. Solid particulate matter that can become airborne. Dust Comprises a wide range of fine materials, including soil materials, which can be transported over long distances by wind. As wind velocity or air turbulence decreases, the larger and heavier particles settle, whereas many of the smallest particles are in almost permanent suspension. The suspension fraction in wind erosion

is generally accepted as being less than 100 pm in size. In a soil conservation context, a dust storm or dust cloud is the manifestation of a major wind erosion event in which soil materials comprise the majority of the dust in suspension.

Dust Control

The whole of the processes for the separation of solid particles from a gas stream in which they are suspended. (By extension, also the activities involved in the construction and commissioning of a dust separator.)

Dust Separator

An apparatus for separating solid particles from a gas stream in which they are suspended.

Note:

Dust separators working on the following principles are given as examples:

- gravity;
- inertia;
- centrifugal force;
- electricity;
- fibrous layer;
- packed tower;
- bubble washer;
- spray washer;
- venturi-scrubber.

Dwelling

Structure or building, or any portion thereof which is used, intended, or designed to be occupied for temporary or permanent human living purposes including, but not limited to: houses,

houseboats, mobile homes, motor homes, travel trailers, hotels, motels, and apartments.

Dynamic Equilibrium

The condition of an electrode when the rate of anodic dissolution just balances the rate of cathodic plating.

Dynamic Head

(1) When there is flow, (a) the head at the top of a waterwheel; (b) the height of the hydraulic grade line above the top of a waterwheel; and (c) the head against which a pump works. (2) That head of fluid that would produce statically the pressure of a moving fluid.

Dynamic Suction Head

The reading of a gauge on the suction line of a pump corrected for the distance of the pump below the free surface of the body of liquid being pumped; exists only when the pump is below the free surface. When pumping proceeds at the required capacity, the vertical distance from the source of supply to the center of the pump minus velocity head and entrance and friction losses. Internal pump losses are not subtracted.

Dynamic Suction Lift

When pumping proceeds at the required capacity, the vertical distance from the source of supply to the centre of the suction end of a pump, plus velocity head and entrance and friction losses. Internal pump losses are not added.

E

Earth

A general term commonly used to describe a range of soil materials. In pedological terms, it is used to describe great soil groups such as Black Earths and Red Earths. The term also refers to gradational soils with an earthy fabric in their B horizons.

In the classification of mass movement earth refers to material in which about 80% or more of the particles are smaller than 2 mm in size. This distinguishes it from debris type movements which contain 20–80% of fragments greater than 2 mm.

Earthflow

A category of mass movement involving earth materials and movement resembling that of a viscous fluid. Earth flows occur under a variety of moisture conditions and displacement varies from extremely slow to extremely rapid. Accelerated movement is often associated with moisture content increases. They may occur on a wide range of slope gradients.

Nomenclature of earth flows is commonly based on the dominance of particular separates

within or composing the earth material, and their moisture content, such as:

Dry Sand Flow

Occurs under dry conditions in non-plastic sorted sands and is typified by the 'flow' of sand resulting from disturbance of a sand dune.

Wet Sand Flow

Occurs under wet conditions in non-plastic sorted sands and is typified by the 'flow' of sand following the collapse of a beach ridge by wave action.

Mud Flow

Occurs under very wet conditions in plastic clay type materials. Mudflows typically result when water is suddenly applied to an area where a suitable load of unconsolidated clayey material is available, especially in the absence of a good vegetative cover.

Earthwork

An earthen structure designed and constructed for the purpose of interception, diversion, retention, detention and/or safe disposal of runoff, or any similar soil conservation purpose. The term may also be applied to the physical re-orientation

of land surface materials by mechanical means to facilitate soil erosion control or prevention.

Earthwork Tunnelling (Piping)

The process of tunnel/erosion as it occurs in constructed earthworks. Results from the use of dispersible soils in such earthworks and their post construction de flocculation. The continued removal of soil material through the tunnels so formed can lead to the serious leaking of the structure and its eventual collapse. The use of permeable soil materials, and those subject to cracking, may also lead to or accentuate the problem. Failure to achieve sufficient compaction during construction and/or to incorporate appropriate soil ameliorants are the main reasons for the initiation of earthwork tunneling.

Eave Vents

Vent openings located in the soffit under the eaves of a house to allow the passage of air through the attic and out the roof vents.

Eccentricity

The extent to which the Earth's orbit around the Sun departs from a perfect circle.

Eco Management Systems

Are being used by more and more companies as a tool to obtain a better overview of the environmental impact their operations have. An effective eco management system can also help a company to control and limit this environmental impact. Introducing an eco-management system makes it possible to integrate environmental programmes naturally with other operations. A company that uses eco management should draw up an

environmental policy and environmental objectives, define an environmental programme and conduct regular environmental audits.

Ecological Engineering

The design, management or reconstruction of sustainable ecosystems that serve human needs such as providing clean water and food while requiring low energy inputs. Ecological engineering has enhanced our understanding of environmental problems such as wastewater treatment, wetlands damage and mitigation, the effect of nonpoint pollution on ecosystems and ecosystem restoration. Systems designs that are considered to be "sustainable", that is with the aim of having little to no impact on earth's ecology. See INDUSTRIAL ECOLOGY.

Ecologist

A scientist concerned with the interrelationship of organisms and their environment.

Ecology

The study of relationships between living organisms and their environment.

Eco Region

An area of relatively homogeneous environmental conditions, usually defined by elevation, geology, and soil type. Examples include mountains, piedmont, coastal plain, sand hills and slate belt.

Ecosystem

A community of animals and plants and the physical environment in which they live.

Edge Cities

Cities bounded by water, usually with eroding or polluted waterfront areas.

Edge Preparation

Squaring, grooving, chamfering or bevelling an edge in preparation for welding.

Eductor

A device for mixing air with water; a liquid pump operating under a jet principle, using liquid under pressure as the operating medium to entrain air in the liquid. See also EJECTOR.

Effective Clearance

The vertical distance measured from the lowest point on the cutting edge of any tillage tool/up to any part of the tillage implement potentially obstructive to vegetation or residue flow through it. This measurement gives a clear indication of the implement's residue handling capacity.

Effective Size

The diameter of the particles, spherical in shape, equal in size, and arranged in a given manner, of a hypothetical sample of granular material that would have the same transmission constant as the actual material under consideration. There are a number of methods for determining effective size, the most common being that developed by Allen Hazen, which consists of passing the granular material through sieves with varying dimensions of mesh. In this method, the effective size is determined from the dimensions of that mesh, which permits 10% of the sample to pass and will retain the remaining 90%; in other words, the effective size is that for which 10% of the grains are smaller and 90% larger.

Effective Soil Depth

The depth of soil material that plant roots can penetrate readily to obtain water and plant nutrients. It is the depth to a layer that differs sufficiently from the overlying material in physical or chemical properties to prevent or severely retard the growth of roots.

Effectiveness

The extent to which the development intervention's objectives were achieved, or are expected to be achieved, taking into account their relative importance.

Effervescence

The vigorous escape of small gas bubbles from a liquid, especially as a result of chemical action.

Efficiency

The relative results obtained in any operation in relation to the energy or effort required to achieve such results. It is the ratio of the total output to the total input, expressed as a percentage.

Effluent

Effluent is a liquid which flows out of a containing space, and/or sewage, water or other liquid, partially or completely treated, or in its natural state, as the case may be flowing out of a reservoir, basin, or treatment plant, or part thereof. Any fluid discharged from a given source into the external environment. A general term describing any fluid discharged from a given source. Water or waste water discharge from a containing space such as a treatment plant, industrial process or lagoon. Wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall. Generally refers to wastes discharged into surface waters.

Effluent Limitation

Effluent limitation is any restriction (including schedules of compliance) established by a governmental authority on quantities, rates and concentrations of chemical, physical, biological and other constituents which are discharged from point sources into navigable waters, the waters of the contiguous zone, or the ocean.

Effluent Quality

Physical, biological, and chemical characteristics of a liquid flowing from a component or device. The physical, biological, and chemical characteristics of a wastewater or other liquid flowing out of a basin, reservoir, pipe, or treatment plant.

Effluent Screen

Removable, cleanable (or disposable) device installed on the outlet piping of a septic tank for the purpose of retaining solids larger than a specific size and/or modulating effluent flow rate.

Eight-Hour Ozone Standards

Since 1971, the U.S. Environmental Protection Agency (EPA) has established national air quality standards for ozone. Revised in 1997, the current national air quality standard for ozone is 0.08 parts per million (ppm), or 80 parts per billion (ppb), averaged over 8 hours. For a given geographic area to be in compliance, its fourth highest 8-hour concentration in a year, averaged over three years, must be equal to or less than that amount.

Ejector

A device for moving a fluid or solid by entraining it in a high-velocity stream of air or water jet.

Elastic Deformation

A change in dimensions directly proportional to and in phase with an increase or decrease in applied force.

Elastic Limit

The maximum stress that a material is capable of sustaining without any permanent strain (deformation) remaining upon complete release of the stress.

Elasticity

The property of a material by virtue of which deformation caused by stress disappears upon removal of the stress. A perfectly elastic body completely recovers its original shape and dimensions after release of stress.

Elastomer

A natural or synthetic polymer, which at room temperature can be stretched repeatedly to at least twice its original length, and which after removal of the tensile load will immediately and forcibly return to approximately its original length.

Elastomeric

A closed-cell foam insulation containing elastomers that provide the property of high elasticity.

Elbow

A pipe fitting that connects two pipes at an angle. The angle is always 90° unless another angle is stated. Also called an ell.

Electrical Conductivity

A measure of the conduction of electricity through water or a water extract of soil. It can be used to determine the soluble salts in the extract and hence soil salinity. The unit of electrical conductivity is the Siemens and soil salinity is normally expressed as milli-siemens per centimeter at 25 °C (symbol: E, Units: ms/cm). Conductivity values of 1.5 (for a 1:5 soil:water suspension) or 4.0 (for a saturation extract) indicate the likely occurrence of plant growth restrictions.

Electrical Isolation

The condition of being electrically separated from other metallic structures or the environment.

Electrical Resistivity

The electrical resistance offered by a material to the flow of current, times the cross-sectional area of current flow and per unit length of current path; the reciprocal of the conductivity. Also called resistivity or specific resistance.

Electrochemical Admittance

The inverse of electrochemical impedance.

Electrochemical Cell

An electrochemical system consisting of an anode and a cathode in metallic contact and immersed in an electrolyte. (The anode and cathode may be different metals or dissimilar areas on the same metal surface.)

Electrochemical Corrosion

Corrosion that is accompanied by a flow of electrons between cathodic and anodic areas on metallic surfaces.

Electrochemical Equivalent

The weight of an element or group of elements oxidized or reduced at 100% efficiency by the passage of a unit quantity of electricity. Usually expressed as grams per coulomb (1 amp/s).

Electrochemical Impedance

The frequency-dependent complex-valued proportionality factor ($SE/6i$) between the applied potential or current and the response signal. This factor is the total opposition (I1 or III cm-) of an electrochemical system to the passage of charge. The value is related to the corrosion rate under certain circumstances.

Electrochemical Impedance Spectroscopy

(AC Impedance)—A method to study the impedance of a metal/fluid interface by electrochemical properties by applying a sinusoidal polarization potential to the interface through a range of frequencies.

Electrochemical Potential

The partial derivative of the total electrochemical free energy at a constituent with respect to the number of moles of this constituent where all factors are kept constant. It is analogous to the chemical potential of a constituent except that it includes the electric as well as chemical contributions to the free energy. The potential of an electrode in an electrolyte relative to a reference electrode measured under open circuit conditions.

Electrochemical Series

Same as electromotive force series.

Electrode

(1) An electronic conductor used to establish electrical contact with an electrolytic part of a circuit. (2) An electronic conductor in contact with an ionic conductor.

Electrode Polarization

Change of electrode potential with respect to a reference value. Often the free corrosion potential is used as the reference value. The change may be caused, for example, by the application of an external electrical current or by the addition of an oxidant or reductant.

Electro-deposition

The deposition of a substance on an electrode by passing electric current through an electrolyte.

Electrode Potential

The potential of an electrode in an electrolyte as measured against a reference electrode. The electrode potential does not include any resistance losses in potential in either the solution or external circuit. It represents the reversible work to move a unit charge from the electrode surface through the solution to the reference electrode. The potential of an electrode as measured against a reference electrode. The electrode potential does not include any resistance loss in potential in solution due to the current passing to or from the electrode.

Electrode Reaction

Interfacial reaction equivalent to a transfer of charge between electronic and ionic conductors. See also ANODIC REACTION and CATHODIC REACTION.

Electro-galvanising

Galvanized by electroplating.

Electrokinetic Potential

This potential, sometimes called zeta potential, is a potential difference in the solution caused by residual, unbalanced charge distribution in the adjoining solution, producing a double layer. The electro kinetic potential is different from the electrode potential in that it occurs exclusively in the solution phase; that is, it represents the reversible work necessary to bring a unit charge from infinity in the solution up to the interface in question but not through the interface.

Electro Less Plating

A process in which metal ions in a dilute aqueous solution are plated out on a substrate by means of autocatalytic chemical reduction.

Electrolysis

Production of chemical changes of the electrolyte by the passage of current through an electrochemical cell.

Electrolyte

A chemical substance or mixture, usually liquid, containing ions which migrate in an electric field. An ionic conductor (usually in aqueous solution). (1) A chemical substance or mixture, usually liquid, containing ions that migrate in an electric field. (2) A chemical compound or mixture of compounds which when molten or in solution will conduct an electric current.

Electrolytic Cell

An assembly, consisting of a vessel, electrodes, and an electrolyte, in which electrolysis can be carried out.

Electrolytic Cleaning

A process of removing soil, scale, or corrosion products from a metal surface by subjecting it as an electrode to an electric current in an electrolytic bath; process of cleaning, degreasing, of a metal by making it an electrode in a suitable bath.

Electrolytic Protection

Cathodic protection.

Electromotive Force

The property of a physical device that tends to produce an electrical current in a circuit. It is the moving force that causes current to flow (see VOLT).

Electromotive Force Series

(EMF Series)—The potential of an electrode in an electrolytic solution when the forward rate of a given reaction is exactly equal to the reverse rate. (The equilibrium potential can only be defined with respect to a specific electrochemical reaction.)

Electromotive Force Series (EMF Series)

A list of elements arranged according to their standard electrode potentials (Hydrogen electrode is a reference point and given the value zero), with “noble” metals such as gold being positive and “active” metals such as zinc being negative.

Electron-Beam Welding

Fusion welding in which the joint is made by fusing the parent metal by the impact of a focused beam of electrons.

Electron Flow

A movement of electrons in an external circuit connecting an anode and cathode in a corrosion cell; the current flow is arbitrarily considered to be in an opposite direction to the electron flow.

Electronic Tacheometer

A surveying instrument which combines the functions of a theodolite, electronic distance measurement and a microprocessor. The horizontal and vertical circles are electronically scanned. The instrument is capable of displaying horizontal and vertical circle values as well as slope distances, and horizontal/vertical components of slope distance. These displayed values can also be stored in an electronic data recorder connected to the instrument.

Electroplating

Electro deposition of a thin adherent layer of a metal or alloy of desirable chemical, physical and mechanical properties on metallic or non-metallic substrate.

Electro Polishing

A technique commonly used to prepare metallographic specimens, in which a high polish is produced by making the specimen the anode in an electrolytic cell, where preferential dissolution at high points smooths the surface.

Electro-slag Welding

A welding process in which consumable electrodes are fed into a joint containing flux; the current melts the flux, and the flux in turn melts the faces of the joint and the electrodes, allowing the weld metal to form a continuous cast ingot between the joint faces.

Electrostatic Precipitator

An air pollution abatement device that removes particulate matter from a gas stream by imparting an electrical charge to the particles for mechanical collection on an electrode. A device that removes particles from a gas stream (smoke) after combustion occurs. The ESP imparts an electrical charge to the particles, causing them to adhere to metal plates inside the precipitator. Rapping on the plates causes the particles to fall into a hopper for disposal.

Electroplating

Electroplating tin on an object.

Elevation Head

The energy possessed per unit weight of a fluid because of its elevation above some point. Also called position head or potential head.

El Niño

El Niño is a climatic phenomenon occurring every 5–7 years during Christmas (El Niño means Christ child) in the surface oceans of the SE Pacific. The phenomenon involves seasonal changes in the direction of Pacific winds and abnormally warm surface ocean temperatures. The changes normally only effect the Pacific region, but major events can disrupt weather patterns over much of the globe. The relationship

between these events and global weather patterns are poorly understood and are currently the subject of much research.

Elutriation

A method of separating particles using the difference in apparent weight which may exist between the particles when they are suspended in a fluid.

Elutriator

An instrument which lifts particles from a fluidized bed of dry soil in a rising current of air. By changing the rate of lift, particles of different sizes may be separated to enable soil to be characterized by particle size distribution or to determine the proportion of suspension fraction capable of being mobilized during wind erosion. This process is called elutriation.

Eluviation

The downward removal of soil material in suspension, or in solution, from a layer or layers of a soil. The loss of material in solution is described by the term leaching. Some of the eluviated materials are typically deposited in lower layers or horizons.

EMAS

An acronym for Eco Management and Audit Scheme, a voluntary directive within the European Union relating to eco management and environmental audits for companies. EMAS is designed to help companies work on environmental issues in a systematic manner and resembles the ISO 9000 quality standard when it comes to its working methods. There is also a parallel eco management system which is known as ISO 14001. According to EMAS, companies should draw up an environmental policy, an environmental

programme and an eco-management programme. Companies should also openly share the results of their environmental programmes with the general public via what is known as an environmental report.

Embankment

An artificial elevation of earth, longer than it is wide, typically constructed for the purpose of controlling the flow of, or storing water as in a bank or dam.

Embargoes

Embargoes prohibit the granting of applications for further access licences, except for those purposes specifically exempted, for example, for increased town water supplies.

Embrittlement

Severe loss of ductility of a metal (or alloy). Loss of load carrying capacity of a metal or alloy; The severe loss of ductility or toughness or both, of a material, usually a metal or alloy. Many forms of embrittlement can lead to brittle fracture. Many forms can occur during thermal treatment or elevated-temperature service (thermally induced embrittlement). Some of these forms of embrittlement, which affect steels, include blue brittleness, 885 °F (475 °C) embrittlement, quench-age embrittlement, sigma-phase embrittlement, strain-age embrittlement, temper embrittlement, tempered martensite embrittlement, and thermal embrittlement. In addition, steels and other metals and alloys can be embrittled by environmental conditions (environmentally assisted embrittlement). The forms of environmental embrittlement include acid embrittlement, caustic embrittlement, corrosion embrittlement, creep-rupture embrittlement, hydrogen embrittlement, liquid metal embrittlement, neutron embrittlement,

solder embrittlement, solid metal embrittlement, and stress-corrosion cracking.

Emerging Contaminants

Newly identified compounds or substances that have the potential to adversely affect public health or the environment and for which there is no currently published health standard.

Emerson's Aggregate Test

A classification of soil aggregates based on their coherence in water. Small dry aggregates are placed in dishes of distilled water and their behavior observed. The conditions under which they slake, swell and disperse allows the different aggregates to be separated into eight classes. The test is particularly valuable in a soil conservation context as it grades soil aggregates according to their stability in water.

The test uses natural peds, with the first separation being based on slaking. Those aggregates which do not slake are placed in class 7 if they swell and in class 8 if they do not. Of those which do slake, which form the majority of soils, those which show complete soil dispersion are placed in class 1 and those showing only partial dispersion are placed in Class 2. Those showing no dispersion are remolded at field capacity and reimmersed in water. Aggregates which disperse after remolding are placed in class 3 and those which do not are further separated by the presence or absence of carbonate or gypsum.

Those with carbonate or gypsum fall into class 4 while those without are made up into a 1:5 suspension aggregates/water. Those soils which then show dispersion are placed in class 5 and those which show flocculation fall into class 6.

In general the degree of stability of soils increases from class 1 through to class 8. In a soil conservation context, it may be useful to further subdivide classes 2 and 3 according to the degree of dispersion observed.

End Wall

A cut-oil wall at the outlet of a hydraulic structure. Its primary purpose is to prevent undercutting by flows leaving the structure.

Emission

Release of pollutants into the air from a source. We say sources emit pollutants. Continuous emission monitoring systems (CEMS) are machines, which some large sources are required to install, to make continuous measurements of pollutant release. Emission is discharge of a liquid, solid, or gaseous material. The manner by which substances are discharged through the air.

Emissions

Released or discharged air contaminants in the ambient air from any source.

Emissions Cap

A limit on the amount of greenhouse gases that a company or country can legally emit.

Emission Factor

The relationship between the amount of pollution produced and the amount of raw material processed or burned. For example, the emission factor for oxides of nitrogen from fuel oil combustion in an industrial boiler would be the number of pounds of oxides of nitrogen emitted per 1000 gallons of fuel oil burned. By using the emission factor of a pollutant and specific data regarding quantities of material used by a given source, it is possible to compute emissions for the source. This approach is used in preparing an emissions inventory.

Emission Inventory

An estimate of the amount of pollutants emitted into the atmosphere from major mobile, stationary, area-wide, and natural source categories over a specific period of time such as a day or a year. A list of air pollutants emitted into a community's atmosphere, in amounts (commonly tons) per day or year, by type of source.

Emission Rate

The weight of a pollutant emitted per unit of time (e.g., tons/year).

Emission Standard

The maximum amount of pollution that is permitted to be discharged from a polluting source—for example, the number of pounds of dust that may be emitted per hour from an industrial process.

Emitter, Non-Pressure Compensating (Non-PC)

Emitter that discharges effluent at rates dependent upon operating pressure.

Emitter, Pressure Compensating (PC)

Emitter designed to deliver effluent at a consistent flow rate under a range of operating pressures above a threshold.

Emulsification

Suspension of solids as a result of decreased surface tension due to the presence of an emulsifying agent or some substance that alters or prohibits normal microbial activity.

Emulsified Diesel

This is diesel that is mixed with a small percentage of water and an agent that keeps the water and diesel mixed. By adding the water to the diesel a smaller amount emissions are created when the fuel is burned.

Emulsifying Agent

Agent capable of modifying the surface tension of emulsion droplets to prevent coalescence; examples are soap and other surface-active agents, certain proteins and gums, water-soluble cellulose derivatives, and polyhydric alcohol esters and ethers.

Emulsion

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

Encapsulation

To protect the assembly by inhibited organic sealant, plastic caps or cast potting compound.

Endogenous Respiration

Auto-oxidation by organisms in biological processes.

Endangered Species

Species in danger of extinction throughout all or a significant part of its range.

Endemic Species

Endemic species are the species which are native, restricted or peculiar to an area. Energy-efficient is electrical lighting devices which produce the

same amount of light (lumens) using less electrical energy than incandescent electric light bulbs. Such devices are usually of the fluorescent type, which produce little heat, and may have reflectors to concentrate or direct the light output.

Endocrine Disruptors

Substances that stop the production or block the transmission of hormones in the body.

Endogenous Respiration

Auto-oxidation by organisms in biological processes.

Endosaturation

Condition in which the soil is saturated with water in all layers from the upper boundary of saturation to a depth of 200 cm or more from the mineral soil surface.

Endurance Limit

The maximum stress that a material can withstand for an infinitely large number of fatigue cycles; maximum cyclic stress level a metal can withstand without fatigue failure. See also FATIGUE STRENGTH.

Energy

Energy cannot be destroyed only converted. Energy sources can be divided into three main groups—solar energy, fossil fuels and nuclear energy. Solar energy can be used directly as wind, water and biofuels. Fossil fuels are coal, oil and natural gas. Different carriers of energy such as electricity, water and air help to make it available for use. Energy can be used for work, lighting, heating and transport. In principle, all energy use has an environmental impact, but the impact varies depending on the source of energy that is used.

Energy Conservation

Using energy efficiently or prudently; saving energy.

Energy Content

The amount of energy available for doing work. For example, the amount of energy in fuel available for powering a motor vehicle.

Energy Dissipator (Dissipator)

A structure used to absorb excess kinetic energy possessed by flowing water. This energy is acquired by the water when its velocity is high, such as in a chute or over a weir. Energy dissipators are incorporated into the design of hydraulic structures to reduce turbulence and the erosive power of fast-moving water.

Energy Efficiency

Energy efficiency is the amount of fuel needed to sustain a particular level of production or consumption, in an industrial or domestic enterprise. Energy efficiency measures are designed to reduce the amount of fuel consumed, either through greater insulation, less waste, or improved mechanical efficiencies, without losing any of the value of the product or process. Improving energy efficiency is a technological means to reduce emissions of greenhouse gases without increasing production costs.

Energy Sources

They are:

fossil fuels (coal, oil, gas);
nuclear (fission and fusion);
renewables (solar, wind, geothermal, biomass, hydro).

Enforcement

The legal methods used to make polluters comply with air quality regulations. Enforcement methods include citations of polluters for violations of the law (citations are much like traffic tickets), fines and even jail terms. EPA and the state and local governments are responsible for enforcement of the Clean Air Act, but if they don't enforce the law, members of the public can sue EPA or the states to get action. Citizens can also sue violating sources, apart from any action EPA or state or local governments have taken. Before the 1990 Clean Air Act, all enforcement actions had to be handled through the courts. The 1990 Clean Air Act gave EPA authority so that, in some cases, EPA can fine violators without going to court first. The purpose of this new authority is to speed up violating sources' compliance with the law and reduce court time and cost.

Enhanced Greenhouse Effect

The concept that the natural greenhouse effect has been enhanced by increased atmospheric concentrations of greenhouse gases (such as CO₂ and methane) emitted as a result of human activities. These added greenhouse gases cause the earth to warm.

Enteric Fermentation

The natural digestive process in ruminant animals (e.g. cattle and sheep) that produces methane as a by-product.

Enterococci

A group of Cocci that normally inhabit the intestines of man and animals. Incorrectly used interchangeably with fecal Streptococci.

Entrainment

The carryover of drops of liquid during processes such as distillation. The trapping of bubbles in a liquid produced either mechanically through turbulence or chemically through a reaction.

Entrainment

The process by which detached soil particles are drawn into the flow of air or water during an erosion event.

Environment

The sum of all the external conditions that may act upon a living organism or community to influence its development or existence.

Environmental and Social Effects

IEG's indicator as a part of Development Outcome evaluation, covering: (1) the project's environmental performance in meeting IFC's requirements; and (2) the project's actual environmental impacts, including pollution loads, conservation of biodiversity and natural resources and, in a broader context, social, cultural and community health aspects, as well as labor and working conditions and workers' health and safety.

Environmental Aspect

Element of an organizations activities, products and services that can interact with the environment.

Environmental Assessment

A comprehensive and systematic process designed to identify, analyse and evaluate the environmental effects of proposed projects.

Environmental Audit

A systematic evaluation to ensure that a company's eco management system is working and that environmental programmes are being run according to the law and in a satisfactory manner by internal standards. During this audit, the company's effect on the external environment, the way the internal organisation handles environmental issues and the documentation which is designed to guide and control environmental programmes are all examined.

Environmental Cracking

Brittle fracture of a normally ductile material in which the corrosive effect of the environment is a causative factor. Environmental cracking is a general term that includes corrosion fatigue, high-temperature hydrogen attack, hydrogen blistering, hydrogen embrittlement, liquid metal embrittlement, solid metal embrittlement, stress-corrosion cracking, and sulfide stress cracking. The following terms have been used in the past in connection with environmental cracking, but are becoming obsolete: caustic embrittlement, delayed fracture, season cracking, static fatigue, stepwise cracking, sulfide corrosion cracking, and sulfide stress-corrosion cracking. See also EMBRITTLEMENT.

Environmental Economy

The part of national economy which attempts to integrate an economic approach with an ecological one. In short, it would be true to say that environmental economy constitutes an attempt to make concealed environmental costs visible—i.e. costs which current economic thinking does not take into account. Present-day environmental economists use environmental accounts, economic management systems, tax exchange and so on.

Environmental Effect

Environmental effect is any direct or indirect impingement of activities, products and services of an organization upon the environment, whether adverse or beneficial. An environmental effect is the consequence of an environmental intervention in an environmental system.

Environmental Flow

A volume of water released from the Head works for environmental purposes. This is an important input to the River Operations Function. See also RECREATIONAL FLOW and REPLENISHMENT FLOW.

Environmental Footprint

A measure of human demand on the ecosystems and natural resources.

Environmental Impact

Environmental impact is any change to the environment, whether adverse or beneficial, wholly or partially resulting from an organization's activities, products or services. An environmental impact addresses an environmental problem.

Environmental Justice (EJ)

The fair treatment of people of all races and incomes with respect to development, implementation and enforcement of environmental laws, regulations and policies.

Environmental Management Plan

The synthesis of all proposed mitigative and monitoring actions, set to a timeline with specific responsibility assigned and follow-up actions

defined. The EMP is one of the most important outputs of the environmental assessment process.

Environmental Management System

Part of an organization's management system used to develop and implement its environmental policy and manage its environmental aspects.

Environmental Mainstreaming

The integration of environmental concerns into macroeconomic and sectoral interventions.

Environmental Performance

Measurable results of an organization's management of its environmental aspects.

Environmental Performance Criterion

Environmental objective, target, or other intended level of environmental performance set by the management of the organization and used for the purpose of environmental performance evaluation.

Environmental Objective

Overall environmental goal, consistent with the environmental policy that an organization sets itself to achieve.

Environmental Performance Evaluation

Process to facilitate management decisions regarding an organization's environmental performance by selecting indicators, collecting and

analyzing data, assessing information against environmental performance criteria, reporting and communicating, and periodically reviewing and improving the process (ISO 14031).

Environmental Protection Agency

An agency of the federal government of the United States charged with protecting human health and the environment, by writing and enforcing regulations based on laws passed by Congress.

Environmental Sanitation Infrastructure

Infrastructure such as a wastewater treatment plant or sanitary landfill designed in part to improve environmental quality although its ultimate purpose is to protect human health and welfare.

Environmental Sensitivity

Relative susceptibility of the natural environment to adverse impacts from an outside constituent.

Environmental Sustainability

Ensuring that the overall productivity of accumulated human and physical capital resulting from development actions more than compensates for the direct or indirect loss or degradation of the environment. Goal 7 of the UN Millennium Development Goals specifically refers to this in part as integrating the principles of sustainable development into country policies and programs and reversing loss of environmental resources.

Enzyme

A catalyst produced by living cells. All enzymes are proteins, but not all proteins are enzymes.

Ephemeral

Describes a watercourse, or portion thereof, that does not flow at all times. It generally only flows in direct response to precipitation. It receives little or no water from springs and no long continued supply from snow or other sources. Its channel is at all times above the water table.

Epidemic

A disease that occurs simultaneously in a large fraction of the community.

Epidemiology

The study of the occurrence and distribution of disease within a population.

Epoxy

Resin formed by the reaction of bisphenol and epichlorohydrin.

EPS

EPS (Expanded PolyStyrene) is a lightweight, rigid, plastic foam insulation material produced from solid beads of polystyrene.

Equalization

In wastewater systems, the storage and controlled release of wastewaters to treatment processes at a controlled rate determined by the capacity of the

Fig. 9 Equalizing basin

processes, or at a rate proportional to the flow in the receiving stream; used to smooth out variations in temperature and composition as well as flow.

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 (Fig. 9). Also called balancing reservoir.

Equilibrium

A condition of balance in which the rate of formation and the rate of consumption or degradation of various constituents are equal. See also CHEMICAL EQUILIBRIUM.

Equilibrium Constant

A value that describes the quantitative relationship between chemical species in a system at equilibrium.

Equilibrium (Reversible) Potential

The potential of an electrode in an electrolytic solution when the forward rate of a given reaction is exactly equal to the reverse rate. The equilibrium potential can only be defined with respect to a specific electrochemical reaction.

Equity

In the environmental sense, the planned dispersment of toxic or waste facilities in regions throughout the socioeconomic strata.

Equivalent Calcium Carbonate

A common form of expressing hardness, the acidity, or the carbon dioxide, carbonate, bicarbonate, noncarbonate, hydroxide, or total alkalinity of water; expressed in milligrams per litre (mg/L). It is calculated by multiplying the number of chemical equivalents of any of these constituents present in 1 L by 50, the equivalent weight of calcium carbonate. See also CHEMICAL EQUIVALENT.

Equivalent Diameter

The diameter of a spherical particle the size of which will give identical geometric, or optical, or electrical or aerodynamic behaviour to that of the particle being examined.

For sieves, the equivalent diameter is the diameter of the holes in a round hole sieve which will pass the same proportion of material as will a specified square mesh sieve. It is dependent upon the shape and size of the particles under examination.

Equivalent Dwelling Units (EDUs)

Units of measure that standardize all land use types (housing, retail, office, etc.) to the level of demand created by one single family housing unit.

Equivalent Opacity

The application of the Ringelmann system to the evaluation of the density of other than black smoke.

Equivalent Sound Level

It is the constant sound pressure level which would have produced the same total energy as the actual sound level over the given time.

Erode

To wear away the land. In a soil conservation context the main active factors responsible are rainfall, running water and wind, and these are called erosive agents.

Erodibility

Susceptibility to erosion.

Erodibility Index

A quantitative expression of soil erodibility based on measured soil properties.

Erodible

Susceptible to erosion. The term is typically applied to soils.

Erosion

Wearing a way of rock or soil by the gradual detachment of soil or rock fragments by water, wind, ice, and other mechanical and chemical forces.

The wearing away of the land by running water, rainfall, wind, ice or other geological agents, including such processes as detachment, entrainment, suspension, transportation and mass movement.

Natural Erosion (Geologic Erosion)

Erosion occurring under natural environmental conditions, undisturbed by humans, and occurring over long geologic periods.

Accelerated Erosion

Erosion much more rapid than natural erosion, primarily involving the loss of soil material from the land as a result of the influence of human activities.

Soil Erosion

The detachment and transportation of soil and its deposition at another site by wind, water or gravitational effects. Although a component of natural erosion, it becomes the dominant component of accelerated erosion as a result of human activities, and includes the removal of chemical materials.

Wave Erosion

An erosion process in which soil is detached and transported from the land by the action of waves. It is typically associated with coastal areas and is thus often referred to as coastal erosion. However, wave erosion may occur at the margin of any water body, such as a retention structure or dam.

Wind Erosion

An erosion process in which soil is detached and transported from the land surface by the action of wind, where the removal of a fairly uniform layer of soil from the land surface occurs the term sheet erosion may be used. Transport of wind-blown particles occurs by suspension, saltation or surface creep.

Water Erosion

An erosion process in which soil is detached and transported from the and by the action of rainfall, runoff, seepage and/or ice. The following terms are used to describe different types of water erosion:

Splash Erosion (Raindrop Erosion)

The spattering of soil particles caused by the impact of raindrops on the soil. The loosened particles may or may not be subsequently removed by runoff. An important component of sheet erosion.

Sheet Erosion

The removal of a fairly uniform layer of soil from the and surface by raindrop splash and/or runoff. No perceptible channels are formed. The term may also be applied with respect to wind erosion.

Rill Erosion

The removal of soil by runoff from the land surface whereby numerous small channels, generally up to 30 centimeters deep, are formed. Typically occurs on recently disturbed soils.

Gully Erosion

A complex of processes whereby the removal of soil is characterized by large incised channels in the landscape. Such channels are generally more than 30 centimeters in depth. The severity of gully erosion may be recorded as minor, moderate, severe or very severe. Minor and moderate gully erosion are related to the density of gullies within the primary drainage lines over a specified area. With minor gully erosion.

Gullies are generally discontinuous, and with moderate gully erosion they are generally continuous. When branching of the gullies away

from the primary drainage line occurs, the severe categories are used. Three categories of gully depth may be recorded: <1.5 m, 1.5–3 m, >3 m.

Gully erosion processes may include:

Removal of soil from the land surface by concentrated runoff with sufficient volume and velocity to cut large channels. *Dispersion of unstable subsoil due to seepage followed by the collapse of surface soil into the void so formed.

Head Ward Erosion

Gully enlargement in an upstream direction due to incision by concentrated runoff and the formation of a waterfall and splash pool leading to undercutting and slumping of the gully head. This process may be accentuated by the effects of sheet and splash erosion, and subsurface seepage.

Lateral Erosion

Gully enlargement in a lateral direction due to incision by concentrated runoff entering at the gully sides and/or by undercutting and slumping and/or by sheet, rill and splash erosion of the gully sides.

Streambank Erosion

The removal of soil from stream banks by the direct action of stream flow, and/or wind/wave action. Typically occurs during periods of high flow.

Tunnel Erosion (Tunnelling)

The removal of sub-surface soil by water while the surface soil remains relatively intact. An erosion process in which water seeps into dry soil causing soil dispersion and/or slaking of soil particles into suspension. The dispersed soil is then removed by seepage until the seepage path takes the form of a tunnel. The process continues as more water comes into contact with fresh dry soil.

Such a tunnel usually outlets in the side of a gully, batter or earth wall, or at the ground surface lower down a slope. The tunnel normally collapses in due course and a gully is formed. The process can occur in soils in their natural field situation or in constructed earthworks. The soils involved are normally highly dispersible.

Erosion (Corrosion)

Destruction of metals by the abrasive action of moving fluids accelerated by the presence of solid particles in suspension. When corrosion occurs simultaneously, the term “erosion-corrosion” is often used.

Erosion-Corrosion

Erosion is a strictly mechanical phenomenon, while erosion-corrosion is a combination of mechanical action and chemical or electrochemical reaction. Pure erosion seldom occurs in aqueous systems. Erosion-corrosion is characterized by grooves, gullies, waves, rounded holes and valleys, and usually exhibits a directional pattern. In copper alloy heat exchanger tubes, the attack frequently results in the formation of horseshoe-shaped depressions. Erosion-corrosion is the acceleration of metal loss because of the relative movement between a fluid and a metal surface. Generally, the movement is rapid, and the effects of mechanical wear are involved. Metal is removed as dissolved ions or as solid corrosion products that are swept from the surfaces.

Corrosion which is increased because of the abrasive action of a moving stream; the presence of suspended particles greatly accelerates abrasive action.

Erosion Control Measures

Those activities based on structural works, vegetation management, tillage operations and/or other farm management options designed primarily to achieve control of soil erosion.

Erosion Hazard

The susceptibility of a parcel of land to the prevailing agents of erosion. It is dependent on a combination of climate, landform, soil, land use and land management factors. The qualitative

categories of erosion hazard used are low, moderate, high, very high and extreme.

Low erosion hazard is associated with a combination of the above factors that results in no appreciable erosion damage occurring during or after the development of the particular land use under consideration. Soil conservation management should however, include simple practices, such as top soiling and conservation tillage where appropriate.

Moderate erosion hazard implies that significant erosion may occur during development of the particular land use. Provided appropriate soil conservation measures are adopted during development both short term and long term erosion problems may be avoided.

High erosion hazard implies that significant erosion will occur during development of the particular land use and that appropriate erosion control measures are needed to minimize long-term erosion problems. Control of short term erosion could be provided by simple soil conservation measures but long-term erosion control would involve intensive measures. Very high erosion hazard implies that significant erosion will occur during development and after the land use is established, even with intensive soil conservation measures. Such an erosion hazard infers that planning will need to carefully consider the balance between the probability of long-term erosion damage and the maintenance or repair needed to ensure the viability of the land use. Extreme erosion hazard implies that erosion will occur to such an extent that economic control utilizing conventional soil conservation measures is impractical. If implementation of the land use is imperative, detailed engineering, geotechnical and/or other appropriate studies will be necessary to ascertain its viability.

Erosion Mitigation

Reduction in the severity of erosion. A general term used to embrace all those activities, including specific soil conservation activities, aimed at the control of soil erosion and the reduction of its impact on all forms of land use.

Erosion Risk

The intrinsic susceptibility of a parcel of land to the prevailing agents of erosion. It is dependent on a combination of climate, landform and soil factors. Determination of erosion risk differs from the determination of erosion hazard in that land management factors are ignored. Thus, the relative difference between various parcels of land is less susceptible to change due to technological improvements in land management practices.

Erosion Survey

The systematic examination, description, classification and mapping of existing soil erosion within an area. Although other land resource attributes and/or other elements of the land may be mapped during the survey, its principal function is to describe, classify and map soil erosion to show the extent of degradation of the soil resources. Such a survey also provides some indication of the erodibility of different soil types.

Erosion-Resisting Crops

A strip cropping term for those crops with good capability for stowing and spreading the overland flow or runoff.

Erosive

Tending to produce erosion. It applies to factors which act, or can act, on the soil or other materials to cause erosion, but is not a property of the material itself.

Therefore, the term refers to the active agents of erosion such as rainfall, running water and wind.

Erosive Velocity

Velocity of the erosive agent necessary to cause erosion of the material in question.

Erosivity

Potential ability to cause erosion. The amount of erosion at a site is dependent on the erosivity of the eroding agent—rainfall, running water, wind, etc. The term is commonly applied to rainfall.

Escarpment

A steep to precipitous landform comprising a linearly extensive, straight or sinuous inclined surface which separates terrains at different altitudes. The upper margin is commonly marked by a precipitous face, revealing the exposed geological strata, below which talus or scree occurs.

Escarments are unstable due to their mode of formation and have a high potential for mass movement as well as the hazard of rock fall. Plateaus frequently occur above escarpments.

Escherichia Coliform

A species of bacteria found in large numbers in the intestinal tract of warm-blooded animals.

Estimated Unaccounted Difference

The forecast of the volume of water (usually between two points on a Stream) which will be lost to the system due to Evaporation, Absorption, Unlawful Extraction or other actions or situations which are not directly known.

Estuary

Coastal waters situated between rivers and near-shore ocean waters, where tidal action and river flow mix fresh and saltwater. Such areas include bays, sounds, mouths of rivers, salt marshes, and lagoons.

Etch

To corrode the surface of a metal in order to reveal its composition and structure.

Ethanol

Ethyl-alcohol, a volatile alcohol containing two carbon groups ($\text{CH}_3\text{CH}_2\text{OH}$). For fuel use, ethanol is produced by fermentation of corn or other plant products.

Eugenics

The study of hereditary improvement of the human race by controlled selective breeding.

Eutectic

(1) An isothermal reversible reaction in which a liquid solution is converted into two or more intimately mixed solids on cooling, the number of solids formed being the same as the number of components in the system. (2) An alloy having the composition indicated by the eutectic point on an equilibrium diagram. (3) An alloy structure of intermixed solid constituents formed by a eutectic reaction.

Eutectoid

(1) An isothermal reversible reaction in which a solid solution is converted into two or more intimately mixed solids on cooling, the number of solids formed being the same as the number of components in the system. (2) An alloy having the composition indicated by the eutectoid point on an equilibrium diagram. (3) An alloy structure of intermixed solid constituents formed by a eutectoid reaction.

Eutrophication

Degradation of water quality due to enrichment by nutrients primarily nitrogen (N) and phosphorus (P), which results in excessive plant (principally algae) growth and decay. Low dissolved oxygen in the water is a common consequence.

Nutrient enrichment of a lake or other water body, typically characterized by increased growth of planktonic algae and rooted plants. It can be accelerated by wastewater discharges and polluted runoff.

Evaporimeter (Evaporation Pan)

A shallow open container from which daily changes in water level are used to calculate natural evaporation from a free water surface. Allowance is made for any addition of rainfall which occurs. The Bureau of Meteorology's standard for this purpose is the U.S.

Class A Pan, which is 1.2 meters in diameter and 25 centimeters deep. The water level is adjusted daily to a depth of 19 centimeters.

Evaporation

(1) The process by which water becomes a vapor. (2) The quantity of water that is evaporated; the rate is expressed in depth of water, measured as liquid water removed from a specified surface per unit of time, generally in inches or centimeters per day, month, or year. (3) The concentration of dissolved solids by driving off water through the application of heat.

Evapotranspiration (ET) Bed

Dispersal component with a continuous, impermeable bed liner that uses evaporation and transpiration for dispersal of effluent.

Evapotranspiration/Adsorption (ETA) Bed

Dispersal component with an unlined bed using evaporation, transpiration, and adsorption for dispersal of effluent with an unlined bed; sometimes called an evapotranspiration/infiltration (ETI) bed.

Evaporation Opportunity

The ratio of the rate of evaporation from a land or water surface in contact with the atmosphere to evaporation under existing atmospheric conditions; that is, the ratio of the actual to the potential rate of evaporation. Also called relative evaporation.

Evaporation Rate

The quantity of water, expressed in terms of depth of liquid water, evaporated from a given water surface per unit of time. It is usually expressed in inches or millimeters per day, month, or year.

Evaporation Reduction

The amount by which Carryover may be reduced, usually determined on a time period basis. For example, any unused Carryover not taken within the first three months of the Water Year may be reduced by $X\%$.

Evaporative Emissions

Emissions from evaporating gasoline, which can occur during vehicle refueling, vehicle operation and even when the vehicle is parked. Evaporative emissions can account for two-thirds of the hydrocarbon emissions from gasoline-fueled vehicles on hot summer days.

Evapotranspiration

Water withdrawn from soil by evaporation or plant transpiration; considered synonymous with consumptive use. Removal of moisture from soil by evaporation plus transpiration by plants growing in that soil. It is measured at a specific site over a specific period of time.

Evapotranspiration Potential

Water loss that would occur if there was never a deficiency of water in the soil for use by vegetation.

Excavation

Any man-made cut, cavity, trench, or depression in an earth surface, formed by earth removal.

Exceedance

A measured level of an air pollutant higher than the national or state ambient air quality.

Exchange Capacity

The total ionic charge of a soil, expressed in centimoles of charge per kilogram of soil. Its numerical value is identical to the value expressed in milliequivalents per 100 grams of soil.

Exchange Current

When an electrode reaches dynamic equilibrium in a solution, the rate of anodic dissolution balances the rate of cathodic plating. The rate at which either positive or negative charges are entering or leaving the surface at this point is known as the exchange current.

Exchange Current Density

The rate of charge transfer per unit area when an electrode reaches dynamic equilibrium (at its reversible potential) in a solution; that is, the rate of anodic charge transfer (oxidation) balances the rate of cathodic charge transfer (reduction).

Exchangeable Sodium Percentage

The proportion of the cation exchange capacity occupied by sodium ions, expressed as a percentage. Sod/c soils are categorized as those with an ESP from 6% to 14%, strongly sodic soils are those with an ESP of 15% or more. Soils with a high ESP are typically unstable and as a consequence have high erodibility and often present problems in soil conservation earthworks.

Exfiltration

Unintended/undesirable outflow of effluent from a component into the environment.

Exfoliation

Exfoliation is a type of subsurface corrosion that occurs and propagates as cracks approximately parallel to the surface. It leaves the metal in a laminated, flaky, or blistered condition, and appears most frequently in aluminium alloys or Cupro-Nickels.

Exhaust Duct

A duct carrying air from a conditioned space to an outlet outside the building.

Exhaust Gas Recirculation (EGR)

An emission control method that involves recirculating exhaust gases from an engine back into the intake and combustion chambers. This lowers combustion temperatures and reduces NO_x.

Exhaust Gas Recirculation System (EGR)

The controlled diversion of some of the combustion gases back into the combustion chamber, lowering the combustion temperature and reducing nitrogen oxides in the engine. This is a very

effective process, because oxides of nitrogen tend to rise disproportionately with increased combustion temperatures. There are two methods of exhaust gas recirculation internally through overlap of valve opening times and externally with recirculation valves and manifolds.

Existing Construction

(With failing sewage disposal systems) an existing structure where the sewage disposal system serving the structure has failed or is currently in violation of state law or regulations and requires correction.

Expanded Metal

Metal network made by suitably stamping or cutting sheet metal and stretching it to form open diamond-shaped meshes.

Expansion

Increasing the capacity of a wastewater treatment system.

Expansion Joint

An arrangement in an insulation system to minimize the risk of cracking due to thermal movement.

Expansive Clay Mineralogy

Soil in which the clay fraction is dominated by expansive 2:1 clay minerals, such as smectite or vermiculite.

Expansive Soil

Soil that undergoes significant volume change upon wetting and drying, usually because of a high content of expansive clay minerals.

A soil which significantly changes its volume with changes in moisture content. It typically cracks when drying out, and expands on wetting. The shrinking swelling characteristic is normally due to the presence of montmorillonite type clays in the soil, and is characterized by testing for linear shrinkage. This characteristic can be detrimental to such structures as masonry walls, roads, buildings and soil conservation earth-works, unless appropriate precautions are taken.

Expected Peak Day Concentration (EPDC)

A calculated value that represents the concentration expected to occur at a particular site once per year, on average. The calculation procedure uses measured data collected at the site during a three-year period. Measured concentrations that are higher than the EPDC are excluded from the state area designation process.

Exposed Spaces

Those spaces not referred to as concealed or as defined by the specifier.

Explosimeter

A device for measuring the concentration of potentially explosive fumes. Also called a combustible-gas indicator.

Exposure

The concentration of the pollutant in the air multiplied by the population exposed to that concentration over a specified time period. The amount of radiation or pollutant present in a given environment that represents a potential health threat to living organisms.

Exposure Assessment

Measurement or estimation of the magnitude, frequency, duration and route of exposure to a substance for the populations of interest.

Extended Aeration

An aeration system that adds aerobic sludge digestion to the activated sludge process. Extended aeration A modification of the activated-sludge process using long aeration periods to promote aerobic digestion of the biological mass by endogenous respiration. The process includes stabilization of organic matter under aerobic conditions and disposal of the gaseous end products into the air. Effluent contains finely divided suspended matter and soluble matter. An aeration system that adds aerobic sludge digestion to the activated sludge process.

Extended Aeration Process

A modification of the activated-sludge process. See EXTENDED AERATION.

Extension

Alteration of a wastewater treatment system resulting in an increase in capacity, lengthening, or expansion of the existing collection, treatment or dispersal component.

Extensive Building Complexes

A level of urban development which provides for the construction of commercial centers, such as offices and shopping malls, industrial centers or sporting facilities, which require large scale clearing and leveling for broad areas of floor space and/or parking bays.

External Circuit

The wires, connectors, measuring devices, current sources, etc. that are used to bring about or measure the desired electrical conditions within the test cell. It is this portion of the cell through which electrons travel.

Externalities

Uninternalized costs or benefits resulting from one economic agent's actions that affect the well-being of others. They may be either positive or negative with pollution and other forms of environmental degradation frequently cited as an example of the latter.

Extraction

The process of dissolving and separating out particular constituents of a liquid by treatment with solvents specific for those constituents. Extraction may be liquid–solid or liquid–liquid.

Extraction Management Unit

A group of water sources for the purpose of managing annual average extraction.

Exurbia

(1) The area of suburbs; (2) the region outside a city and its suburbs where wealthier families live.

F

Fabric Filter

A cloth device that catches dust particles from industrial emissions.

Faced Insulation

Insulation with a facing already attached. Kraft paper or foil-backed paper are common facings.

Faces

Vertical or inclined earth surfaces formed as a result of excavation work.

Facing

A protective or decorative (or both) surface applied as the outer most layers of an insulation system.

Factory Farming

Large-scale, industrialized agriculture.

Factory Ships

Industrial-style ships used for the large-scale collection and processing of fish.

Factual Key

The alpha-numeric coding system for recognition and classification of Australian soils based on observable soil profile features. It has a hierarchical structure which uses the bifurcating principle to successfully separate out primary profile forms, subdivisions, sections, classes and principal profile forms. The soil profile features used include soil texture, colour, structure, pH, presence of pans, consistency, coherence and other special features related to both A and B horizons. Additional features may be added to give an extended principal profile form.

Facultative

Having the ability to live under different conditions; for example, with or without free oxygen.

Facultative Bacteria

Bacteria that can grow and metabolize in the presence, as well as in the absence, of dissolved oxygen.

Facultative Lagoon

A lagoon or treatment pond with an aerobic upper section and an anaerobic bottom section so that both aerobic and anaerobic biological processes occur.

Facultative Ponds

A wastewater treatment pond that includes surface aeration and algal photosynthesis for oxygen replenishment.

Fahrenheit

A temperature scale in which 32° marks the freezing point and 212° the boiling point of water at 760-mm Hg. To convert to centigrade (Celsius), subtract 32 and multiply by 0.5556.

Failure

A general term used to imply that a part in service (1) has become completely inoperable, (2) is still operable but is incapable of satisfactorily performing its intended function, or (3) has deteriorated seriously, to the point that it has become unreliable or unsafe for continued use.

Fall-In (mm)

Subsidence and/or cracking of the ground surface as a result of roof collapse in an underground mine.

Fallowing

The management practice' of leaving land in an uncropped state for a period of time prior to sowing another crop. Its purpose is to allow for

the accumulation and retention of water and mineralized nutrients in the soil, and generally to also allow for weed control. Fallowing may not necessarily involve tillage, but in Australia the term is usually understood to do so. BARE FALLOWING involves stubble removal and weed control by tillage. CHEMICAL FALLOWING involves no tillage, weeds being controlled by herbicides. Fallow length may vary from about 1–5 months (short), 6–12 months (medium) and up to 20 months or more (long fallow)

Faraday's Law

(1) The amount of any substance dissolved or deposited in electrolysis is proportional to the total electric charge passed. (2) The amounts of different substances dissolved or deposited by the passage of the same electric charge are proportional to their equivalent weights.

Fatigue

Subjecting a material to repeated stresses ultimately results in cracking. The environment may have an effect on the fatigue limit of a metal, though this is usually a minor factor. Generally, a fatigue failure is a single fracture, which is transgranular in most common metals. There is normally only a single fracture because stresses on other regions are relieved when the fracture occurs. Characteristic chevron patterns or beach marks can appear on the fracture face.

Fatigue Crack Growth Rate

The rate of crack extension caused by constant-amplitude fatigue loading, expressed in terms of crack extension per cycle of load application.

Fatigue Life

The number of cycles of stress that can be sustained prior to failure under a stated test condition.

Fatigue Limit

The maximum stress that presumably leads to fatigue fracture in a specified number of stress cycles. If the stress is not completely reversed, the value of the mean stress, the minimum stress, or the stress ratio should also be stated.

Fatigue Strength

The maximum stress that can be sustained for a specified number of cycles without failure, the stress being completely reversed within each cycle unless otherwise stated.

Fauna

The total animal population that inhabits an area.

False Filter Bottom

A type of underdrainage system consisting of a porous or perforated floor suspended above the true bottom of the filter. See also UNDERDRAIN.

Farm Dam

A privately owned dam typically of earthen construction designed to collect and/or store water for use on one or a few properties. It does not include publicly owned dams or weirs. See also IN-RIVER DAM and RUNOFF HARVESTING DAM.

Fats (Wastes)

Triglyceride esters of fatty acids; erroneously used as a synonym for grease.

Fauna

Fauna is the total animal life in an area.

Fecal Coliform

Bacteria found in the intestinal tracts of warm-blooded animals. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated sewage and/or the presence of animal feces. These organisms may also indicate the presence of pathogens that are harmful to humans. Aerobic and facultative, Gram-negative, non-spore-forming, rod-shaped bacteria capable of growth at 44.5 °C (112 °F), and associated with fecal matter of warm-blooded animals.

Fecal Indicators

Fecal coliform, fecal Streptococci, and other bacterial groups originating in human or other warm-blooded animals, indicating contamination by fecal matter.

Fecal Streptococci

The subgroup of enterococci that is of particular concern in water and wastewater. See also ENTEROCOCCI.

Fecal Typing

Assessment technique (e.g., DNA finger-printing) used to isolate human and non-human sources of fecal coliform contamination in surface and ground water.

Federal Highway Administration (FHWA)

Agency within the Department of Transportation that supports State and local governments in the design, construction, and maintenance of the Nation's highway system.

Federal Transit Administration

An agency within the United States Department of Transportation (DOT) that provides financial and technical assistance to local transit systems.

Feed

Parameter that describes the orientation of the manifold relative to the supply line and/or laterals in a system.

Feed Hydrant

A feed hydrant is a term used to describe a fire hydrant suitable for supplying water to the suction of a fire fighting appliance.

Feedback Mechanisms

Factors which increase or amplify (positive feedback) or decrease (negative feedback) the rate of a process. An example of positive climatic feedback is the ice-albedo feedback.

Feeder

A circuit conductor between the service equipment or switchboard and the branch circuit over-current device.

Feedlots

A plot of ground used to feed farm animals.

Fermentation

Changes in organic matter or organic wastes brought about by anaerobic microorganisms and leading to the formation of carbon dioxide,

organic acids, or other simple products. See also BIOLOGICAL OXIDATION.

Ferric Chloride (FeCl₃)

A soluble iron salt often used as a sludge conditioner to enhance precipitation or bind up sulfur compounds in wastewater treatment. A chemical compound of iron and chlorine used to cause phosphorus particles in the sewage to settle to the bottom of treatment units and then be removed with the sludge produced in the treatment process. In sewage treatment, this means that both iron and phosphorus are carried into raw sludge and waste activated sludge (WAS).

Ferric Sulfate [Fe₂(SO₄)₃]

A water-soluble iron salt formed by reaction of ferric hydroxide and sulfuric acid or by reaction of iron and hot concentrated sulfuric acid; also obtainable in solution by reaction of chlorine and ferrous sulfate; used in conjunction with lime as a sludge conditioner to enhance precipitation.

Ferrite

(1) A solid solution of one or more elements in body-centred cubic iron. Unless otherwise designated (for instance as chromium ferrite), the solute is generally assumed to be carbon. On some equilibrium diagrams, there are two ferrite regions separated by an austenitic area. The lower area is alpha ferrite; the upper delta ferrite. If there is no designation, alpha ferrite is assumed.

(2) In the field of magnetic, substances having the general formula $M_2 + O_2^-$, $M_2 3 + O_{32}^-$ the trivalent metal often being iron.

Ferritic

Pertaining to the body-centred cubic crystal structure (BCC) of many ferrous (iron-base) metals.

Ferrous Chloride (FeCl₂)

A soluble iron salt used as a sludge conditioner to enhance precipitation or bind up sulfur. See also COAGULANT.

Ferrous Sulfate (FeSO₄·7H₂O)

A water-soluble iron salt, sometimes called copperas; used in conjunction with lime as a sludge conditioner to enhance precipitation.

Fertiliser

Any substance, natural or manufactured, added to the soil to supply essential plant nutrients for plant growth, and thereby either maintain or increase the general level of crop yield and pasture productivity. A straight fertilizer supplies only one major nutrient element (i.e. N, P or K). Mixed fertilizers are physical mixtures of two or more straight fertilizers, whereas compound fertilizers contain two or more of the major elements and are manufactured by chemical reaction.

Fertiliser Analysis

A statement of the effective composition of a fertilizer. The contents of nitrogen (N), phosphorus (P) and potassium (K) are generally given in terms of the percentage content of each element. For example, 12:12:18 fertilizer contains 12% nitrogen, 12% phosphorus and 18% potassium. Information on other nutrients and additives such as trace elements and insecticides may also be given.

Fertility

The ability to reproduce; in humans, the ability to bear children.

Fertility Rates

Average number of live births per woman during her reproductive years, among a given set of people.

Fiberglas

A fibrous material made by spinning molten glass used as an insulator and heat loss retardant.

Fiberisation

The manufacturing process of turning molten raw material (e.g. for insulation; glass or stone) into fibres.

Fibrous Glass

A synthetic vitreous fibre insulation made by melting predominantly silica sand and other inorganic materials, and then physically forming the melt into fibres. To form an insulation product, there are often other materials applied to the mineral wool such as binders, oils, etc. Commonly referred to as either fibre glass or fiberglass.

Fibrous Insulation

Insulation composed of small diameter fibres that finely divide the air space. Fibbers used are silica, rock wool, slag wool or alumina silica. Insulation constructed from fibre, naturally occurring or manufactured that incorporate single or composite filaments generally circular in cross section and length considerably greater than the diameter.

Field Capacity

The percentage of water remaining in the soil 2 or 3 days after gravity drainage has ceased from saturated conditions. The amount of water held in

a soil after any excess has drained away following saturation. Expressed as a percentage of the oven dry weight of the soil. As a general rule, soils are considered to be at field capacity after draining for 48 hours.

Field Flush

Act of opening a cleanout or valve to allow the movement of effluent to scour accumulated materials out of a pipe or pipes.

Field Groundwater Velocity

The actual or field velocity of groundwater percolating through water-bearing material. It is measured by the volume of groundwater passing through a unit cross-sectional area in unit time divided by the effective porosity. Also called effective groundwater velocity, true groundwater velocity, actual groundwater velocity.

Field Moisture Capacity

The approximate quantity of water that can be permanently retained in the soil in opposition to the downward pull of gravity. It may be expressed as a percentage of dry weight or in inches for a given depth of soil. The length of time required for a soil to reach field moisture capacity varies considerably with various soils, being approximately 24–48 hours for sandy soils, 5–10 days for silt clay soils, and longer for clays. Also called capillary capacity, field carrying capacity, maximum water-holding capacity, moisture-holding capacity, normal moisture capacity.

Field Permeability Coefficient

The rate of flow of water, in gallons per day (gpd) or liters per second (L/s), under prevailing conditions, through each 1 ft (0.3 m) of thickness of a given aquifer in a width of 1 mile (1.6 km), for each 1 ft/mile (0.19 m/km) of hydraulic gradient. Also called hydraulic conductivity.

Field Tunnelling

The process of tunnel erosion as it occurs in the field. Usually occurs in soils with unstable A2 or B horizons as a result of flow into cracks, stump holes, rabbit burrows, or other surface irregularities. The downward movement of water into the unstable layers, and its subsequent lateral movement, creates sub-surface tunnels through which further water and soil material is moved to an outlet down slope or in the side of a gully. Eventually the surface soil collapses into the enlarged tunnel and a gully is formed.

Filamentous Growth

Intertwined, thread-like biological growths characteristic of some species of bacteria, fungi, and algae. Such growths reduce sludge settleability and dewaterability.

Filamentous Organisms

Bacterial, fungal, and algal species that grow in thread-like colonies resulting in a biological mass that will not settle and may interfere with drainage through a filter.

Filiform Corrosion

Corrosion which occurs under film in the form of randomly distributed hairlines.

Fill

(1) Unconsolidated material that meets specific textural criteria and is used as part of a dispersal component; (2) Unconsolidated material used to change grade or to enhance surface water diversion; (3) any other human-transported unconsolidated soil material. (4) Material used to raise the surface of an area to a desired level prior to or during earthmoving operations. Usually made up of soil and/or rock material, but may also be solid waste.

Fill Batter

An exposed surface created during earthmoving operations by deposition of fill.

Filler Rod

Filler metal in the form of a rod. It may also take the form of filler wire.

Filler Metal

Metal added during welding, braze welding, brazing or surfacing.

Film

A thin, not necessarily visible, layer of material.

Filter

Device that removes constituents through processes such as sieving, stagnation, adsorption, or absorption; a filter has both area and depth with respect to flow. An apparatus for separating solid or liquid particles from a gas stream in which they are suspended. This apparatus is generally formed of a porous or fibrous layer or of an assembly of porous and/or fibrous layers. (By extension, applied also to some oil-bath devices and some electrical devices.) A device or structure for removing solid or colloidal material, usually of a type that cannot be removed by sedimentation, from water, wastewater, or other liquid. The liquid is passed through a filtering medium, usually a granular material but sometimes finely woven cloth, unglazed porcelain, or specially prepared paper. There are many types of filters used in water and wastewater treatment. See also PRESSURE FILTER.

Filter, Activated Carbon

Device filled with a porous form of carbon that is used to decolorize liquids, recover solvents, and remove toxins and odors from water and air.

Filter Aid

Solid particulate media (for example, diatomaceous earth) added to a filter to improve the rate of filtration; also used colloquially to describe flocculents in water treatment; same as filtration aid. See also COAGULANT or FLOCCULENT AID.

Filter Bed

(1) A type of bank revetment consisting of layers of filtering medium of which the particles gradually increase in size from the bottom upward. Such a filter allows the groundwater to flow freely, but it prevents even the smallest soil particles from being washed out. (2) A tank for water filtration that has a false bottom covered with sand, such as a rapid sand filter. (3) A pond with sand bedding, as a sand filter or slow sand filter. (4) The media that comprise a trickling filter.

Filter Blanket

A layer of sand and/or gravel designed to prevent the movement of fine-grained soils through protective linings of channels or batters. For example, a filter blanket placed beneath rip-rap used to stabilize a batter will reduce movement of the underlying soil into and through the rip-rap.

Filter Bottom

(1) The underdrainage system for collecting the water that has passed through a rapid sand filter and for distributing the wash water that cleans the

filtering medium. (2) The underdrainage system supporting the graded gravel of a biological bed. It may consist of specially fabricated tile or concrete blocks containing waterways and slots in the top for conveying the underdrainage, or it may consist of inverted half tile.

Filter, Bottomless Media

Media filter that does not incorporate a liner or other physical barrier between the media and the existing soil on which it has been placed; used as a final treatment and dispersal component.

Filter Cake

The solids collected on the surface of a mechanical filter. It also applies to spent cake removed from a diatomaceous earth filter.

Filter Clogging

The effect occurring when fine particles fill the voids of a sand filter or biological bed, or when growths form surface mats that retard the normal passage of liquid through the filter.

Filter Cloth

A fabric stretched around the drum of a vacuum filter. A synthetic material which allows water to pass through it but not soil particles. The size of soil particles held back depends on the mesh size of the material. Its main use is to provide a protective lining for earth structures, or channels.

Filter, Coir

Media filter that uses organic fibric material (coir) from outer husk of coconut.

Filter Dam

A barrier, embankment or other similar structure, built of pervious materials, such as stones or gabions, and located in drainage lines to filter out and store the sediment carried in passing flows.

Filter, Disc

Device consisting of concentrically grooved discs stacked one upon the other and used for removal of particles larger than a specific size; typically used in drip distribution systems.

Filter Efficiency

The operating results of a filter as measured by various criteria such as percentage reduction in suspended matter, total solids, BOD, bacteria, or color.

Filter Flooding

The filling of a trickling filter to an elevation above the top of the medium by closing all outlets in order to reduce or control filter flies.

Filter, Foam

Media filter that utilizes an open-cell polyurethane foam material that is randomly arranged in prefabricated modular units.

Filter Gallery

A gallery provided in a treatment plant for the installation of conduits and valves and used as a passageway to provide access to them. See also PIPE GALLERY.

Filter, In-Line

Device installed as a part of the piping in a system, operated under pressure and designed to remove suspended solids from wastewater.

Filter Loading

Organically, the pounds (kilograms) of BOD in the applied liquid per unit of filter bed area or volume per day. Hydraulically, the quantity of liquid applied per unit of filter bed area or volume per day.

Filter Media

(1) Material through which water, wastewater, or other liquid is passed for the purpose of purification, treatment, or conditioning. (2) A cloth or metal material of some appropriate design used to intercept sludge solids in sludge filtration. (3) Particulate (sand, gravel, or diatomaceous earth) or fibrous (cloth) material placed within a filter to collect suspended particles. Device that uses materials designed to treat effluent by reducing BOD and/or removing suspended solids in an unsaturated environment; biological treatment is facilitated via microbial growth on the surface of the media.

Filter Medium

The material of which the biological filter is formed and on which a biological film containing bacteria and fungi develops. The part of a filter on or within which the particles are retained.

Filter, Peat

Media filter that uses appropriate organic fibric material (peat) as the media; typically packaged as pre-fabricated modular units with the media in a container; a type of bio filter.

Filter Ponding

The formation of ponds on the surface of trickling filters, caused by excessive biofilm growth, media degradation, or inadequate ventilation. Sometimes called filter pooling.

Filter Press

A plate and frame press operated mechanically to produce a semisolid cake from a slurry. See also PLATE PRESS.

Filter Rate

The rate of application of material to some process involving filtration, for example, application of wastewater sludge to a vacuum filter, wastewater flow to a trickling filter, or water flow to a rapid sand filter.

Filter Run

(1) The interval between the cleaning and washing operation of a rapid sand filter. (2) The interval between the changes of the filter medium on a sludge dewatering filter.

Filter, Sand

Media filter which uses sand of particular specifications as the media.

Filter, Screen

Filter consisting of a mesh material configured as a cylinder and used to remove particles larger than a specific size in pressurized systems.

Filter Strainer

A perforated device inserted in the underdrain of a rapid sand filter through which the filtered water is collected and through which the wash water is distributed when the filter is washed. Also called a strainer head.

Filter Strip

Strip or area of vegetation often situated at the edge of a field or along a waterway that is used for removing sediment, organic matter, and other pollutants from stormwater runoff.

Filter Strip (Buffer Strip)

A strip of permanent vegetation at least 20 meters wide along each side of a drainage line or banks of a watercourse to retard the lateral flow of runoff, causing deposition of transported material and thereby reducing sediment movement.

Filter Strip (Desilting Area)

A strip of permanent vegetation located above dams, diversions and other structures to retard the flow of runoff and cause deposition of transported material thereby reducing sediment load in the runoff. They may be contour strips located on long slopes to intercept overland flow, bands across waterways to intercept flows, or buffer zones around storm water inlets. The flatter and wider these strips, the more sediment they will retain. Also applied to strips of vegetation used to restrict the off-site effects of wind erosion.

Filter, Trickling

Type of media filter which uses a variety of media such as rigid plastics of varying shapes, stone, or tire chips; includes a clarifier in its configuration and may include a recirculation mode.

Filter Underdrain

A system of subsurface drains to collect water that passes through a sand filter or biological bed. See also FILTER BOTTOM.

Filter, Upflow

Media filter through which wastewater flows from a lower to a higher elevation; usually characterized by an anaerobic environment.

Filter Wash

The reversal of flow through a rapid sand filter to wash clogged material out of the filtering medium and relieve conditions causing loss of head. Also called backwash.

Filtrate

The liquid that has passed through a filter.

Filtration

Removal of suspended materials using processes such as sieving, stagnation, adsorption, absorption, and possibly biochemical degradation. The separation by a filter of solid particles or liquid particles from a gas stream in which they are suspended. (By extension, also the whole of the activities involved in the construction and commissioning of a filter installation.) The process of contacting a dilute liquid suspension with filter media for the removal of suspended or colloidal matter, or for the dewatering of concentrated sludge.

Filtered Wastewater

Wastewater that has passed through a mechanical filtering process but not through a trickling filter bed.

Final Cover

Soil with characteristics suitable for stabilizing the surface of system components, supporting vegetative growth and (in some cases) facilitating gas exchange.

Final Effluent

The effluent discharged from a sewage treatment plant. The effluent from the final treatment unit of a wastewater treatment plant.

Final Sedimentation

The separation of solids from wastewater in the last settling tank of a treatment plant.

Final Treatment and Dispersal

Last treatment component (or combination of components) through which effluent is returned to the hydrologic cycle via a soil treatment area or a discharging outfall.

Final Void

The excavation remaining at a strip or open-cut mine when the mining operation has ceased. Because mining has ceased there is no adjacent material for back-filling. If back-filling is required, material must be carted from the out of pit emplacement or obtained from other external sources. The final void is sometimes used as an area to dump mine waste materials prior to rehabilitation, for water storage, or to permit access to underground workings.

Fine Bubble Diffuser

Diffused aeration device that disperses very small air bubbles into mixed liquor in an aerobic treatment unit aerobic process; often described in relative sizes (e.g., micro-, fine, etc.).

Fine Particulates

Particulate matter with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$). Ambient fine particulate matter consists basically of five species: sulphates, ammonium nitrate, organics, elemental carbon, and soil dust.

Fire Blocking

Building materials installed to resist the free passage of flame of flame and gasses to other areas of the building through concealed spaces.

Firebreak (For, Gen)

A cleared or ploughed strip within agricultural or forested land designed to prevent or halt the spread of fire. It may also double as a farm track or forest road, often subject to erosion on steep terrain or erodible soils.

Fire Fighting Appliance

Fire Fighting Appliance is a term used to describe a fire truck with a booster pump used to boost water pressure for fire fighting.

Fire Fighting Flow

The fire fighting flow is the flow rate required for fire fighting purposes established by assessing the building material type, building design and size and referring to the Fire Fighting Regulations.

Fire Flow

The rate of flow, usually expressed in gallons per minute (gpm) or cubic meters per second (m^3/s), that can be delivered from a water distribution system at a specified residual pressure for fire fighting. When delivery is to fire department pumpers, the specified residual pressure is generally 20 psi (138 kPa).

Fire Hydrant

A fire hydrant is a source of water provided in most urban, suburban and rural areas with municipal water service to enable fire-fighters to tap into the municipal water supply to assist in extinguishing a fire.

Fire Pressure

The pressure necessary in water mains when water is used for fire fighting; applied to cases in which the pressure for fire fighting is increased above that normally maintained for general use.

Fire-Service Connection

A pipe extending from a main to supply a sprinkler, standpipe, yard main, or other fire protection system.

Fire System

A separate system of water pipes or mains and their appurtenances installed solely to furnish water for extinguishing fires.

First Flush

The first portion of runoff, usually defined as a depth in inches, considered to contain the highest pollutant concentration resulting from a rainfall event.

First-Stage BOD

That part of oxygen demand associated with biochemical oxidation of carbonaceous material. Usually, the greater part of the carbonaceous material is oxidized before the second stage (active oxidation of the nitrogenous material) takes place.

Fish Eyes

Areas on a steel fracture surface having a characteristic white crystalline appearance.

Fish-Mouth

A gap between layers of sheet materials caused by warping or bunching of one or both layers. Typically seen when stapling Kraft face insulation or the jacketing on pipe insulation.

Fisheries

An established area where fish species are cultivated and caught.

Fissile Material

Material fissionable by slow neutrons. The fission process and the fissionable isotopes are the source of energy in nuclear weapons and nuclear reactors.

Fission

The process whereby the nucleus of a particular heavy element splits into (generally) two nuclei of lighter elements, with the release of substantial amounts of energy.

Fissured

Description of a soil material that has a tendency to break along definite planes of fracture with little resistance, or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

Five-Day Biochemical Oxygen Demand (BOD₅)

A standard test to assess wastewater pollution due to organic substances, measuring the oxygen used under controlled conditions of temperature (20 °C) and time (5 days).

Fixed Distributor

A distributor consisting of perforated pipes or notched troughs, sloping boards, or sprinkler nozzles that remain stationary when the distributor is operating. See also DISTRIBUTOR.

Fixed Solids

The residue remaining after ignition of suspended or dissolved matter.

Fixture Unit

Relative estimate of discharge into a system by various types of plumbing fixtures; used in the determination of design flow.

Flakes

Short, discontinuous internal fissures in wrought metals attributed to stresses produced by localized transformation and decreased solubility of hydrogen during cooling after hot working. In a fracture surface, flakes appear as bright silvery areas; on an etched surface, they appear as short, discontinuous cracks. Also called shatter cracks or snow flakes.

Flame Arrester

(1) A device incorporating a fine-mesh wire screen or tube bundle inserted in a vent or pipe and designed to resist the flashback of flame. (2) Device consisting of a multiple number of cor-

rugated stamped sheets in a gas-tight housing. As a flame passes through the sheets, it is cooled below the ignition point.

Flame Hardening

Hardening of metal surface by heating with oxy-acetylene torch, followed by rapid cooling with water or air jet.

Flame Spraying

Thermal spraying in which coating material is fed into an oxyfuel gas flame, where it is melted. Compressed gas may or may not be used to atomize the coating material and propel it onto the substrate.

Flange

A projecting rim, edge, lip, or rib. A projecting collar attached to a pipe for the purpose of connecting to another pipe, valve or fitting.

Flange Cover

The insulation for a pipe flange composed of the specified thickness of insulation material, may be preformed. Also, a preformed jacketing. Foam Board Plastic foam insulation manufactured most commonly in 4' × 8' sheets in thickness of 1/4" to 3".

Flap Gate

A gate that opens and closes by rotation around a hinge or hinges at the top side of the gate.

Flap Valve

A valve that is hinged at one edge and opens and shuts by rotating about the hinges. See also CHECK VALVE.

Flash Dryer

A device for vaporizing water from partly dewatered and finely divided sludge through contact with a current of hot gas or superheated vapor. It includes a squirrel-cage mill for separating the sludge cake into fine particles.

Flash Mixer

A device for uniform, quick dispersal of chemicals throughout a liquid.

Flash Point

The temperature at which a gas, volatile liquid, or other substance ignites.

Flat-Crested Weir

A weir with a horizontal crest in the direction of flow and of appreciable length when compared with the depth of water passing over it.

Flexible Fuel Vehicle

Vehicles that can use either alcohol fuels (methanol or ethanol) or a combination of alcohol fuel and unleaded gasoline.

Flexible Insulation

A material that tends to conform to the shape of the surface against which it is laid, or is so designed as to alter its manufactured shape to accommodate bends and angles.

Flight

A scraper in a rectangular sedimentation tank with blades that move sludge along the bottom of the tank to a collection point. As the flights return,

scum is collected on the surface of the tank and pushed to an outlet point.

Float

Sensor installed in a pump vault or tank which opens or closes an electrical circuit in response to changing liquid levels, thereby controlling equipment operation.

Float Control

A float device that is triggered by changing liquid levels that activates, deactivates, or alternates process equipment operation.

Float Gauge

A device for measuring the elevation of the liquid, the actuating element of which is a buoyant float that rests on the surface of the liquid and rises or falls with it. The elevation of the surface is measured by a chain or tape attached to the float.

Floating Cover

A gas-tight metal cover floating on the sludge in a digestion tank, with guides to assist in smooth vertical travel as the sludge level changes.

Float Switch

An electrical switch operated by a float in a tank or reservoir and usually controlling the motor of a pump.

Float Tree

Removable device located within a pump vault or pump tank to which floats are attached.

Float Valve

A valve, such as a plug or gate, that is actuated by a float to control the flow into a tank.

Floatable

Material in wastewater with a density less than that of water.

Floc

The agglomeration of smaller particles in a gelatinous mass that can be more easily removed from the liquid than the individual small particles. Collections of smaller particles agglomerated into larger, more easily settle able particles through chemical, physical, or biological treatment. See also FLOCCULATION.

Flocculants

Same as flocculating agent, the catalyst substance that causes the chemical reaction with TSS to form flocculent many times encapsulating the solids. Water-soluble organic polyelectrolytes that are used alone or in conjunction with inorganic coagulants, such as aluminium or iron salts, to agglomerate the solids present to form large, dense floc particles that settle rapidly.

Flocculating Tank

A tank used for the formation of floc by the gentle agitation of liquid suspensions, with or without the aid of chemicals.

Flocculent

The “floc” or woolly mass of clusters that is formed in flocculation. Many times used interchangeably with “flocculants” however truly refers to the floc mass and not the catalyst flocculating agent.

Flocculation

The provision of retention time with gentle agitation to allow the floc particles or precipitate, associated with the impurities to increase in size by agglomeration. In water and wastewater treatment, the agglomeration of colloidal and finely divided suspended matter after coagulation by gentle stirring by either mechanical or hydraulic means. For biological wastewater treatment in which coagulation is not used, agglomeration may be accomplished biologically.

Flocculating Agent

The flocculant or chemical used to cause flocculation. A coagulating substance that, when added to water, forms a flocculent precipitate that will entrain suspended matter and expedite sedimentation; examples are alum, ferrous sulfate, and lime.

Flocculator

(1) A mechanical device to enhance the formation of floc in a liquid. (2) An apparatus for the formation of floc in water and wastewater.

Flood

An overflow of water onto lands that are used or usable by man and not normally covered by water. Floods have two essential characteristics: The inundation of land is temporary; and the land is adjacent to and inundated by overflow from a river, stream, lake, or ocean.

Flood, 100-Year

A 100-year flood does not refer to a flood that occurs once every 100 years, but to a flood level with a 1% chance of being equalled or exceeded in any given year.

Flood flow

The discharge of a stream during periods of flood.

Flood Frequency

The frequency with which the maximum flood may be expected to occur at a site in any average interval of years. Frequency analysis defines the “n-year flood” as being the flood that will, over a long period of time, be equalled or exceeded on the average once every n years. Thus, the 10-year flood would be expected to occur approximately 100 times in a period of 1000 years, and of these, 10 would be expected to reach the 100-year magnitude. Sometimes expressed in terms of percentage of probability; for example, a probability of 1% would be 100-year flood; a probability of 10% would be a 10-year flood

Flood-Out

A flat spreading radially away from a point on the edge of a stream channel, showing evidence of rapid deposition of sediment from overbank flow.

Floodplain

A large flat area, adjacent to a watercourse, characterized by frequently active erosion and aggradations by channeled or overbank stream flow, such areas result from, and are subject to inundation by floodwaters. Components may include stream channel, levee and back plain.

Flood-Plain

For a given flood event, the area of land adjoining a continuous water course that has been covered temporarily by water.

Floodplain Harvesting

The collection or capture of water flowing across floodplains.

Flood-Protection Works

Structures built to protect lands and property from damage by floods.

Flood Stage

The elevation at which overflow of the natural banks of a stream or body of water begins in the reach or area in which the elevation is measured.

Floodway

The channel of a river or stream and the parts of the floodplain adjoining the channel that are reasonably required to efficiently carry and discharge the flood water or flood flow of a river or stream. A long low section in a road which allows flood waters to flow across it.

Flora

Flora is the total plant life in an area.

Flotation

(1) Separation of suspended particles, or oil and grease, from solution by naturally or artificially raising them to the surface, usually with air. (2) Thickening of waste activated sludge by injecting air into it and introducing the mixture into a tank where the air buoys the sludge to the surface.

Flow

(1) The movement of a stream of water or other fluid from place to place; the movement of silt, water, sand, or other material. (2) The fluid that is in motion. (3) The quantity or rate of movement of a fluid discharge; the total quantity carried by a stream. (4) To issue forth or discharge. (5) The liquid or amount of liquid per unit time passing a given point.

Flow

The movement of a fluid from one point to another. In a soil conservation context the term is normally applied to the movement of water over a surface or in a channel. Various types of flow are defined as follows:

Steady Flow

Flow in which the depth and velocity remain constant with respect to time.

Unsteady Flow

Flow in which velocity changes either in depth or in direction with respect to time.

Uniform Flow

Flow in which the depth and velocity remain constant with respect to distance.

Non-Uniform Flow

Flow in which depth or direction changes with respect to distance. For example, in flow around a bend of a pipe the direction changes with distance, or in flow with changing cross-section the depth changes with distance.

Critical Flow

Flow in which the specific energy head is a minimum for a given discharge. Under this condition, the Froude number will be equal to unity (one) and surface disturbances will not travel upstream.

Sub-Critical Flow

Flow in which the Froude number is less than unity. For a given cross-section of flow, there is a fixed specific energy associated with the dis-

charge. The specific energy is composed of two parts, the kinetic energy of the water and the potential energy of its depth. For a particular value of the specific energy, two alternate depths of flow are possible, one which is greater than the critical depth and one which is less. In sub-critical flow the depth is greater than the critical depth. The potential energy is larger than that for the alternative depth and the kinetic energy is less, consequently the velocity of flow is slower.

Super-Critical Flow

Flow in which the Froude number is greater than unity. In super-critical flow the depth is less than the critical depth. The potential energy is less than that for the alternative depth and the kinetic energy is greater. Consequently the velocity of flow is greater.

Flow, Average Daily

Average volume of wastewater in a 24-hour period; calculated from values measured over a period of time (e.g., week, month, year, etc.).

Flow Classes

Categorized by the size and duration of flow levels in unregulated rivers. For example:

1. very low flows may be a class on their own,
2. low flows may be categorized as 'A' class,
3. moderate flows may be categorized as 'B' class,
4. high flows may be categorized as 'C' class,
5. very high flows may be categorized as 'D' class, and
6. extremely high flows may be categorized as 'E' class.

Flow-Control Valve

A device that controls the rate of flow of a fluid.

Flow, Daily

Measured volume of wastewater generated from a facility in a 24-hour period; expressed as a volume per day.

Flow, Daily Design

Estimated volume of wastewater for any 24-hour period; parameter used to size systems.

Flow, Design

Estimated volume of wastewater per unit of time for which a component or system is designed.

Flow, Depressurized

Portion of a dosing event during which the distribution system is draining.

Flow Equalization

Transient storage of wastewater for release to a sewer system or wastewater treatment plant at a controlled rate to provide a reasonably uniform flow for treatment. System configuration that includes sufficient effluent storage capacity to allow for uniform flow to a subsequent component despite variable flow from the source.

Flow Gauging Station

A device used to measure the height of a river, from which the flow in the river can be calculated.

Flow, Instantaneous

Highest recorded flow occurring within a short, specific period of time (expressed in gallons per minute).

Flow Measurement

Any method used to accurately quantify the flow of liquid.

Flow Meter

A Primary Meter which is driven by a physical flow of water through the device to measure customer water extraction.

Flow Path

Represents a trace of the route along which a fluid moves as it passes between any two given points of different elevation. In a soil conservation context it generally refers to the route along which runoff moves as it passes from a given point within a catchment or at the catchment boundary to another given point downstream or at the catchment outlet. The flow path of a large natural catchment typically includes the sheet flow from the catchment boundary to its initial channelization in a drainage depression, then along a drainage line into a creek and finally into a river. The mouth of the river is considered the end of the flow path. Soil conservation works are used to alter the natural flow path, especially at the sheet flow stage and/or prior to the watercourse stage, to decrease the potential for soil erosion.

Flow, Peak

Highest flow occurring within a specified time (minutes, hours, days, etc.); may be further expressed as peak hourly flow, peak daily flow, peak monthly flow, peak seasonal flow, etc.

Flow Rate

The volume or mass of a gas, liquid, or solid material that passes through a cross section of conduit in a given time; measured in such units as kilograms

per hour (kg/h), cubic meters per second (m³/s), litres per day (L/d), or gallons per day (gpd). Flow Rate is the rate, expressed in gallons- or litres-per-hour, at which a fluid escapes from a hole or fissure in a tank. Such measurements are also made of liquid waste, effluent, and surface water movement.

Flow Recording

Documentation of the rate of flow of a fluid past a given point. The recording is normally accomplished automatically.

Flow Regulator

A structure installed in a canal, conduit, or channel to control the flow of water or wastewater at the intake or to control the water level in a canal, channel, or treatment unit. See also RATE-OF-FLOW CONTROLLER.

Flow, Peak

Highest flow occurring within a specified time (minutes, hours, days, etc.); may be further expressed as peak hourly flow, peak daily flow, peak monthly flow, peak seasonal flow, etc.

Flow, Pressurized

Portion of a dosing event during which the distribution system is full and thus at operating pressure.

Flow, Pressurizing

Portion of a dosing event during which the distribution system is being filled and thus is not yet at operating pressure.

Flow Sheet

A diagrammatic representation of the progression of steps in a process showing their sequence and interdependence.

Flow Splitter

Device used to divide effluent and direct flow to multiple components (e.g., a distribution box, drop box, or manifold).

Flow, Surge

Flow of effluent that occurs in a short enough period of time that it upsets the function of one or more components of the treatment train.

Flowage

Body of water that has been created by deliberately flooding an area.

Flowing Well/Spring

A well or spring that taps ground water under pressure so that water rises without pumping. If the water rises above the surface, it is known as a flowing well.

Flowline

A well defined route down which water naturally concentrates and flows. It is a general term including drainage depression, gully, drainage line, creek and river.

Flue Gas

The air coming out of a chimney after combustion in the burner it is venting. It can include nitrogen oxides, carbon oxides, water vapor, sulfur oxides, particles and many chemical pollutants.

Flue Gas Desulfurization (FGD)

A technology that employs a sorbent, usually lime or limestone, to remove sulfur dioxide from the gases produced by burning fossil fuels. Flue gas desulfurization is current state-of-the-art technology for major SO₂ emitters, like power plants.

Fluid

Substances which are transported through a pipeline in liquid and/or gaseous phase.

Fluid Conductivity

The constant of proportionality in Darcy's Law relating the rate of flow of a fluid through a cross-section of porous medium in response to a hydraulic gradient. Fluid conductivity is a function of the intrinsic permeability of a porous medium and the kinematic viscosity of the fluid which flows through it. Fluid conductivity has units of length per time (cm/sec).

Fluidized Bed Reactor

A pressure vessel or tank that is designed for liquid–solid or gas–solid reaction. The liquid or gas moves upward through the solids particles at a velocity sufficient to suspend the individual particles in the fluid. Applications include ion exchange,

granular activated carbon adsorbers, and some types of furnaces, kilns, and biological contactors.

Flume

A hydraulic structure incorporating an inlet, chute and outlet, to convey water to a lower level without causing erosion. It may be constructed of rock, timber, concrete or other relatively permanent material; or it may be formed from local soil material and appropriately stabilized with vegetation. Flumes are usually used at the head or side of a gully where no alternative natural disposal method or site is available. They are also used in association with equipment that measures flow rate or sediment discharge by providing a suitable support for the equipment and concentrating the flows.

Fluorescent Light

Fluorescent light is a device which uses the glow discharge of an electrified gas for the illuminating element rather than an electrically heated glowing conductive filament.

Fluorinated Gases

Powerful synthetic greenhouse gases such as hydro fluorocarbons, perfluorocarbons, and sulfur hexafluoride that are emitted from a variety of industrial processes. Fluorinated gases are sometimes used as substitutes for stratospheric ozone-depleting substances (e.g., chlorofluorocarbons, hydro chlorofluorocarbons, and halons) and are often used in coolants, foaming agents, fire extinguishers, solvents, pesticides, and aerosol propellants. These gases are emitted in small quantities compared to carbon dioxide (CO₂), methane (CH₄), or nitrous oxide (N₂O),

but because they are potent greenhouse gases, they are sometimes referred to as High Global Warming Potential gases.

Fluorocarbon

An organic compound that contains fluorine. Some of these compounds may affect health but they are non-reactive and therefore not smog forming.

Flush

Process of using effluent to scour a component and transport accumulated materials.

Flushing

The flow of water under pressure in a conduit or well to remove clogged material.

Fluting

A process of lateral gully erosion whereby a series of vertically elongated grooves, called flutes, is created by rill erosion of gully sides, particularly in dispersible soils. The riling is caused by runoff flowing down the gully side-walls which eventually get cut back leaving a series of narrow buttresses between the flutes. These may become isolated storm the walls to form narrow tapered pinnacles in the gully. These pinnacles eventually collapse due to a combination of further erosion, slumping and undermining.

Flux

Material used during welding, brazing or braze welding to clean the surfaces of joint, prevent atmospheric, oxidation and to reduce impurities. The rate of movement of material over a surface unconfined by flow boundaries. It is commonly expressed in terms of weight per unit width per unit time.

Fly Ash

Ash entrained by combustion gases. Air-borne solid particles that result from the burning of coal and other solid fuel.

Foam

(1) A collection of minute bubbles formed on the surface of a liquid by agitation, fermentation, and so on. (2) The frothy substance composed of an aggregation of bubbles on the surface of liquids and created by violent agitation or by the admission of air bubbles to liquid containing surface-active materials, solid particles, or both. Also called froth.

Foamed In-Situ Plastics

Cellular plastics produced in situ and foamed by physical or chemical means.

Fog

A general term applied to a suspension of droplets in a gas. In meteorology, it refers to a suspension of water droplets resulting in the visibility of less than 1 km.

FOG (Fats, Oils, and Grease)

Constituent of sewage typically originating from foodstuffs (animal fats or vegetable oils) or consisting of compounds of alcohol or glycerol with fatty acids (soaps and lotions), typically measured in mg/L.

Fogged Metal

A metal whose lustre has been reduced because of a surface film, usually a corrosion product layer.

Foliar Cover

The proportion of the ground surface covered, over a given area, by the aerial parts of plants, expressed as a percentage.

Food Chain

Food chain is a sequence of organisms through which energy is transferred from its ultimate source in a green plant; the predator-prey pathway in which organism eats the next link below and is eaten by the link above.

Food-to-Microorganism (F:M) Ratio

In the activated-sludge process, the loading rate expressed as pounds of BOD₅ per pound of mixed liquor or mixed liquor volatile suspended solids per day (lb BOD₅/d/lb MLSS or MLVSS).

Food Web

Food web is a group of interconnecting food chains.

Foot Valve

(1) A valve placed at the bottom of the suction pipe of a pump that opens to allow water to enter the suction pipe, but closes to prevent water from passing out of it at the bottom end. (2) A valve with the reverse action attached to the drainage pipe of a vacuum chamber. It allows water to drain out, but closes to hold the vacuum.

Footprint

Plan view of the area and geometry of a system.

Footslope

A moderate to very gently sloping landform at the lower end of a slope, resulting from aggradations or erosion by sheet flow, earth flow or creep.

Forced Aeration

The bringing about of intimate contact between air and liquid where the air, under pressure, is applied below the surface of the liquid through diffusers or other devices that promote the formation of small bubbles.

Force Main

A pressure pipe joining the pump discharge at a water or wastewater pumping station with a point of gravity flow.

Forcing Mechanism

A process that alters the energy balance of the climate system, i.e. changes the relative balance between incoming solar radiation and outgoing infrared radiation from Earth. Such mechanisms include changes in solar irradiance, volcanic eruptions, and enhancement of the natural greenhouse effect by emissions of greenhouse gases.

Foreshore

That part of the catchment of a water storage which drains directly into the storage itself without first entering the watercourse or its tributaries.

Foresight

Rod reading taken on a point of unknown elevation; foresight reading is subtracted from the Height of Instrument (HI) to determine the elevation of the

desired point. The last sight taken before moving the level and also the final sight taken during a leveling operation.

Forest Certification

A process of labeling wood that has been harvested from a well-managed forest.

Forests

Lands on which trees are the principal plant life, usually conducive to wide biodiversity.

Foreign Structure

Any metallic structure that is not intended as part of a *cathodic protection* system of interest.

Formaldehyde

A chemical compound, the simplest aldehyde, chemical symbol CH_2O . Formaldehyde is a common pollutant, a VOC.

Formazine Turbidity Unit (FTU)

A standard unit of turbidity based on a known chemical reaction that produces insoluble particulates of uniform size. The FTU has largely replaced the JTU. Also known as nephelometric turbidity unit.

Formline Survey

A topographic survey where approximate contour lines are determined using a level or other surveying instrument. The survey information can be recorded on a plan or aerial photograph at suitable plotting scale.

Fossil Fuels

Fuels such as coal, oil, and natural gas; so-called because they are the remains of ancient plant and animal life.

Fouling

A gelatinous, slimy accumulation resulting from the activity of organisms in the water. Fouling may be found on concrete, masonry, or metal surfaces, but tuberculation is found only on metal surfaces.

Fouling (Corrosion)

An accumulation of deposits. This term includes accumulation and growth of marine organisms on a submerged metal surface and also includes the accumulation of deposits (usually inorganic) on heat exchanger tubing.

Fouling Organism

Any aquatic organism with a sessile adult stage that attaches to and fouls underwater structures of ships.

Foundation

Natural or prepared ground or base on which some structure rests.

Fractography

Descriptive treatment of fracture, especially in metals, with specific reference to photographs of the fracture surface. Macrofractography involves photographs at low magnification (<25×); microfractography, photographs at high magnification (>25×).

Fracture Mechanics

A quantitative analysis for evaluating structural behavior in terms of applied stress, crack length, and specimen or machine component geometry.

Fracture Toughness

A generic term for measures of resistance to extension of a crack. The term is sometimes restricted to results of *fracture mechanics* tests, which are directly applicable in fracture control. However, the term commonly includes results from simple tests of notched or precracked specimens not based on fracture mechanics analysis. Results from test of the latter type are often useful for fracture control, based on either service experience or empirical correlations with fracture mechanics tests.

Fragipan

Dense, brittle, usually acid subsoil horizon which limits the movement of water, air, and roots; extreme density and compactness is not a result of high clay content but of a dense soil fabric arrangement and/or cementation by various chemical constituents.

Francis Turbine

A reaction turbine of the radial inward-flow type.

Free Available Chlorine

The amount of chlorine available as dissolved gas, hypochlorous acid, or hypochlorite ion that is not combined with an amine or other organic compound.

Free Available Residual Chlorine

That portion of the total residual chlorine remaining in water or wastewater at the end of a specified contact period that will react chemically and biologically as hypochlorous acid or hypochlorite ion.

Freeboard

Vertical distance between the normal maximum level of the surface of the liquid in a conduit, reservoir, tank, or canal and the top of the sides of an open conduit or the top of a dam or levee, which is provided so that waves and other movements of the liquid will not overflow the confining structure. The vertical distance between the top water level and the crest of a bank, dam or similar structure. Freeboard is provided for in designing such structures, to prevent overtopping due to surcharge or wave action. In an earth structure, freeboard should include an allowance for settlement.

Free Carbon

The part of the *total carbon* in steel or cast iron that is present in elemental form as graphite or temper carbon. Contrast with *combined carbon*.

Free Corrosion Potential

Corrosion potential in the absence of net electrical current flowing to or from the metal surface.

Free Ferrite

Ferrite that is formed directly from the decomposition of hypoeutectoid austenite during cooling, without the simultaneous formation of cementite. Also called proeutectoid ferrite.

Free Flow

A condition of flow through or over a structure where such flow is not affected by submergence or the existence of tail water.

Free Machining

Pertains to the machining characteristics of an alloy to which one or more ingredients have been introduced to give small broken chips, lower power consumption, better surface finish, and longer tool life; among such additions are sulphur or lead to steel, lead to brass, lead and bismuth to aluminium, and sulfur or selenium to stainless steel.

Free Oxygen

Elemental oxygen (O₂).

Free Product

A contaminant in the unweathered phase, where no dissolution or biodegradation has occurred.

Free-Swimming Ciliate

Mobile, one-celled organisms using cilia (hair-like projections) for movement.

Free Water

Suspended water constituting films covering the surface of solid particles or the walls of fractures, but in excess of pellicular water; mobile water is free to move in any direction under the pull of the force of gravity and unbalanced film pressure.

Free Water Surface Wetland (FWS)

A lined basin or channel with porous plant substrate and wetland vegetation in which the shallow water is exposed to the air. A constructed wetland or other shallow wastewater treatment pond where the shallow water is exposed directly to the air.

Frequency

(1) The time rate of vibration or the number of complex cycles per unit time. (2) The number of occurrences of a certain phenomenon in a given time. (3) The number of occasions on which the same numerical measure of a particular quantity has occurred between definite limits. (4) The number of cycles through which an alternating current passes per second. Frequency has been generally standardized in the electrical utility industry in the United States at 60 cycles per second (60 Hz).

Frequency Analysis

It allows to separate the main components of the signals by dividing the frequency bands using a set of filters.

Frequency of Storm

Anticipated number of years between storms of equal intensity and/or total rainfall volume. For example, a 25-year 24-hour storm is the volume of rainfall that could be expected to occur during a 24-hour period once every 25 years on average.

Fresh-Air Inlet

A specially constructed opening usually provided with a perforated cover to facilitate ventilation of a wastewater line.

Fresh Sludge

Sludge in which decomposition is little advanced.

Fresh Wastewater

Wastewater of recent origin containing dissolved oxygen.

Freshwater

All waters that would have a chloride ion content of less than 500 parts per million under natural conditions.

Freshwater Classifications

Class C: freshwaters protected for secondary recreation, fishing, and propagation and survival of aquatic life; all freshwaters are classified to protect these uses at a minimum.

Class B: freshwaters protected for primary recreation, which includes swimming on a frequent or organized basis, and all Class C uses.

Class WS-I: waters protected as water supplies which are essentially in natural and undeveloped watersheds. Class WS-II: waters protected as water supplies which are generally in predominantly undeveloped watersheds.

Class WS-III: waters protected as water supplies which are generally in low to moderately developed watersheds. Class-IV: waters protected as water supplies which are generally in moderately to highly developed watersheds. Class-V: waters protected as water supplies which are generally upstream of and draining to Class-IV waters.

Fretting

A type of wear that occurs between tight-fitting surfaces subjected to cyclic relative motion of extremely small amplitude. Usually, fretting is accompanied by corrosion, especially of the very fine wear debris. Fretting refers to metal deteriora-

tion caused by repetitive slip at the interface between two surfaces. When metal loss is increased by corrosion, the term "fretting corrosion" should be used.

Fretting Corrosion

Another special case of erosion-corrosion, fretting corrosion, occurs when two heavily loaded metals rub rapidly together, causing damage to one or both metals. Vibration is usually responsible for the damage, but corrosion is also a factor because the frictional heat increases oxidation. In addition, mechanical removal of protective corrosion products continually exposes fresh metal. Fretting corrosion occurs more frequently in air than in water.

Friction Factor

A measure of the resistance to flow of fluid in a conduit as influenced by wall roughness.

Friction Head

The head loss resulting from water flowing in a stream or conduit as the result of the disturbances set up by the contact between the moving water and its containing conduit and by intermolecular friction. In laminar flow, the head loss is approximately proportional to the first power of the velocity; in turbulent flow to a higher power, approximately the square of the velocity. While, strictly speaking, head losses such as those caused by bends, expansions, obstructions, and impact are not included in this term, the usual practice is to include all such head losses under this term. The energy loss due to friction when water flows through a conduit. Depends on the roughness of the surface over which the, water passes.

Friction Loss

The head loss resulting from water flowing in a stream or conduit as the result of the disturbances set up by the contact between the moving water

and its containing conduit and by intermolecular friction. See also FRICTION HEAD.

Frontal Zone

The row of fore dunes facing the ocean or other large body of water.

Frost-Heave

The uplifting of a surface by the internal action of frost. Occurs when sub-zero temperatures cause water in the soil to freeze and form ice crystals. In doing so it expands, causing upward movement of the soil.

Froude Number

A dimensionless parameter expressing the ratio between the inertia and the gravitational forces in a fluid.

$$F = V^2 / 2g$$

where: F=Froude Number, V = velocity (m/s), g=acceleration due to gravity=9.8 (m/s²), d=depth (m).

The Froude number is used to characterize conditions in flowing water in terms of its velocity and depth. For example, in an hydraulic jump, the state of flow before and after the jump is described in terms of the Froude Number, so that the height of the jump can be calculated.

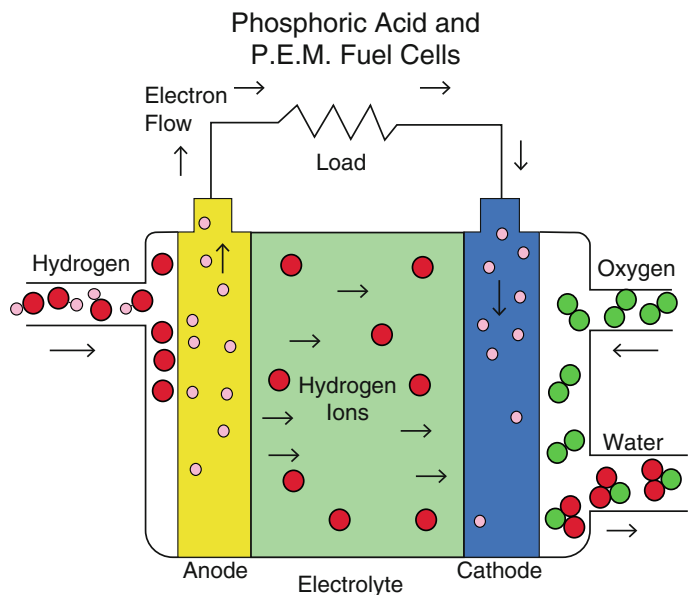
Fuel

Fuel is a material which is consumed, giving up its molecularly stored energy which is then used for other purposes. e.g. to do work (run a machine).

Fuel Cell

An electrochemical engine (no moving parts) that converts the chemical energy of a fuel, such as hydrogen, and an oxidant, such as oxygen, directly to electricity. The principal components of a fuel cell are catalytically activated electrodes for the fuel (anode) and the oxidant (cathode) and an electrolyte to conduct ions between the two electrodes (Fig. 10).

Fig. 10 A diagram of fuel cell



Fugitive Dust

Dust particles that are introduced into the air through certain activities such as soil cultivation, or vehicles operating on open fields or dirt roadways.

Fuel Efficiency

Fuel efficiency is the amount of work obtained for the amount of fuel consumed. In cars, an efficient fuel allows more miles per gallon of gas than an inefficient fuel.

Fuel Switching

In general, this is substituting one type of fuel for another. In the climate-change discussion it is implicit that the substituted fuel produces lower carbon emissions per unit energy produced than the original fuel, e.g., natural gas for coal.

Fugitive Emissions

Emissions not caught by a capture system that are often due to equipment leaks, evaporative processes, and windblown disturbances.

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. Small, nonchlorophyll-bearing plants that lack roots, stems, or leaves; occur (among other places) in water, wastewater, or wastewater effluents; and grow best in the absence of light. Their decomposition may cause disagreeable tastes and odors in water; in some wastewater treatment processes they are helpful and in others they are detrimental. Fuse A protective device that carries the full current of a circuit. If the current is higher than the fuse rating, it contains a substance

that will melt and break the current. Fuses cannot be reset but must be replaced.

Fume

An aerosol of solid particles, usually from metallurgical processes, generated by condensation from the gaseous state generally after volatilization from melted substances and often accompanied by chemical reactions such as oxidation.

Fumes

In popular usage, gaseous effluents, often unpleasant and malodorous; which might arise from chemical processes.

Furan

Resin formed from reactions involving furfuryl alcohol alone or in combination with other constituents.

Furnace

A combustion chamber; an enclosed structure in which fuel is burned to heat air or material, an appliance for heating a medium to distribute heat throughout the dwelling unit.

Fusion Penetration

Depth to which the parent metal has been fused.

Fusion Welding

Welding in which the weld is made between metals in a molten state without the application of pressure.

Fusion Zone

The part of the parent metal which is melted into the weld metal.

G

Gabion

A rectangular wire mesh cage filled with rock, brick or similar material. The components are usually assembled on site, securely tied together, and used in the construction of retaining walls and anti-erosion structures.

Gable Vents

A louver vent mounted in the top of the gable to allow the passage of air through the attic. (The hole near the pointy part of the wall.)

Gage Height

The height of the water surface above the gage datum (zero point). Gage height is often used interchangeably with the more general term, stage, although gage height is more appropriate when used with a gage reading.

Gaging Station

A site on a stream, lake, reservoir or other body of water where observations and hydrologic data are obtained. The U.S. Geological Survey measures stream discharge at gaging stations.

Galvanic

Pertaining to the current resulting from the coupling of dissimilar electrodes in an electrolyte.

Galvanic Anode

A metal which because of its relative position in the galvanic series, provides *sacrificial protection* to metals that are more noble in the series, when coupled in an electrolyte.

Galvanic Cell

A cell in which chemical change is the source of electrical energy. It usually consists of two dissimilar conductors in contact with each other and with an electrolyte or of two similar conductors in contact with each other and with dissimilar electrolytes.

Galvanic Corrosion

When two dissimilar metals are in contact with each other and exposed to a conductive environment, a potential exists between them, and a current flows. The less resistant metal

becomes anodic, and the more resistant, cathodic. Attack on the less resistant metal increases, while on the more resistant one, it decreases.

Galvanic Couple

A pair of dissimilar conductors, commonly metals, in electrical contact.

Galvanic Couple Potential

Mixed potential.

Galvanic Current

The electric current that flows between metals or conductive nonmetal in a *galvanic couple*.

Galvanic Series

A list of metals arranged according to their relative corrosion potentials in some specific environment; sea water is often used.

Galvanize

To coat a metal surface with zinc using any of various processes.

Galvanizing

The accepted term for the coating of iron or steel with zinc by the immersion of the metal in a bath of molten zinc. Galvanizing comes from "GALVANO".

Galvanneal

To produce a zinc-iron alloy coating on iron or steel by keeping the coating molten after hot dip galvanizing until the zinc alloys completely with the base metal.

Galvanometer

An instrument for indicating or measuring a small electric current by means of a mechanical motion derived from electromagnetic or electrodynamic forces produced by the current.

Galvanostatic

An experimental technique where by an *electrode* is maintained at a constant current in an *electrolyte*.

Gamma Iron

The face-centered cubic form of pure iron, stable from 910 to 1400 °C (1670 to 2550 °F).

Gangue Minerals

The non-metalliferous or commercially non-valuable minerals contained in an ore body. These become concentrated in waste dumps following the extraction of the required mineral from the ore body.

Garbage

Garbage is the waste that is generated whether in the household, commercial areas, industries, etc.

Gas

A mixture of gaseous compounds or elements flowing in a duct, carrying particulate matter.

Gas Chromatography

A method of separating a mixture of compounds into its constituents so they can be identified. The sample is vaporized into a gas-filled column, fractionated by being swept over a solid adsorbent, selectively eluted, and identified.

Gas Chromatography-Mass Spectrometry (GC-MS)

An analytical technique involving the use of both gas chromatography and mass spectrometry, the former to separate a complex mixture into its components and the latter to deduce the atomic and molecular weights of those components. It is particularly useful in identifying organic compounds.

Gas Dome

In sludge digestion tanks, usually a steel cover floating entirely or in part on the liquid sludge.

Gas Heating System

A heating system that uses natural gas or bottled liquid propane gas as fuel.

Gas Production

The creation of a gas by chemical or biological means.

Gas-Purifier

An apparatus for totally or partially removing one or more constituents from a gas mixture.

Gas Turbine

An engine that uses a compressor to draw in air and compress it. Fuel is then added to the air and combusted in a combustor. Hot combustion gases exiting the engine turn a turbine which also turns the compressor. The engine's power output can be delivered from the compressor or turbine side of the engine.

Gaseous Corrosion

Corrosion with gas as the only corrosive agent and without any aqueous phase on the surface of the metal. Also called dry corrosion.

Gasification

The transformation of soluble and suspended organic materials into gas during waste decomposition.

Gasoline Volatility

The evaporative properties of gasoline. Gasoline vapor is a volatile organic compound.

Gate Valve

A valve in which the closing element consists of a disk that slides over the opening or cross-sectional area through which water passes.

Gauge

(1) A device for indicating the magnitude or position of an element in specific units when such magnitude or position is subject to change; examples of such elements are the elevation of a water surface, the velocity of flowing water, the pressure of water, the amount or intensity of precipitation, and the depth of snowfall. (2) The act or operation of registering or measuring the magnitude or position of a thing when these characteristics are subject to change. (3) The operation of determining the discharge in a waterway by using both discharge measurements and a record of stage.

Gene

Gene is a section of a chromosome containing enough DNA to control the formation of a protein; a gene controls the transmission of a hereditary character.

General Circulation Model (GCM)

A global, three-dimensional computer model of the climate system which can be used to simulate human-induced climate change. GCMs are highly complex and they represent the effects of such factors as reflective and absorptive properties of atmospheric water vapor, greenhouse gas concentrations, clouds, annual and daily solar heating, ocean temperatures and ice boundaries. The most recent GCMs include global representations of the atmosphere, oceans, and land surface.

General Corrosion

A form of deterioration that is distributed more or less uniformly over a surface; see UNIFORM CORROSION.

Geographic Information System (GIS)

A computerized database system containing information on natural resources and other factors that can be analyzed and displayed in spatial or map format.

Geomorphology

The branch of both physiography and geology that deals with the form of the earth, the general configuration of its surface, and the changes that take place in the evolution of Landforms.

Geosphere

The soils, sediments, and rock layers of the Earth's crust, both continental and beneath the ocean floors.

Geotextile Fabric

(1) Synthetic fabric installed over distribution media to prevent migration of fine material; (2) synthetic fabric used to control soil erosion and/or weed growth.

Geothermal

Geothermal is pertaining to heat energy extracted from reservoirs in the earth's interior, as is the use of geysers, molten rock and steam spouts.

Geothermal Energy

Geothermal energy is the heat generated by natural processes within the earth. Chief energy resources are hot dry rock, magma (molten rock), hydrothermal (water/steam from geysers and fissures) and geopressure (water saturated with methane under tremendous pressure at great depths).

Geyser

A geothermal feature of the Earth where there is an opening in the surface that contains superheated water that periodically erupts in a shower of water and steam.

Giardiasis

A disease that results from an infection by the protozoan parasite *Giardia Intestinalis*, caused by drinking water that is either not filtered or not

chlorinated. The disorder is more prevalent in children than in adults and is characterized by abdominal discomfort, nausea, and alternating constipation and diarrhea.

Gilgai

Surface micro-relief associated with some clayey soils, consisting of hummocks and/or hollows of varying size, shape and frequency. This phenomenon is a continuing long-term process due to the shrinking and swelling of deep subsoil with changes in moisture content. It is usually associated with the occurrence of expansive soils.

Normal gilgai are irregularly spaced and have sub circular depressions with vertical intervals usually less than 300 mm and horizontal intervals usually 3–10 m. They are associated with flat or very gently sloping terrain. Gilgai that deviate significantly from this pattern include the following main types:

Crabrole Gilgai

Small mounds and depressions separated by a more or less continuous shelf and the horizontal interval extends from 3-20 m.

Linear Gilgai

Long narrow parallel elongate mounds and broader elongate depressions more or less at right angles to the contour, usually in sloping terrain. Vertical interval is usually less than 300 mm and horizontal interval usually 5–8 m,

Lattice Gilgai

Discontinuous elongate mounds and/or elongate depressions more or less at right angles to the contour. Usually in sloping terrain, commonly between megar gilgai on lower slopes and plains.

Melonhole Gilgai

Irregularly distributed large depressions, usually greater than 3 m in diameter, sub-circular or irregular and varying from closely spaced in a network of elongate mounds to isolated depressions set in an undulating shelf with occasional small mounds, Vertical interval is usually greater than 300 mm and horizontal interval usually 6–50 m.

Gillnets

Walls of netting that are usually staked to the sea floor. Fish become entangled or caught by their gills.

Girt

A girt is a horizontal structural member usually located on the wall in a framed wall—used as a term in metal building construction.

Glacier

A huge mass of ice, formed on land by the compaction and recrystallization of snow, that moves very slowly downslope or outward due to its own weight.

Glass Cloth

Fabric woven from continuous filament or staple glass fibre.

Glass Electrode

A glass membrane *electrode* used to measure pH or hydrogen-ion activity.

Glass Fibre

A material consisting of glass fibres used in making various products, including yarns, fabrics, insulation, and structural objects or parts. Fibre glass is resistant to heat and fire.

Glass Fibre (Glass Wool)

Mineral fibre produced from molten glass.

Gleying

The grey or greenish-grey coloration of soils often produced under conditions of poor drainage, which give rise to chemical reduction of iron and other elements. It typically occurs in the clayey lower B horizons of soils situated in low topographic positions where the water table remains high for much of the year.

Global Average Temperature

An estimate of Earth's mean surface air temperature averaged over the entire planet.

Global Warming

An increase in the near surface temperature of the Earth. Global warming has occurred in the distant past as the result of natural influences, but the term is most often used to refer to the warming predicted to occur as a result of increased emissions of greenhouse gases. Scientists generally agree that the Earth's surface has warmed by about 1 °F in the past 140 years. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that increased concentrations of greenhouse gases are causing an increase in the Earth's surface temperature and that increased concentrations of sulfate aerosols have led to relative cooling in some regions, generally over and downwind of heavily industrialized areas (see CLIMATE CHANGE).

Global Warming Potential (GWP)

The relative warming of a greenhouse gas over a specified period of time as compared to carbon dioxide (GWP of 1). GWP allows for the conversion of different greenhouse gas emissions into the same emissions unit, carbon dioxide equivalents (CO₂E).

Globe Valve

A valve having a round, ball-like shell and horizontal disk.

Goaf

That part of an underground coal mine from which the coal has been extracted. It may be more or less filled up, by back-filling, but it still remains a generally unstable area often leading to fall-in.

Good Agricultural Land

Land which because of its soil, climate, topography and location is highly suitable for a form of regular agricultural production, it may have limitations to production requiring significant inputs and/or restrictions to achieve and maintain long term productivity, soil fertility and soil stability.

Good Agricultural Soil

A soil which is highly suitable for a form of intensive agricultural production but may have physical or chemical limitations which restrict the range of optional uses available. Significant inputs may be required to achieve and maintain long term productivity, fertility and stability.

Golden Carrot

An incentive program that is designed to transform the market to produce much greater energy efficiency. The term is a trademark of the Consortium for Energy Efficiency.

GPCD

The rate of water, wastewater, or other flow measured in U.S. gallons (liters) per capita of served population per day.

GPD

The rate of water, wastewater, or other flow measured in U.S. gallons (liters) per day.

GPM

The rate of water, wastewater, or other flow measured in U.S. gallons (liters) per minute.

Grab Sample

A sample which is taken from a waste stream on a one-time basis without consideration of the flow rate of the waste stream and without consideration of time.

Grade

The slope of a specific surface of interest, such as a road, channel bed or bank, top of embankment, bottom of excavation, or natural ground—commonly measured in per cent (unit of measurement per one hundred units) or a ratio of horizontal to vertical distance.

Gradient

The rate of change of any characteristic per unit of length or slope. The term is usually applied to such things as elevation, velocity, or pressure.

Gradation Curve

Graphical representation of the results of a sieve analysis.

Grade

Rate of rise or fall along a specified line; grade is the same as slope; can be expressed in percent (as feet of rise or fall per 100 feet of horizontal distance), as a decimal equivalent as feet of rise or fall per foot or horizontal distance, or as a ratio.

Grade, existing: Natural, unaltered land surface; also referred to as original ground surface.

Grade, finish: Final earth grade required by specifications.

Grade, proposed: Finish grade as specified on a plan.

Grade elevation: Elevation of the bottom of an excavated trench, ditch, or other finished surface; the term 'grade' is sometimes used to denote the elevation of the finished surface of an engineering project.

Gradational Soil

A soil in which there is a gradual change in soil/texture between the A and B horizons (e.g. loam over clay loam over light clay). The soil is dominated by the mineral fraction and shows more clayey texture grades on passing down the soil. The texture of each successive horizon changes gradually to that of the one below. Horizon boundaries are usually gradual or diffuse. The texture difference between consecutive horizons is less than 1 soil texture groups, while the range of texture throughout the soil exceeds the equivalent span of one texture group.

Grade

The degree of slope of a constructed or excavated surface such as a road or batter. May also be applied to the longitudinal fall of a channel such as in a diversion bank, drain or watercourse, May be expressed as a ratio or percentage.

Grade Stabilisation Structure (Gradient Reduction Structure)

A structure used to stabilize the grade of a gully or watercourse. The structure allows for the gradual accumulation of sediment which results in a lessening of the channel grade above it. This produces a decrease in flow velocities thereby reducing erosion.

Use of a number of such structures, it necessary, along the length of a gully, thus assists its long term stabilization. In designing such a system, each segment should allow for a final grade that ensures the stability of the structure above it. The overall fall of the gully should remain the same but the erosive power of the water is lessened because of the 'stepping' effect achieved. Because flow velocities increase as water passes over each structure, appropriate measures are required to prevent under and side-cutting. Such measures would include cut-off walls, wing walls and energy dissipaters.

Grading

Shaping and/or smoothing an earth, gravel or other surface by means of a grader or similar implement. Refers to the distribution of particle sizes in a soil. A well-graded soil consists of particles that are distributed over a wide range in size or diameter. Such a soil's density or bearing properties can normally be easily increased by compaction. A poorly-graded soil consists mainly of particles nearly the same size, or is deficient in particles of a certain size. Because of this, the soil's density can be increased only

slightly by compaction. An assessment of the grading of a soil can be made by particle size analysis and is important to determine the behavior of a given soil when used in soil conservation earthworks.

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Grain

An individual crystal in a polycrystalline metal or alloy; it may or may not contain twinned regions and sub grains; a portion of a solid metal (usually a fraction of an inch in size), in which the atoms are arranged in an orderly pattern.

Grain Boundary

A narrow zone in a metal corresponding to the transition from one crystallographic orientation to another, thus separating one *grain* from another; the atoms in each grain are arranged in an orderly pattern; the irregular junction of two adjacent grains is known as a grain boundary.

Grain-Boundary Corrosion

Same as inter-granular corrosion.

Grain Loading

The rate at which particles are emitted from a pollution source (i.e., number of grains per cubic foot of gas emitted).

Granular Insulation

Insulation composed of small nodules that contain voids or hollow spaces. The material may be calcium silicate, diatomaceous earth, expanded vermiculite, perlite, cellulose or micro porous insulations.

Granular Media

The material used to effect filtration.

Granular Soil

Gravel, sand, or silt, (coarse grained soil) with little or no clay content; Granular soil has no cohesive strength; some moist granular soils exhibit apparent cohesion; granular soil cannot be molded when moist and crumbles easily when dry.

Graphitic Corrosion

Deterioration of gray cast iron in which the metallic constituents are selectively leached or converted to corrosion products leaving the graphite intact. The term *graphic quotation* is commonly used to identify this form of corrosion, but is not recommended because of its use in metallurgy for the decomposition of carbide to graphite; deterioration of gray cast iron in which the metallic constituents are selectively leached or converted to corrosion products leaving the graphite intact.

Graphitization

A metallurgical term describing the formation of graphite in iron or steel, usually from decomposition of iron carbide at elevated temperatures. Not recommended as a term to describe *graphitic corrosion*.

Grassed Swale

An earthen conveyance system that is broad and shallow with check dams and vegetated with erosion resistant and flood tolerant grasses, engineered to remove pollutants from stormwater runoff by filtration through grass and infiltration into the soil.

Grassed Waterway

Natural or constructed watercourse or outlet that is shaped or graded and established with suitable vegetation to minimize erosion during periods of surface water runoff.

Grassroots

Local or person-to-person. A typical grassroots effort might include a door-to-door education and survey campaign.

Gravel

(1) Rounded or surrounded rock fragment that is between 0.1 inch (2 millimetres) and 3 inches (76 millimetres) in diameter. A mixture of coarse mineral particles larger than 2 mm but less than 75 mm in equivalent diameter.

(2) A mixture of coarse mineral particles larger than 2 mm but less than 75 mm in equivalent diameter.

Gravel Envelope

Gravel, sometimes mixed with sand, placed around a sub- surface drain to facilitate the entry of water into it but to prevent the entry of all but the finest particles.

Gravel Outlet

Gravel placed to function as a filter at the outlet of a bank or other structure which ponds sediment-laden runoff. The outlet may sometimes incorporate a core of hay bales to assist sediment entrapment.

Gravel Less Pipe

Distribution medium consisting of perforated, corrugated pipe encased in a geotextile wrap.

Gravimetric

Of or pertaining to measurement by weight.

Gravity Main

Primary collection piping placed on a carefully controlled grade; used for conveyance of wastewater via gravitational force.

Grey Water

Water captured from non-food preparation sinks, showers, baths, spa baths, clothes washing machines, and laundry tubs.

Grazing

The use of grasses and other plants to feed wild or domestic herbivores such as deer, sheep and cows. The maximum stocking rate possible which grazing land can support in the long term without deterioration.

Grease

Fats, soaps, oils, waxes and etc. in wastewater.

Grease and Oil

In wastewater, a group of substances including fats, waxes, free fatty acids, calcium and magnesium soaps, mineral oils, and certain other nonfatty materials; water-insoluble organic compounds of plant and animal origins or industrial wastes that can be removed by natural flotation skimming.

Grease Interceptor

Watertight device designed to intercept, congeal, and retain or remove fats, oils, and grease (FOGs) from food-service wastewaters; may be located inside (grease separator) or outside (grease tank or grease trap) of a facility that generates commercial food service wastewater.

Grease Separator

Mechanical grease interceptor that is usually associated with a plumbing unit and located within a facility that generates commercial wastewater.

Grease Skimmer

A device for removing floating grease or scum from the surface of wastewater in a tank.

Grease Trap

Relatively large device similar to a septic tank located outside a facility that generates commercial food service wastewater and is designed to intercept, congeal, and retain or remove fats, oils, and grease (FOGs).

Great Soil Group

A soil classification category in which soils are classified according to their mode of formation as reflected in major morphological characteristics and profile form.

The grouping depends on an appraisal and interpretation of features such as the colour, texture, structure and consistence of soil material, the various horizons in the soil profile and the nature of the boundary between horizons.

Green Design

A design, usually architectural, conforming to environmentally sound principles of building, material and energy use. A green building, for example, might make use of solar panels, skylights, and recycled building materials.

Green Insulation

Insulation of spaces using recyclable materials.

Green Liquor

The liquor resulting from dissolving molten melt iron the kraft recovery furnace in water.

Green Manure Crop

A crop grown primarily to provide a source of organic matter to the soil. It is normally incorporated into the surface soil by mechanical means, thereby, upon breakdown, providing a source of organic nutrients for subsequent field crops or existing row crops, such as vines or orchard trees. Green manure crops are typically leguminous, for example, lupines, vetches or peas, and are generally incorporated when flowering or, on light soils, before they have utilized excessive amounts of soil moisture.

Green Rot

A form of high-temperature corrosion of chromium-bearing alloys in which green chromium oxide (Cr_2O_3) forms, but certain other alloy constituents remain metallic; some simultaneous carburization is sometimes observed.

Greenest of Green

The Cellulose Insulation Manufacturers Association (CIMA) is actively promoting the environmental benefits of cellulose insulation through their Greenest of the Green campaign.

Greenhouse Effect

The warming effect of the Earth's atmosphere. Light energy from the sun that passes through the Earth's atmosphere is absorbed by the Earth's surface and re-radiated into the atmosphere as heat energy. The heat energy is then trapped by the atmosphere, creating a situation similar to that which occurs in a car with its windows rolled up. The warming of the Earth's atmosphere attributed to a buildup of carbon dioxide or other gases. Some scientists think that this build-up allows the sun's rays to heat the Earth, while making the infra-red radiation atmosphere opaque to infra-red radiation, thereby preventing a counterbalancing loss of heat.

Greenhouse Gas Emissions

Gases that trap heat in the atmosphere are often called greenhouse gases. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities.

Greenhouse Gases

Atmospheric gases such as carbon dioxide, methane, chlorofluorocarbons, nitrous oxide, ozone, and water vapor that slow the passage of

re-radiated heat through the Earth's atmosphere. A gas, such as carbon dioxide or methane, which contributes to potential climate change.

Greenway

Undeveloped land usually in cities, set aside or used for recreation or conservation.

GREET

Greenhouse Gases, Regulated Emissions and Energy Use in Transportation model used to determine emissions from various vehicle and fuel combinations.

Grid Reference

A code for the identification of a point or location on a map or plan. Co-ordinates are stated on the edge of map sheets and the reference is always defined by quoting the easting value first followed by the northing value.

Grid Survey

A survey which establishes spot elevations in a regular pattern (generally square) over an area in such a manner that detailed information (e.g. contours) can be portrayed at an appropriate scale. The term may also be used to describe such surveys carried out for the collection of land resource data, for example, soil and vegetation type surveys.

Ground Cover

A vegetative layer of grasses and/or other low growing plants or plant residues providing protection to the soil against erosive agents. A good ground cover is an essential part of the majority

of soil conservation programs. Generally a percentage ground cover of 75% or more is needed to give adequate protection against soil erosion.

Ground Truth

The measurements or observations collected by equipment or personnel in the field for the purpose of verifying an interpretation made from remotely sensed data. Results of analysis of such data are dependent on the field information since it provides a comparison of accuracy between the images and the actual on-site conditions.

Groundwater

Subsurface water contained in a saturated zone of the soil and/or a geologic stratum. It is at a pressure equal to or greater than atmospheric pressure and will therefore flow out into a well or at the earth's surface.

Groyne

A wall usually built perpendicular to the shoreline, to trap material moved by littoral drift and/or to retard erosion of the shoreline. Similar structures are also used to protect river banks from erosion. Groynes are commonly constructed of large rocks, concrete, piles or other relatively permanent materials.

Grit

Heavy, inorganic matter, such as sand or pebbles. Airborne solid particles in the atmosphere or flues. The heavy suspended mineral matter present in water or wastewater, such as sand, gravel, or cinders. It is removed in a pre-treatment unit called a grit chamber to avoid abrasion and wearing of subsequent treatment devices.

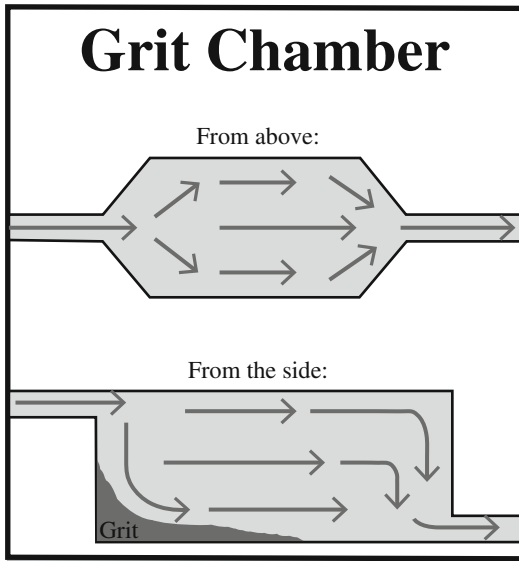


Fig. 11 Grit chamber

Grit Chamber

Usually in municipal wastewater treatment, a chamber or tank in which primary influent is slowed down so heavy typically inorganic solids can drop out, such as metals and plastics. A Grit Chamber is typically a long narrow tank designed to settle out solids such as sand, coffee grounds, and eggshells from wastewater passing through it (Fig. 11). A detention chamber or an enlargement of a sewer designed to reduce the velocity of flow of the liquid to permit the separation of mineral (grit) from organic solids by differential sedimentation.

Grit Collector

A device placed in a grit chamber to convey deposited grit to a point of collection.

Grit Removal

An element of preliminary treatment used to remove heavy materials, such as sand and gravel, from the sewage arriving at the treatment plant. The settled material is removed and sent to landfill.

Grit Separator

Any process or device designed to separate grit from a water or wastewater stream.

Grit Washer

A device for washing organic matter out of grit.

Ground

A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body that serves in place of earth.

Ground Bed

A buried item, such as junk steel or graphite rods, that serves as the *anode* for the *cathodic protection* of pipelines or other buried structures.

Grounded

Connected to earth or to some conducting body that serves in place of the earth.

Groundfish

A general term referring to fish that live on or near the sea floor. Groundfish are also called bottom fish or demersal fish.

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." Water that fills all of the unblocked pores of material underlying the water table within the upper limit of saturation. Underground water stored in aquifers. Groundwater is created by rain

which soaks into the ground and flows down until it collects above an impervious zone.

Any water, except capillary moisture, beneath the land surface in the zone of saturation or beneath the bed of any stream, lake, reservoir or other body of surface water within the boundaries of this commonwealth, whatever may be the sub-surface geologic structure in which such water stands, flows, percolates or otherwise occurs.

Ground Water, Confined

Ground water under pressure significantly greater than atmospheric, with its upper limit the bottom of a bed with hydraulic conductivity distinctly lower than that of the material in which the confined water occurs.

Groundwater Dependent Ecosystems

Ecosystems which have their species composition and natural ecological processes wholly or partially determined by Groundwater.

Groundwater Lowering System

Assembly of components and devices designed to actively or passively lower the water table beneath a soil treatment area.

Groundwater Makeup Allocation

See CONJUNCTIVE USE: the volume by which the Regulated Surface Water Allocation may be supplemented by an additional Groundwater Allocation.

Groundwater Management Area

A geographical extent of land which relates directly to an Aquifer.

Groundwater Mounding

Localized increase in the elevation of a water table that results from the downward percolation of additional liquid toward groundwater.

Groundwater Property Allocation

This is the water allocation announcement for groundwater licences. Allocation is based upon the Property Account entity, which is one or many associated groundwater licences.

Groundwater Property Minimum Allocation

A Groundwater Property Minimum Allocation may be defined. Property Allocations greater than the minimum are subject to any Percentage Reduction down to the Minimum Allocation but Property Allocations equal to or less than the minimum will not be subject to any Percentage Reduction.

Ground-Water Recharge

Inflow of water to a ground-water reservoir from the surface. Infiltration of precipitation and its movement to the water table is one form of natural recharge. Also, the volume of water added by this process.

Ground Water, Unconfined

Water in an aquifer that has a water table that is exposed to the atmosphere.

Groundwater Zone

A portion of a Groundwater Management Area.

Growth Management Plan

A plan for a given geographical region containing demographic projections (i.e., housing units, employment and population) through some specified point in time and which provides recommendations for local governments to better manage growth and reduce projected environmental impacts.

Growth Overfishing

The process of catching fish before they are fully grown resulting in a decrease in the average size of the fish population.

Gully

An open incised erosion channel in the landscape generally greater than 30 cm deep. Gullies are characterized by moderately to very gently inclined floors and precipitous walls. They form by a complex of processes dominated by concentrated surface water flow and hence are frequently found in drainage lines. Major flows only occur in gullies during and/or immediately after periods of heavy rainfall.

Gullies vary widely in shape, depending on soil type, landform and the hydrological regime of the catchment. They may be wide in relation to depth or vice-versa, and may be of “U” or “V” cross-section.

Gully Control Structure (GCS)

A constructed wall or other barrier of earth, concrete or masonry, incorporating a stable outlet, which entraps runoff in a gully or drainage line as part of a scheme of gully erosion control. It can also act as a sediment trap, diversion bank or gully crossing. The primary purpose of such a structure is to control the flow of runoff into or along a gully, thereby reducing erosion. Appropriately

sited, the structure may also provide for drowning of the gully head, thus restricting head ward erosion. The inclusion of a stable outlet assists safe disposal of surplus runoff so that the gully below the structure, if not filled in, can stabilize naturally. The siting of a GCS is important in a scheme of erosion control. It may depend on: the availability of suitable construction material; the achievement of a high storage/ excavation ratio; the need to control erosion in the drainage line; the location of fencing and the possible role of the structure as a watering point for stock; and/or the need to dispose of or divert runoff from other soil conservation structures. The design of such a structure is dependent on: its location; the size of the catchment above it and the associated land use: availability of a suitable site for the spillway and disposal of overflow; the nature of the site selected and the construction materials available there; and its relationship to other soil conservation structures. The construction of a GCS involves on-site consideration of: the nature of the site chosen; the nature and moisture content of soil materials available if used in construction; the conditions occurring at the time of construction; and the equipment available in relation to the size of structure required. Important factors in the construction of an effective earthen GCS include: compaction of the material in the wall at or near optimum moisture content; keying of the wall by way of a core trench in suitable material, particularly when built across a gully; top soiling and seeding of the final wall and surrounding areas above top water level: and adequate spillway installation.

Gully Filling

Placing material, by mechanical means, in a gully to raise its floor, and subsequently shaping it to a uniform cross-section and stabilizing it to minimize the potential for further erosion. The aim of gully filling is to revert the area lost through channel incision back to its original productive capability.

The till may include soil and rock materials, usually excavated from within the immediate vicinity of the gully, but should exclude material that will rot, rust or create voids that form a nucleus for funnel erosion or lead to subsidence. The surface layer of fill should be topsoil to ensure a suitable medium for plant growth.

Gully Head

The upstream end of a gully where runoff from the catchment above falls to the gully floor. It is the exposed part of the gully upon which erosive forces, including water flow, splash and seepage, act to cause the gully to extend upstream by head ward erosion.

Gully Re-Entry

Provision made for runoff, diverted from a gully head in a scheme of erosion control, to be brought back into the gully by way of a flume or drop structure, at a point lower down the flow line, without creating a further erosion hazard.

Gully Shaping

Physical reorientation of the sides of a gully, by mechanical means, to create a uniform cross-section that will cater for expected flows without substantially raising the level of the gully floor. Gully shaping includes top soiling of exposed or created surfaces and their revegetation to minimize the potential for future erosion.

Gully Trimming

The removal of the upper edge of a gully side, by mechanical means, with the aim being to decrease the potential for lateral erosion by creating a stable gradient along the gully side, Gully trimming should include top soiling of the exposed surfaces and their revegetation. Material removed is generally incorporated in the reshaped gully side, decreasing its gradient and thus, aiding gully stabilization. Gully trimming is not intended to raise or alter the floor of a gully and it is typically undertaken on deep gullies having stable floors.

Gypsum

A naturally-occurring soft crystalline mineral which is the hydrated form of calcium sulphate, having the formula $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$. Deposits occur mainly in arid inland areas of Australia. Contains approximately 23% calcium and 18 per cent sulphur. This mineral is also a by-product of the manufacture of phosphoric acid. Such by-product gypsum, also called DUMP GYPSUM, is more variable in quality, particularly with respect to moisture content.

Gypsum is normally used as a soil ameliorant to improve soil structure and reduce crusting in hard setting clayey soils. The applied calcium increases soil aggregation, which results in improved water infiltration, seed germination and root growth. Typical rates used are up to 5 tones/hectare, with heavier rates being required on highly sodic soils. Gypsum is also a useful source of nutrient calcium and sulphur, and can also be used for clearing muddy watering dams. N.B. It is suggested that any unknown gypsum be tested for flocculating potential before use.

H

Habitat

Habitat is the natural area in which a species or organism is found.

Habitat Assessment

The evaluation of the physical, biological, and chemical environment and evaluation of its impact on biodiversity and ecosystem function and integrity.

Habitat Fragmentation

A process during which larger areas of habitat are broken into a number of smaller patches of smaller total area, isolated from each other by a matrix of habitats unlike the original habitat.

Halocarbons

Compounds containing either chlorine, bromine or fluorine and carbon. Such compounds can act as powerful greenhouse gases in the atmosphere. The chlorine and bromine containing halocarbons are also involved in the depletion of the ozone layer.

Half Cell

A pure metal in contact with a solution of known concentration of its own ion, at a specific temperature, develops a potential which is characteristic and reproducible; when coupled with another half-cell, an overall potential develops which is the sum of both half cells.

Halogen

A family of chemical elements that includes fluorine, chlorine, bromine, and iodine. Any of the elements of the halogen family, consisting of fluorine, chlorine, bromine, iodine, and astatine.

Halogenated Organic Compounds

Organic compounds containing one or more atoms of a halogen. These compounds tend to be stable and non-reactive, and therefore have low smog-producing potential.

Hard Chromium

Chromium plated for engineering rather than decorative applications.

Hard Liquid

A liquid with a vapor pressure below the prevailing atmospheric pressure, e.g. stabilized crude oil.

Hardsetting

The condition of a dry surface soil when a compact, hard and apparently a pedal condition prevails. Because of this characteristic such soils tend to give rise to high rates of runoff compared with better structured soils. Clods formed by the tillage of hard setting soils usually retain the condition until completely broken down by further tillage operations. Soil on which surface sealing develops may or may not be hardsetting—a surface seal is not a criterion for the hard setting condition. Soils which do not set hard are pedal in the dry, as well as in the moist state (clay loams, clays) or are single-grained (sands).

Hard Water

Water that contains certain salts, such as those of calcium or magnesium, which form insoluble deposits in boilers and form precipitates with soap.

Hardenability

The relative ability of a ferrous alloy to form martensite when quenched from a temperature above the upper critical temperature. Hardenability is commonly measured as the distance below a quenched surface at which the metal exhibits a specific hardness (50 HRC, for example) or a specific percentage of martensite in the microstructure.

Hard Facing

Depositing filler metal on a surface by welding, spraying, or braze welding to increase resistance to abrasion, erosion, wear, galling, impact, or cavitation damage.

Hardness

A characteristic of water imparted primarily by salts of calcium and magnesium, such as bicarbonates, carbonates, sulfates, chlorides, and nitrates, that causes curdling and increased consumption of soap, deposition of scale in boilers, damage in some industrial processes, and sometimes objectionable taste. It may be determined by a standard laboratory titration procedure or computed from the amounts of calcium and magnesium expressed as equivalent calcium carbonate. See also CARBONATE HARDNESS.

Harpooning

A surface method of fishing that requires considerable effort in locating and chasing individual fish. Harpoons are hand-held or fired from a harpoon gun and aimed at high-value fish, such as giant tuna and swordfish.

Harrowing

A procedure involving the pulling of a light finned or disc type implement over the land surface. In an arable situation it involves surface soil tillage to break up and redistribute soil aggregates to achieve a more satisfactory seedbed, and in some instances to control weed growth. In a pasture situation it may be used for weed control, manure or plant residue spreading and/or surface soil aeration. In a stubble retention system, harrowing may be used on level heaps of stubble and soil ridges, and to kill young weeds.

Harvesting (Forestry)

All planning and design, road, log deck and skid trail construction, and maintenance during active logging to remove wood products from the forest to a processing plant.

Haunch

(1) Portion of piping or conduit extending from its bottom to the spring line; (2) lower third of the circumference of a cylindrical tank; (3) portion of nonstraight-walled tank below the horizontal plane defined by its greatest width.

Haunch Zone

Portion of an excavation where the haunch of a pipe, conduit, tank or structure is located.

Haunching

(1) Material placed around piping, conduit, tank, or component for uniform structural support within the haunch zone; (2) placing backfill or embedment around a conduit or structure in an excavation such that the void area is stabilized.

Hay Bale Barrier

Hay bales placed in the path of sediment-laden runoff to filter out sediment as the runoff passes through them. For example, hay bales could be placed lengthwise, in single or double rows, around a construction site, forming a perimeter bank, to contain sediment within it. Each bale should be securely anchored and embedded into the soil to a depth of 10 cm.

Hazardous Air Pollutants

Toxic chemicals that cause serious health and environmental effects. Health effects include cancer, birth defects, nervous system problems, and death due to massive accidental releases such as occurred at the pesticide plant in Bhopal, India. Hazardous air pollutants are released by sources such as chemical plants, dry cleaners, printing plants, and motor vehicles (cars, trucks, buses, etc.).

Hazardous Atmosphere

Atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

Hazardous Waste

Hazardous waste is solid waste which poses specified health and environmental hazards Any waste that is potentially damaging to environmental health because of toxicity, ignitability, corrosivity, chemical reactivity, or other reasons.

Haze (Hazy)

A phenomenon that results in reduced visibility due to the scattering of light caused by aerosols. Haze is caused in large part by man-made air pollutants.

Head

(1) The height of the free surface of fluid above any point in a hydraulic system; a measure of the pressure or force exerted by the fluid. (2) The energy, either kinetic or potential, possessed by each unit weight of a liquid, expressed as the vertical height through which a unit weight would have to fall to release the average energy possessed. It is used in various compound terms such as pressure head, velocity head, and loss of head. (3) The upper end of anything, such as a head works. (4) The source of anything, such as a head-water. (5) A comparatively high promontory with either a cliff or steep face extending into a large body of water, such as a sea or lake. An unnamed head is usually called a headland. The height of water above any plane of reference. It determines the hydraulic head between the water surface and the plane of reference, which may cause the water to flow to the lower level.

Header

(1) A structure installed at the head or upper end of a gully to prevent overfall cutting. (2) A supply ditch for the irrigation of a field. (3) A large pipe installed to intercept the ends of a series of pipes; a manifold. (4) The closing plate on the end of a sewer lateral that will not be used immediately.

Head, Dynamic

Variable component of total dynamic head (TDH); comprised of friction head which fluctuates with piping diameter, system configuration, and flow rate.

Head, Elevation

Component of total dynamic head (TDH) described as the difference in elevation between the lowest effluent operational level in the dosing tank and the discharge point; the sum of elevation head and operating pressure constitutes the static head component of total dynamic head (TDH).

Head, Friction

Component of total dynamic head (TDH) described as the sum of all friction loss in the piping network and associated devices.

Head Gate

A gate at the entrance to a conduit such as a pipeline, penstock, or canal.

Head Loss

Energy losses resulting from the resistance of flow of fluids; may be classified into conduit surface and conduit form losses.

Head Space

(1) Volume between the invert of the outlet and the inside top of a septic tank; (2) volume between the alarm elevation and the inside top the tank which constitutes reserve volume in a dosing tank.

Head, Static

Fixed component of total dynamic head (TDH); expressed as the sum of elevation head and operating pressure.

Head, Total Dynamic (TDH)

Measure of the cumulative energy that a pump must impart to a liquid to move it from one point to another, consisting of the sum of friction head (as based upon piping diameter, system configuration, and flow rate) and static head (the sum of elevation head and operating pressure);

Head Wall

A watertight barrier at the entrance to a hydraulic structure. Its primary purpose is to prevent seepage from under mining the structure.

Height Difference

The vertical relationship between points on the earth's surface, which may be related to specific reference planes, such as sea level. In surveying, height difference is determined by reduction of leveling observations or trigonometric leveling.

Headwater(s)

(1) The source and upper reaches of a stream; also the upper reaches of a reservoir. (2) The water upstream from a structure or point on a

stream. (3) The small streams that come together to form a river. Also may be thought of as any and all parts of a river basin except the mainstream river and main tributaries.

Headwater Storage

The primary source of water for a Regulated Stream. Usually refers to a Dam but may be a Weir or an Off-take.

Headworks

(1) All the structures and devices located at the head or diversion point of a conduit or canal. The term as used is practically synonymous with diversion works; an intake heading. (2) The initial structures and devices of a water or wastewater treatment plant. The beginning of the treatment plant where the influent begins treatment.

Health Risk

The probability that exposure to a given set of toxic air contaminants will result in an adverse health effect. The health risk is affected by several factors: the amount and toxicity of emissions; the weather; how far sources are from people; the distance between sources; and the age, health and lifestyle of the people living and working at the receptor location. The term "risk" usually refers to the increased chance of contracting cancer as a result of an exposure and is expressed as a probability, e.g., chances-in-a-million.

Health Risk Assessment

A document that identifies the risks and quantities of possible adverse health effects that may result from exposure to emissions of toxic air contaminants. A health risk assessment cannot predict specific health effects; it only describes the increased possibility of adverse health effects based on the best scientific information available.

Heat-Affected Zone

That portion of the base metal that was not melted during brazing, cutting, or welding, but whose microstructure and mechanical properties were altered by the heat; Refers to area adjacent to a weld where the thermal cycle has caused microstructural changes which generally affect corrosion behavior.

Heat Exchanger

A device providing for the transfer of heat between two fluids (Fig. 12).

Heat Flow Rate

The rate at which heat moves from an area of higher temperature to an area of lower temperature. Btu/hr (W/hr). Heat flow is generally used to quantify the rate of total heat gain or heat loss of a system.

Heat Loss

Heat that is lost from a building through air leakage, conduction and radiation. To maintain a steady interior temperature, heat losses must be offset by a combination of heat gains and heat contributed by a heating system.

Heat Island

An urban area characterized by temperatures higher than those of the surrounding non-urban area. As urban areas develop, buildings, roads, and other infrastructure replace open land and vegetation. These surfaces absorb more solar energy, which can create higher temperatures in urban areas.

Heat Recovery Ventilation System

A mechanical ventilation system that recovers energy from exhausted indoor air and transfers it to incoming air. This system usually incorporates

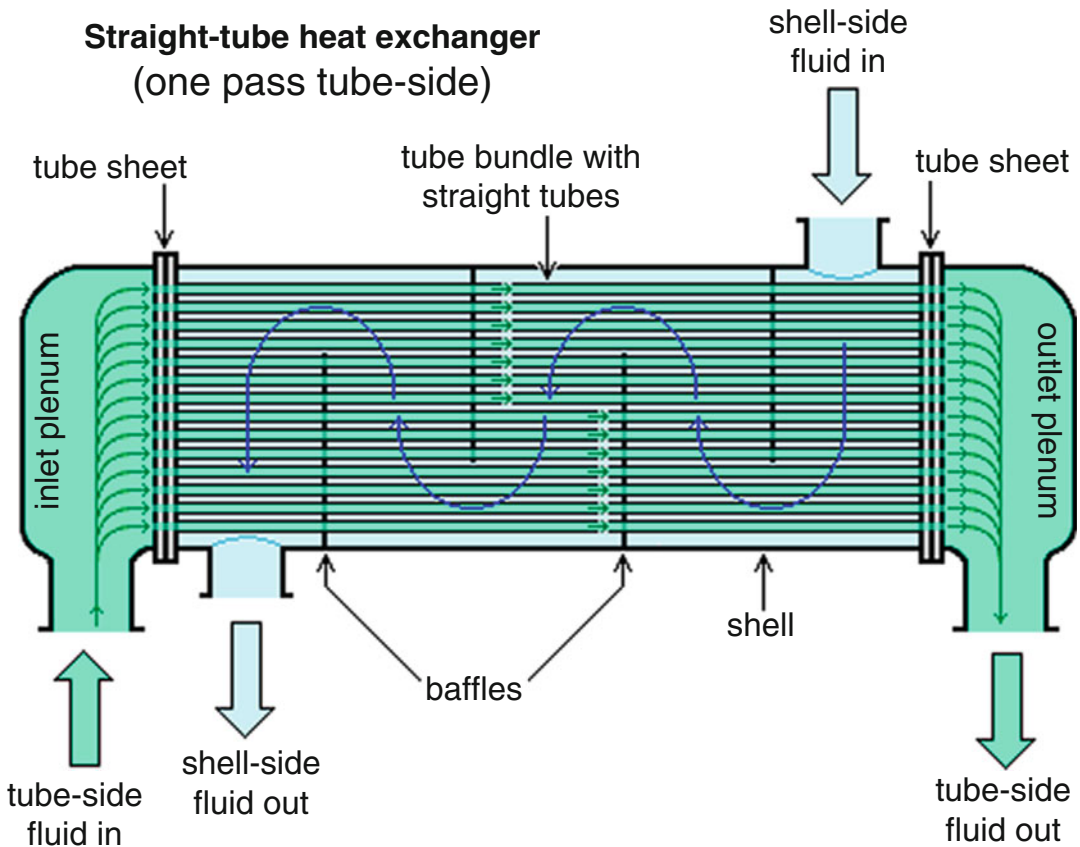


Fig. 12 Heat exchanger

an air-to-air heat exchanger which transfers the heat from exhaust air to the incoming air or vice versa.

Heat Transfer

Heat flow from a hot to a cold body (see CONVECTION, CONDUCTION and RADIATION).

Heat Treatment

A sludge conditioning process combining high temperature, time, and pressure to improve the dewaterability of organic sludge.

Heat Waves

A prolonged period of excessive heat, often combined with excessive humidity.

Heated Space

Building area supplied directly with heat.

Heavy Metals

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

that have high specific gravity and high atomic mass, such as lead, cadmium, zinc, copper, silver, and mercury. In sufficient concentrations, these metals are toxic to humans and aquatic life.

Height of Instrument (HI)

Elevation of the line of sight of the surveying instrument; determined by adding the Backsight (BS or +) to the known elevation of the point upon which the rod reading was taken, usually a bench mark or turning point.

Hematite

(1) An iron mineral crystallizing in the rhombohedral system; the most important are of iron. (2) An iron oxide, FeO, corresponding to an iron content of approximately 70%.

Henry's Law

The relationship between the partial pressure of a compound and the equilibrium concentration in the liquid through a constant of proportionality known as Henry's Law Constant.

Herbicide (Weedicide)

A chemical substance used for killing plants, usually weeds. Such substances are typically concentrated and have to be diluted with water prior to spraying on to the soil, the growing crop or an area infested with weeds. Herbicides act in a variety of ways and are commonly used to control weeds in a conservation tillage program. Their use is controlled by legislation which requires each herbicide to be registered for general or specific usage, details of which are set out on its container. The following main types are in use:

Selective Herbicide

A herbicide used to kill some plants but not others. It is usually applied to a growing crop in order to kill weeds without adversely affecting

the crop. Selectivity depends on the different growth habit, physiology or growth stage of the target weeds compared with that of the crop.

Non-Selective Herbicide

A herbicide used to kill all plant species in the area being treated.

Contact Herbicide (Desiccant Herbicide)

A herbicide which only affects those parts of plants with which it is in contact. Such herbicides can be either selective or non-selective in action, depending on the rate of absorption of the chemical and/or the growth habit of plants sprayed.

Translocated Herbicide

A herbicide which is applied to the exposed aerial parts of plants (leaves and stems) and is then absorbed and transferred via the plants' vascular system to roots and underground parts. They tend to have slower and more widespread effects than contact herbicides, which may include the destruction of chlorophyll, prevention of root growth, interference with growth buds and the movement of nutrients within the plant. They can be selective or non-selective in action, depending on the physiology of the plants sprayed.

Knockdown Herbicide

A herbicide typically applied to plant foliage and which is only active for a short duration. Such herbicides may be contact or translocated in their mode of action.

Residual Herbicide

A herbicide which is applied to the soil where it persists and from which it is taken up by germinating seedlings and established weeds. The period of activity is determined by the rate of application, the soil type and the susceptibility of the plants being controlled, but typically is much longer than that of a knockdown herbicide. The action of a residual herbicide may be selective or non-selective.

Pre-Emergent Herbicide

A herbicide which is applied to the soil surface after the crop has been sown, but before it emerges. Such herbicides are mainly selective residual or non-selective contact in action, but a few non-selective translocated herbicides are also available. Selective residual herbicides are incorporated by rain or, on rare occasions, by very shallow cultivation.

Pre-Sowing Herbicide

A herbicide which is applied to kill growing or germinating weeds prior to sowing of the crop. Such herbicides mainly include translocated and contact non-selective types or selective residual types which require rain or mechanical incorporation into the soil. Pre-sowing herbicides are often included with the pre-emergent group in the literature.

Post-Emergent Herbicide

A herbicide applied after the crop has emerged. Such herbicides are of the contact or translocated types which are selective in action.

Herbivore

Herbivore is an animal that eats plants or parts of plants.

Hermetic Seal

An impervious seal made by the fusion of metals or ceramic materials (as by brazing, soldering, welding, fusing glass or ceramic), which prevents the passage of gas or moisture.

Heterogeneous

Varying in structure or composition and having different properties in different locations or directions.

Heterotrophic Plate Count

Standard procedure for estimating the total number of live non-photosynthetic bacteria in water; colony-forming units (cfu) are counted after spreading an aliquot of a sample over a membrane or pour plate and incubating in an

amiable growth medium (agar) at an amiable temperature.

High-Performance Insulation

Fiber glass insulation with densely packed fibers, resulting in higher R-values for a given thickness. Most commonly used in confined spaces such as walls or cathedral ceilings.

High Priority Watershed

A watershed assigned to the category of nominal scaling associated with the greatest impacts to water quality for the criteria being ranked (i.e., total agriculture high priority watershed). When a criteria is not explicitly referenced with this term, the highest rank of the overall (total) NPS pollution assignment is implied.

High Seas

International ocean water under no single country's legal jurisdiction.

High Security

A form of Entitlement, hence Allocation, pertaining to a Regulated Stream for which the supply of water is guaranteed irrespective of circumstances. Usually applies to Town water Supplies and Irrigation of permanently established crops such as orchards.

High-Temperature Hydrogen Attack

A loss of strength and ductility of steel by high-temperature reaction of absorbed hydrogen with carbides in the steel resulting in *decarburization* and internal fissuring.

High Lift Pump Station

A High lift Pump Station is a pump station designed to pump treated water into the water reticulation system at pressure either directly or via a Water Tower.

Highly Migratory Fish

Fish that travel over great areas.

High-Purity Oxygen

A modification of the activated-sludge process using relatively pure oxygen and covered aeration tanks in a conventional flow arrangement.

High-Rate Aeration

A modification of the activated-sludge process whereby the mixed liquor suspended solids loadings are kept high, allowing high food-to-microorganism (F/M) ratios and shorter detention times.

Hillcrest

A very gently inclined to steep, smoothly convex crest, standing above a hillslope, usually representing the top of the interfluves between drainage lines. Hillcrest soils are typically shallow, and they are eroded mainly by sheet flow.

Hillock

A small hill incorporating a narrow crest and its adjoining slopes. The crest length is less than the width of the adjoining slopes.

Hobby Farm

A type of land development, irrespective of allotment size, involving some form of agricultural enterprise which is secondary to the owners main

line of business. Activities vary according to factors such as income, size of holding, knowledge of agricultural systems and the suitability of the holding for various agricultural enterprises. In a soil conservation context, judicious management strategies should be adopted to adequately provide for soil erosion control

Holding Tank Sewage System

System which combines or utilizes a holding tank with alarm, the services of a sewage pumper/hauler, and off-site treatment of the collected sewage.

Home Audit or Energy Audit

An assessment performed by an energy specialist in order to identify how a structure's energy efficiency can be improved. Many incentives or rebates require an audit be conducted before and after the improvements in order to verify savings.

Home Energy Audit

A thorough assessment of a home's thermal efficiency, often conducted free of charge by most utility companies.

Hood

An inlet device for an extraction system.

Horizon

A general term used to describe individual layers within.

Horizontal Interval

The horizontal distance from one soil conservation structure to another. For practical purposes when applied to banks no distinction is made

between true horizontal distance and the actual distance along the ground, as banks are not normally used on steep slopes where the difference would be significant.

Hot Corrosion

An accelerated corrosion of metal surfaces that results from the combined effect of oxidation and reactions with sulfur compounds and other contaminants, such as chlorides, to form a molten salt on a metal surface that fluxes, destroys, or disrupts the normal protective oxide. See also GASEOUS EROSION.

Hot Cracking

Also called solidification cracking hot cracking of weldments is caused by the segregation at grain boundaries of low-melting constituents in the weld metal. This can result in grain-boundary tearing under thermal contraction stresses. Hot cracking can be minimized by the use of low-impurity welding materials and proper joint design. See also COLD CRACKING, LAMELLAR TEARING, and STRESS-RELIEF CRACKING.

Hot Working

Deforming metal plastically at such a temperature and strain rate that crystallization takes place simultaneously with the deformation, thus avoiding any strain hardening. Contrast with cold working.

Hot Dip Coating

A metallic coating obtained by dipping the base metal into a molten metal.

Hot Shortness

A tendency for some alloys to separate along grain boundaries when stressed or deformed at temperatures near the melting point. Hot shortness is caused by a low-melting constituent, often present only in minute amounts, that is segregated at grain boundaries.

Household Hazards

Dangerous substances or conditions in human dwellings.

Hue

Measure of the chromatic composition (wavelength) of light that reaches the eye; one of the three variables of color.

Huey Test

Corrosion testing in a boiling solution of nitric acid. This test is mainly used to detect the susceptibility to inter-granular corrosion of stainless steel.

Humidity

A measure of the amount of water vapor in the atmosphere.

Humidity Test

A corrosion test involving exposure of specimens at controlled levels of humidity and temperature. Contrast with *salt-fog test*.

Humus

The more or less stable fraction of soil organic matter remaining after plant and animal residues have decomposed.

Humus Sludge

Sloughed particles of biomass from trickling media that are removed in the secondary clarifier.

Hydrated Lime

Limestone that has been “burned” and treated with water under controlled conditions until the calcium oxide portion has been converted to calcium hydroxide.

Hydraulic Conductivity

Measurement of the flow of liquid through an area perpendicular to the flow direction. The flow of water through soil per unit of energy gradient. For practical purposes it may be taken as the steady-state percolation rate of a soil when in filtration and infernal drainage are equal, measured as depth per unit time.

Hydraulic Efficiency

Characterizes the economic design and performance of a channel for carrying maximum flows with minimum cross-sectional area and low maintenance requirements consistent with low erosion hazard. The most efficient channels are (hose having a semi-circular cross-section.

However, in practical terms for the construction of vegetated channels, a trapezoidal shape most closely approximates that of a semi-circle in terms of hydraulic efficiency.

Hydraulic Head

The energy, either kinetic or potential, possessed by each unit weight of a liquid expressed as the vertical height through which a unit weight would have to fall to release the average energy possessed.

Hydraulic Jump (Standing Wave)

An abrupt rise occurring in the surface of a liquid when a high velocity flow discharges into a zone of lower velocity. It occurs in open channel flow and is accompanied by violent turbulence. May also be defined in terms of the sudden change from supercritical flow to sub-critical flow.

Hydraulic Loading

The amount of water applied to a given treatment process, usually expressed as volume per unit time, or volume per unit time per unit surface area.

Hydraulic Radius

The cross-sectional area of a stream of water divided by the length of that part of its periphery in contact with its containing conduit; the ratio of area to wetted perimeter. Also called hydraulic mean depth. The ratio of the cross-sectional area ‘A’ of a liquid flowing in a channel, to the wetted perimeter ‘P’ of that channel. $R = A/P$. Symbol R is in meters.

Hydro

Hydro is that which is produced by or derived from water or the movement of water, as in hydroelectricity.

Hydrocarbon

Any of the class of compounds consisting solely of carbon and hydrogen. Usually derived from petroleum. Compounds containing various combinations of hydrogen and carbon atoms. They may be emitted into the air by natural sources (e.g., trees) and as a result of fossil and vegetative fuel combustion, fuel volatilization, and solvent use. Hydrocarbons are a major contributor to smog.

Hydrochlorofluorocarbon (HCFC)

A chemical compound that would be a hydrocarbon except that one or more hydrogen atoms in each molecule is replaced by a chlorine atom and one or more hydrogen atoms is replaced by a fluorine atom. Some HCFCs are implicated in the destruction of stratospheric ozone.

Hydroelectric

Relating to electric energy produced by moving water.

Hydroelectric Power Water Use

The use of water in the generation of electricity at plants where the turbine generators are driven by falling water.

Hydrofluorocarbon (HCA)

A chemical compound that would be a hydrocarbon except that one or more hydrogen atoms in each molecule is replaced by a fluorine atom.

Hydrogen-Assisted Cracking (HAC)

Hydrogen embrittlement.

Hydrogen-Assisted Stress-Corrosion Cracking (HSCC)

Hydrogen embrittlement.

Hydrogen Blistering

The formation of blisters on or below a metal surface from excessive internal hydrogen pressure; Formation of blister-like bulges on a ductile metal surface caused by internal hydrogen pressures. Hydrogen may be formed during cleaning, plating, corrosion, and so forth.

Hydrogen Controlled Electrode

A covered electrode which when used correctly, produces less than a specified amount of diffusible hydrogen in the weld deposit.

Hydrogen Damage

At moderate temperatures, hydrogen damage can occur as a result of a corrosion reaction on a surface or cathodic protection. Atomic hydrogen diffuses into the metal and collects at internal voids or laminations where it combines to form more voluminous molecular hydrogen. In steels, blisters sometimes occur. At higher temperatures and pressures, atomic hydrogen can diffuse into steel and collect at grain boundaries. Either molecular hydrogen is then formed, or the hydrogen reacts with iron carbides to form methane, resulting in cracking and decarburization. Hydrogen cracking is Inter-granular and highly branched, but not continuous.

Hydrogen Disintegration

Deep internal cracks caused by hydrogen.

Hydrogen Embrittlement

A process resulting in a decrease of the *toughness* or *ductility* of a metal due to the presence of atomic hydrogen. Hydrogen embrittlement has been recognized classically as being of two types. The first known as internal hydrogen embrittlement, occurs when the hydrogen enters molten metal which becomes supersaturated with hydrogen immediately after solidification. The second type, environmental hydrogen embrittlement, results from hydrogen being absorbed by solid metals. This can occur during elevated-temperature thermal treatments and in service during electroplating, contact with maintenance chemicals, corrosion reactions, cathodic protection, and operating in high-pressure hydrogen. In the absence of residual stress or external loading, environmental hydrogen embrittlement is manifested in various forms, such as blistering, internal cracking, hydride formation, and reduced ductility. With a tensile stress or stress-intensity factor exceeding a specific threshold, the atomic hydrogen interacts with the metal to induce subcritical crack growth leading to fracture. In the absence of a corrosion reaction (polarized cathodically), the usual term used is hydrogen-assisted cracking (HAC) or hydrogen stress cracking (HSC). In the presence of active corrosion, usually as pits or crevices (polarized anodically), the cracking is generally called *stress-corrosion cracking* (SCC), but should more properly be called hydrogen-assisted stress-corrosion cracking (HSCC). Thus HSC and electrochemically anodic SCC can operate separately or in combination (HSCC). In some metals, such as high-strength steels, the mechanism is believed to be all, or nearly all, HSC. The participating mechanism of HSC is not always recognized and may be evaluated under the generic heading of SCC. Embrittlement of a metal caused by hydrogen; sometimes observed in cathodically protected steel, electroplated parts, pickled steel, etc. Hydrogen embrittlement process results decrease of toughness or ductility of a metal due to absorption of hydrogen.

Hydrogen-Induced Cracking (HIC)

Same as *hydrogen embrittlement*.

Hydrogen Ion Concentration [H+]

The weight of hydrogen ion in moles per litre of solution. Commonly expressed as the pH value, which is the logarithm of the reciprocal of the hydrogen ion concentration.

Hydrogen Overvoltage

Overvoltage associated with the liberation of hydrogen gas.

Hydrogen Probes

Probes designed to measure the permeation rate of atomic hydrogen H⁺ (measured as hydrogen gas H₂) associated with hydrogen-induced cracking.

Hydrogen Stress Cracking (HSC)

Hydrogen embrittlement.

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.

Hydrograph

Graphical representation of flow rate with respect to time. The area under the resulting curve represents the total amount of runoff from the rainfall event in question. The most common form of hydrograph is produced by a stage recorder. Equivalent data can be collected by digital

equipment and later transformed into a graphical form if required. Analysis of the data obtained by either method can be used to determine a range of hydrological characteristics such as peak discharge, maximum stream height and total volume of discharge. Knowledge of these characteristics is essential to the design of effective soil conservation works.

Hydrologic Cycle

The process of evaporation, vertical and horizontal transport of vapor, condensation, precipitation, and the flow of water from continents to oceans. It is a major factor in determining climate through its influence on surface vegetation, the clouds, snow and ice, and soil moisture. The hydrologic cycle is responsible for 25–30% of the mid-latitudes' heat transport from the equatorial to polar region. The continuous interchange of water between land, sea or other water surface and the atmosphere. It has neither beginning nor end, as water evaporates and is lifted, carried and temporarily stored in the atmosphere until it finally precipitates. The precipitated water may be intercepted or transpired by plants, may run off over the land surface or may infiltrate into the soil. Much of the intercepted water and runoff is returned to the atmosphere by evaporation. The infiltrated water may be temporarily stored as soil moisture and evapotranspired; percolate to deeper zones to be stored as groundwater which may be used by plants; flow out as springs; or seep into flow lines and once again evaporate into the atmosphere.

Hydrology

The study of water and water movement in relation to land and soil. In the soil conservation context it is concerned particularly with surface runoff and its effects in causing soil erosion.

Hydrolysis

(1) Decomposition or alteration of a chemical substance by water. (2) In aqueous solutions of electrolytes, the reactions of cations with water to produce a weak base or of anions to produce a weak acid.

Hydromulching

A procedure whereby a mixture of seed and fertilizer and/or mulching material is applied in a water slurry to exposed soil surfaces for revegetation purposes. The mulching material is applied at heavier rates than in hydro seeding in order to provide a layer of mulch to protect the soil surface and create a suitable microenvironment for germinating seeds. A colored dye is usually mixed into the slurry in order to observe areal coverage as the operation proceeds. Where heavy mulch applications are necessary, such as on a rocky surface, an initial application of seed and fertilizer (hydro seeding) followed by an application of mulch may be required to ensure success. Hydro mulching is a fast and efficient method of stabilizing disturbed areas immediately after construction operations are complete. It is particularly applicable on areas where a harsh growing environment occurs or where a low level of growth medium is present. Little prior treatment of the exposed surfaces is required except for runoff control, which is necessary to prevent the removal of material by surface flows.

Hydroseeder (Hydromulcher)

A machine used to facilitate hydro seeding or hydro mulching on sites remote from it. This is achieved by spraying the seed/fertilizer/mulch slurry directly on to the exposed surface through a pivoted nozzle. The machine is most frequently

used for batter stabilization, and the treatment of inaccessible sites or areas which cannot be sown using conventional agricultural machinery.

Hydroseeding

A procedure whereby a mixture of seed, fertilizer and mulching material as a carrier is applied in a water slurry to exposed soil surfaces for revegetation purposes. Common materials used as carrying agents are wood and paper pulp. A contoured dye is usually mixed into the slurry in order to observe areal coverage as the operation proceeds. Hydroseeding is a fast and efficient method of stabilizing disturbed areas immediately after construction operations are complete. It is particularly applicable where an adequate level of growth medium, such as respread topsoil, is present. Where such a medium is not present, hydro mulching is preferred. In both cases little prior treatment of the exposed surfaces is required except for runoff control, which is necessary to prevent the removal of material by surface flows.

Hydrophilic

Having an affinity for water. Contrast with *hydrophobic*.

Hydrophobic

Lacking an affinity for, repelling, or failing to absorb or adsorb water. Contrast with *hydrophilic*.

Hydropower

Energy or power produced by moving water.

Hydrosphere

The component of the climate system comprising liquid surface and subterranean water, such as: oceans, seas, rivers, fresh water lakes, underground water, etc.

Hydraulic Conductivity

The constant of proportionality in Darcy's law relating the rate of flow of water through a cross-section of porous medium in response to a hydraulic gradient. Also known as the coefficient of permeability, hydraulic conductivity is a function of the intrinsic permeability of porous medium and the kinematic viscosity of the water which flows through it. Hydraulic conductivity has units of length per time (cm/sec).

Hydraulic Gradient

The change in piezometric head between two points divided by the horizontal distance between the two points, having dimensions of length per length (cm/cm). See PIEZOMETRIC HEAD.

Hydrograph

A hydrograph is a graph that shows the flow of a stream over time. The stream can be creek or river flows, as well as sewage flow.

Hydrologic Cycle

The movement of water in and on the earth and atmosphere through processes such as precipitation, infiltration, runoff, and evaporation.

Hydrolysis

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

Hydrostatic Level

The level or elevation to which the top of a column of water would rise from an artesian aquifer or basin, or from a conduit under pressure.

Hygroscopic

(1) Possessing a marked ability to accelerate the condensation of water vapor; applied to condensation nuclei composed of salts that yield aqueous solutions of a very low equilibrium vapor pressure compared with that of pure water at the same temperature. (2) Pertaining to a substance whose physical characteristics are appreciably altered by effects of water vapor. (3) Pertaining to water absorbed by dry soil minerals from the

atmosphere; the amounts depend on the physiochemical character of the surfaces, and increase with rising relative humidity.

Hypochlorination

The use of sodium hypochlorite (NaOCl_2) for disinfection.

Hypochlorite

Calcium, sodium, or lithium hypochlorite.

Hypoxia

The depletion of dissolved oxygen in water, a condition resulting from an overabundance of nutrients of human or natural origin that stimulates the growth of algae, which in turn die and require large amounts of oxygen as the algae decompose. It was the most frequently cited direct cause of fishkills in the U.S. from 1980 to 1989.

I&A

Innovative and Alternative. A term defined by the EPA to describe non-conventional technologies. "Alternative systems" are fully proven systems that reclaim or reuse wastewater, productively recycle wastewater components, recover energy, or eliminate the discharge of pollutants. A variety of wastewater treatment systems have been included in the definition, including land treatment, aquaculture, containment ponds, and on-site treatment using small diameter or vacuum sewers.

IAQ

Indoor Air Quality.

Ice Core

A cylindrical section of ice removed from a glacier or an ice sheet in order to study climate patterns of the past. By performing chemical analyses on the air trapped in the ice, scientists can estimate the percentage of carbon dioxide and other trace gases in the atmosphere at a given time. Analysis of the ice itself can give some indication of historic temperatures.

Illite

Clay material comprising a group of aluminosilicate mica minerals of indefinite chemical composition with a 2:1 crystal lattice structure. Its properties are generally intermediate between those of kaolinite and montmorillonite.

Illuviation

The process of deposition of soil material in the lower horizons of a soil as a result of its removal from upper horizons through eluviation. Materials deposited may include clay, organic matter and iron and aluminum oxides.

Imhoff Cone

A cone-shaped graduated vessel used to measure the volume of settleable solids in various liquids of wastewater origin during various settling times.

Immediate Oxygen Demand (IOD)

Immediate oxygen demand (IOD) is the amount of oxygen that is utilized by the components of a wastewater within 15 minutes (unless otherwise

specified) after being introduced into water that contains dissolved oxygen.

Immersion Plating

Depositing a metallic coating on a metal immersed in a liquid solution, without the aid of an external electric current. Also called dip plating.

Immunity

A state of resistance to corrosion or anodic dissolution of a metal caused by thermodynamic stability of the metal.

Impact

A collision of two particles with each other or of a particle with a solid or liquid surface.

Impact Block

A solid block of concrete, or similar permanent material which is located in the path of flowing water to function as an energy dissipater.

Impact Resistance

Capability of an insulation material and/or finish to withstand mechanical or physical abuse.

Impaction

The action of particles entering into contact with a surface.

Impaired Water

Water that is not meeting the state water quality standard; water with fish or shellfish harvesting prohibition by the Virginia Department of Health (VDH); and water where biological monitoring indicates moderate or severe impairment.

Impedance, Resistance, and Reactance

The relationship between impedance, resistance, and reactance is given by the following equation:

$$Z = R + jX$$

where Z =impedance (Ω), R =resistance (Ω), X =reactance (Ω), and j is the imaginary unit.

Impeller

A rotating set of vanes designed to impel rotation of a mass of fluid.

Impermeable

Not permitting the passage of fluid through pores; in practical terms, some small level of hydraulic conductivity may occur, but at so low a level (e.g., 1×10^{-7} cm/s) that it is considered to be negligible.

Impermeable Layer

A layer of solid material, such as rock or clay, which does not allow water to pass through.

Impervious

Resistant to penetration or passage by fluids or by roots. IMPERVIOUS describes a soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to water and air all the time.

Impervious Cover

A surface composed of any material that significantly impedes or prevents natural infiltration of water into soil—includes (but not limited to) roofs, buildings, streets, parking areas and any concrete, asphalt, or compacted gravel surface.

Impingement Corrosion

A form of *erosion-corrosion* generally associated with the local impingement of a high-velocity. Flowing fluid against a solid surface.

Impoundment

An artificial collection or storage of water, as a reservoir, pit, dugout, sump, etc.

Impressed Current

An electric current supplied by a power source that is external to the electrode system. (An example is DC current for cathodic protection.)

Impressed Current Protection

Cathodic protection of structures, where the cathodic polarization of metal is secured by electric currents emitted from an independent source.

Incineration

Combustion or controlled burning of volatile organic matter in sludge and solid waste reducing the volume of the material while producing heat, dry inorganic ash, and gaseous emissions. Incineration is the burning of household or industrial waste in a combustion chamber. A treatment technology involving destruction of waste by controlled burning at high temperatures; e.g., burning sludge to remove the water and reduce the remaining residues to a safe, non-burnable ash that can be disposed of safely on land, in some waters, or in underground locations.

Incinerator

A furnace or apparatus for incineration.

Incised Drainage Channel

A channel in the land surface having distinct bed and banks and which carries perennial or ephemeral water flows. Normally used in the context of mapping landform where a distinction between types of flow lines is not required.

Inclusions

Particles of foreign material in a metallic matrix. The particles are usually compounds (such as oxides, sulfides, or silicates), but may be of any substance that is foreign to (and essentially insoluble in) the matrix.

Incubation Period

A period prior to the detection of corrosion while the metal is in contact with a corrodent.

Index

(1) An indicator, usually numerically expressed, of the relation of one phenomenon to another. (2) An indicating part of an instrument.

Indicator

(1) A device that shows by an index, pointer, or dial the instantaneous value of such quantities as depth, pressure, velocity, stage, or the movements or positions of water-controlling devices; a gauge. See also RECORDER. (2) A substance giving a visible change, usually of color, at a desired point in a chemical reaction, generally at a prescribed end point.

Indirect Emissions

Indirect emissions from a building, home or business are those emissions of greenhouse gases that occur as a result of the generation of electricity

used in that building. These emissions are called “indirect” because the actual emissions occur at the power plant which generates the electricity, not at the building using the electricity.

Indicator Gauge

A gauge that shows, by means of an index, pointer, or dial the instantaneous value of such characteristics as depth, pressure, velocity, stage, discharge, or the movements or positions of waste-controlling devices. See also INDICATOR, RECORDER.

Indicator Organism

Organism that can be readily detected, the presence of which infers the presence of other microorganisms (e.g., fecal coliform bacteria is an indicator of probable presence of pathogens).

Indirect Source

Any facility, building, structure, or installation, or combination thereof, which generates or attracts mobile source activity that results in emissions of any pollutant (or precursor) for which there is a state ambient air quality standard. Examples of indirect sources include employment sites, shopping centres, sports facilities, housing developments, airports, commercial and industrial development and parking lots and garages.

Indirect Source Control Program

Rules, regulations, local ordinances and land use controls, and other regulatory strategies of air pollution control districts or local governments used to control or reduce emissions associated with new and existing indirect sources. Indirect source control programs include regulatory strategies such as transportation control measures; parking charges; land use controls that reduce the need for vehicle travel and increase transit, bicycle, and

pedestrian access; and source-specific regulations such as truck idling and travel schedule requirements.

Individual Cancer Risk

The probability, expressed as chances in a million, that a person experiencing 70 years of continuous area-wide outdoor exposure to a toxic air contaminant will develop cancer.

Individual Daily Extraction Limit (IDEL)

The volume of water that may be extracted, by an individual access licence, from an unregulated river, on a daily basis from a particular flow class.

Indoor Air Pollution

Air pollutants that occur within buildings or other enclosed spaces, as opposed to those occurring in outdoor, or ambient air. Some examples of indoor air pollutants are nitrogen oxides, smoke, asbestos, formaldehyde, and carbon monoxide.

Indurated

Rendered hard. Refers to the hardening of sediments into rock or soil layers into pans by heat and/or pressure and/or cementation.

Industrial Atmosphere

An atmosphere in an area of heavy industry with soot, fly ash, and sulfur compounds as the principal constituents.

Industrial Ecology

Industrial Ecology (IE) focuses on combining perpetually desirable outcomes in environment, economy and technology sustainably. The primary tenet

is that all systems mimic nature and are thus closed loop, continuous, circular. In wastewater treatment industrial ecology would mean that all so called “waste” is re-input into the same or other process. For example, biosolids as fertilizer can be considered a use of sludge consistent with industrial ecology. Recycling wastewater into the treatment plant, manufacturing or other process is another example. Industrial Ecology (IE) focuses on combining perpetually desirable outcomes in environment, economy and technology sustainably. The primary tenet is that all systems mimic nature and are thus closed loop, continuous, circular. In wastewater treatment industrial ecology would mean that all so called “waste” is re-input into the same or other process. For example, biosolids as fertilizer can be considered a use of sludge consistent with industrial ecology. Recycling wastewater into the treatment plant, manufacturing or other process is another example.

Industrial Revolution

A period of rapid industrial growth with far-reaching social and economic consequences, beginning in England during the second half of the eighteenth century and spreading to Europe and later to other countries including the United States. The industrial revolution marks the beginning of a strong increase in combustion of fossil fuels and related emissions of carbon dioxide.

Industrial Sources

Non-municipal, or industrial sources, often generate wastewater that is discharged to surface waters. The types of wastewaters generated at a facility depend on the specific activities undertaken at a particular site, and may include manufacturing or process wastewaters, cooling waters, sanitary wastewater, and stormwater runoff.

Industrial Wastes

The solid and liquid wastes originating from industrial processes.

Industrial Wastewater

Wastewater derived from industrial sources or processes.

Industrial Wastewater Treatment

Wastewater treatment for industries such as manufacturing, food processing, corrugators, printing and so on. Paper and pulp mills’ treatment of wastewater is an example of industrial wastewater treatment. Municipal wastewater treatment would be an example not considered to be industrial.

Industrial Water Use

Water used for industrial purposes in such industries as steel, chemical, paper, and petroleum refining. Nationally, water for industrial uses comes mainly (80%) from self-supplied sources, such as a local wells or withdrawal points in a river, but some water comes from public-supplied sources, such as the county/city water department.

Industrialized Countries

Nations whose economies are based on industrial production and the conversion of raw materials into products and services, mainly with the use of machinery and artificial energy (fossil fuels and nuclear fission); generally located in the northern and western hemispheres (e.g., U.S., Japan, the countries of Europe).

Inert Anode

An *anode* that is insoluble in the *electrolyte* under the conditions prevailing in the *electrolysis*.

Inert Gas

A gas such as helium, neon, or argon that does not react with other substances under ordinary conditions.

Infection

Introduction of presence of pathogenic organisms in potable water supply. This is determined in two ways:

(1) *Bacterial count*: Number of bacteria developed under controlled conditions after 25 hours incubation period. In unpolluted waters count is frequently less than 10 per millilitre.

(2) *Coliform Index*: *Escherichia Coli* is an organism normally found in intestinal tract of man and animals but rare elsewhere. Indicators of this organism family most reliable as index of pollution, purification efficiency and potability of water.

Infectious Hepatitis

An acute viral inflammation of the liver characterized by jaundice, fever, nausea, vomiting, and abdominal discomfort; may be waterborne.

Infective Dose

Number of microorganisms that would initiate an immunological response by a host.

Infiltrability

A general term used to describe the capacity of the soil to take in water at its surface, depending largely on surface texture and structure.

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. The downward movement of water through a soil from rainfall or from the application of artificial recharge in response to gravity and capillarity.

(1) The flow or movement of water through the interstices or pores of a soil or other porous medium. (2) The quantity of groundwater that leaks into a pipe through joints, porous walls, or breaks. (3) The entrance of water from the ground into a gallery. (4) The absorption of liquid by the soil, either as it falls as precipitation or from a stream flowing over the surface. (5) Uncontrolled leakage of air into a building through cracks around doors, windows, electrical outlets and at structural joints. The downward movement of water into the soil. It is largely governed by the structural condition of the soil, the nature of the soil surface including presence of vegetation, and the antecedent moisture content of the soil.

Infiltration Basin

An excavation in highly permeable soils to temporarily store runoff directed into it. The stored water drains by infiltrating into the soil, thereby reducing runoff from the adjacent site. Such basins are normally excavated at or very close to the source of runoff, and are typically used on individual residential, commercial or industrial allotments.

Infiltration Facility

A stormwater management facility that temporarily impounds runoff and discharges it via infiltration through the surrounding soil—may be equipped with an outlet structure to discharge impounded runoff, such discharge is normally reserved for overflow and other emergency conditions (infiltration basin, infiltration trench, infiltration dry well, and porous pavement are considered infiltration facilities).

Infiltration/Inflow

The total quantity of water from both infiltration and inflow without distinguishing the source.

Infiltration Rate

The rate at which water moves downward into the soil at any given time. It is measured as volume flux per unit of surface area, in units of mm/h. Runoff occurs when the rainfall rate exceeds the infiltration rate for a given soil condition. The saturated (or 'steady-state') infiltration rate is the rate which occurs when the soil is saturated and infiltration and drainage are equal.

Infiltrative Surface

Designated interface where effluent moves from distribution media or a distribution device into treatment media.

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. In relation to sanitary sewers, the extraneous flow that enters a sanitary sewer from sources other than infiltration, such as roof leaders, basement drains, land drains, and manhole covers. See also INFILTRATION.

Inflow and Infiltration

Inflow and Infiltration is water entering the sewer system through cracked pipes or leaky manholes.

Influent

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

treatment plant. The untreated wastewater or raw sewage coming into a wastewater treatment plant. iWater, wastewater, or other liquid flowing into a reservoir, basin, treatment plant, or treatment process. See also EFFLUENT.

Influent Quality

Physical, biological, and chemical characteristics of the liquid flowing into a system component or device.

Influent Screens

Screens used to remove large inorganic solids from the waste stream.

Infrared Radiation

Infrared radiation consists of light whose wavelength is longer than the red color in the visible part of the spectrum, but shorter than microwave radiation. Infrared radiation can be perceived as heat. The Earth's surface, the atmosphere, and clouds all emit infrared radiation, which is also known as terrestrial or long-wave radiation. In contrast, solar radiation is mainly short-wave radiation because of the temperature of the Sun.

Infrasonic

The sound of frequency less than 20 HZ.

Infrastructure

Infrastructure includes, but is not limited to, (1) a flow gauging device or any other appliance that is used to measure the height of a river relative to a known datum point, from which the flow in the river can be calculated, or (2) a flow announcement system which is the mechanism by which the Minister communicates daily flow classes to the holders of an access license within this water source.

Inhalable Particles

All dust capable of entering the human respiratory tract.

Inhibitor

A chemical substance or combination of substances that, when present in the proper concentration and forms in the environment, prevents or reduces corrosion.

Inhibitory Substances

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

Initial Allocation Announcement

See ALLOCATION ANNOUNCEMENT. This is the basis upon which Water Allocation is calculated at the beginning of each Water Year. It is expressed as a percentage of Entitlement. See also SUPPLEMENTARY ANNOUNCEMENT.

Injection Well

Well by which effluent is transmitted to an underground formation; in most cases these are regulated and require a permit from a regulatory authority.

Inlet

(1) A surface connection to a drain pipe. (2) A structure at the diversion end of a conduit. (3) The upstream end of any structure through which water may flow. (4) A form of connection between the surface of the ground and a drain or sewer for the admission of surface or stormwater. (5) An intake. The entrance of any structure through which water may flow. It may be a simple grate at the entrance to a pipe, a complete entrance structure such as in

a drop inlet curvet, or merely the entry point at which water flows into a channel.

Inlet Chamber

An Inlet Chamber is a chamber designed to receive a water from a reservoir.

Inlet Control

Control of the relationship between headwater elevation and discharge by the inlet or upstream end of any structure through which water may flow.

Inoculation

The introduction of a pure or mixed culture of microorganisms into the soil. This is usually achieved by mixing the inoculants with the seed at sowing time or by coating the seed with it prior to sowing. The aim of this procedure is to enhance the germination and/or growth of plants. It is typically used to improve legume stands by introducing the appropriate inozobia, which are nitrogen-fixing bacteria associated with legumes.

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". All those combinations of elements that do not include organic carbon. Being or composed of matter other than hydrocarbons and their derivatives, or matter that is not of plant or animal origin. Contrast with *organic*.

Inorganic Gaseous Pollutant

A gaseous pollutant that is not an organic compound. Examples are: sulfur dioxide, hydrogen sulfide and nitrogen oxides.

Inorganic Material

Material that will not respond to biological action (sand, cinders, stone). Non-volatile fraction of solids.

Inorganic Matter

Mineral-type compounds that are generally non-volatile, not combustible, and not biodegradable. Most inorganic-type compounds or reactions are ionic in nature; therefore, rapid reactions are characteristic.

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.

Inorganic Zinc-Rich Paint

Coating containing a zinc powder pigment in an *inorganic* vehicle.

In Situ

A term meaning 'in place'. Normally applied to rocks, fossils and soils which are situated in the place where they were originally formed or deposited. When used to describe soils, it usually refers to those formed directly from and on bedrock. As with other latin words, the term should be printed in italics thus 'in situ'.

In Situ Treatment

In situ treatment means treatment of the soil in place, i.e., they are not dug up. The excavation of contaminated soils usually adds significant expense to a site remediation.

Insecticides

Substances used to kill insects and prevent infestation.

Insolation

Insolation is the solar radiant energy received by the earth.

Inspection

Evaluation of and reporting on the status of a wastewater treatment system.

Inspection and Maintenance Program (I/M Program)

Auto inspection programs that are required for some polluted areas. These periodic inspections, usually done once a year or once every two years, check whether a car is being maintained to keep pollution down and whether emission control systems are working properly. Vehicles that do not pass inspection must be repaired. Enhanced I/M programs, using special machines to check for such things as how much pollution a car produces during actual driving conditions, are required for some severely polluted areas.

Inspector

Service provider who evaluates and reports upon the status of a wastewater treatment system.

Instability Hazard

The susceptibility of the land surface to displacement by mass movement. Usually related to the occurrence of unstable soils and landforms. For example a high instability hazard would exist in a slip-prone area.

Install

To put in place or construct any portion of a wastewater treatment system.

Installer

Service provider who is compensated to construct a wastewater treatment system.

Installation

Assembly and placement of components of a system, including final site grading and establishment of an appropriate cover.

Instrument Height

Generally the difference in height between the telescope axis of the instrument and its plumbed ground mark. It can, however, be relative (vertically) to an adjacent reference mark.

Instrumentation

Use of technology to control, monitor, or analysed physical, chemical, or biological parameters.

Insulate

To cover with a material of low conductivity in order to reduce the passage or leakage of heat, reduce the surface temperature, or reduce the noise emanating from the object.

Insulated Ceiling (I.C.)

Marking on recessed lighting fixture indicating it is designed for direct insulation contact.

Insulating Cement

A mixture of various insulating fibers and binders with water to form a mouldable paste insulation for application to fittings, irregular surfaces or voids.

Insulation

Materials with low thermal conductivity characteristics that are used to slow the transfer of heat.

Insulation (Thermal)

Those materials or combination of materials that slow the flow of heat.

Insulation Density

One factor determining R-Value; higher density equates to better insulating properties.

Insulation Removal

The process of removing installed insulation due to the formation of mildew and mold.

Integrated Mapping Unit

A map unit relating to a number of individual and resource attributes in a composite form such that particular features of those individual attributes are not necessarily immediately identified but can still be derived. The use of integrated mapping units facilitates evaluation of resource data by relating individual attributes to each other or in various combinations whilst still enabling individual attribute maps to be derived. Using an integrated mapping unit system for collecting data is less time-consuming than mapping each individual resource separately.

Intensity of Rain

Depth of rainfall divided by duration.

Interception Loss

Describes that portion of rainfall which is caught by vegetation but subsequently evaporates.

Interception Storage

Describes that portion of rainfall which is caught and stored on vegetation. In forests interception can amount to 10–15 mm while in crops it may be only 0.5–1 mm. The rate of interception is initially high but the available capacity is rapidly tilled so its ability to reduce runoff rates within a given catchment is relatively small.

Intercrystalline Corrosion

Intergranular corrosion.

Intercrystalline Cracking

Intergranular cracking.

Interdendritic Corrosion

Corrosive attack that progresses preferentially along interdendritic paths. This type of attack results from local differences in composition, such as coring commonly encountered in alloy castings.

Interfacial Tension

Phenomena occurring at the interface of a liquid and gas where the liquid behaves as if it were covered by an elastic membrane in a constant state of tension. The tension is due to unbalanced attractive forces between the liquid molecules at the liquid surface.

Intergranular

Between crystals or grains. Also called intercrystalline. Contrast with *transgranular*.

Intergranular Corrosion

Metals are composed of grains or crystals which form as solidification occurs. A crystal grows until it meets another advancing crystal. The regions of disarray between crystals are called grain boundaries, which differ in composition from the crystal center. Intergranular corrosion is the selective attack of the grain boundary or an adjacent zone. The most common example of intergranular corrosion is that of sensitized austenitic stainless steels in heat affected zones at welds. Intergranular corrosion usually leaves the surface roughened, but definite diagnosis must be made by microscopic examination. Corrosion which occurs preferentially at grain boundaries.

Intergranular Cracking

Cracking or fracturing that occurs between the grains or crystals in a polycrystalline aggregate. Also called intercrystalline cracking. Contrast with *transgranular cracking*.

Intergranular Fracture

Brittle fracture of a metal in which the fracture is between the grains, or crystals, that form the metal. Also called intercrystalline fracture. Contrast with *transgranular fracture*.

Intergranular Stress-Corrosion Cracking (IGSCC)

Stress-corrosion cracking in which the cracking occurs along grain boundaries.

Interlock

A means of tying one or more circuits to another. It may be mechanical in nature but more likely involves the use of relays or solid state components.

Intergovernmental Panel on Climate Change (IPCC)

The IPCC was established jointly by the United Nations Environment Programme and the World Meteorological Organization in 1988. The purpose of the IPCC is to assess information in the scientific and technical literature related to all significant components of the issue of climate change. The IPCC draws upon hundreds of the world's expert scientists as authors and thousands as expert reviewers. Leading experts on climate change and environmental, social, and economic sciences from some 60 nations have helped the IPCC to prepare periodic assessments of the scientific underpinnings for understanding global climate change and its consequences. With its capacity for reporting on climate change, its consequences, and the viability of adaptation and mitigation measures, the IPCC is also looked to as the official advisory body to the world's governments on the state of the science of the climate change issue. For example, the IPCC organized the development of internationally accepted methods for conducting national greenhouse gas emission inventories.

Intermediate

A term used to describe a perennial or annual plant, the abundance of which in a particular soil-vegetation association changes with increasing grazing pressure, initially by increasing its abundance but subsequently decreasing under heavy grazing.

Intermediate Sight

The sight taken after a back sight has been observed and before a foresight is taken. Intermediate sights are not taken to change

points. If a point being observed is an important one, the observation should be booked as a fore sight so that the observation is included in the mathematical check of the leveling operation.

Intermittent Chlorination

A technique of non-contiguous chlorination used to control biological fouling of surfaces in fresh-water circuits, particularly those used for heat transfer.

Intermittent Filter

A natural or artificial bed of sand or other fine-grained material to the surface of which wastewater is applied intermittently in flooding doses and through which it passes; filtration is accomplished under aerobic conditions.

Internal Combustion Engine

An engine in which both the heat energy and the ensuing mechanical energy are produced inside the engine. Includes gas turbines, spark ignition gas, and compression ignition diesel engines.

Internal Drainage (Profile Drainage)

The rate of downward movement of water through the soil governed by both soil and site characteristics. It is assessed in terms of soil water status and the length of lime horizons remain wet (soil bolus exudes water when squeezed). It can be difficult to assess in the field and cannot be based solely on soil profile morphology.

Vegetation and topography may be useful guides. Soil permeability, ground water level and seepage are also important. The presence of mottling often, but not always, reflects poor drainage.

Categories are as follows: Very poorly drained: Free water remains at or near the surface for most of the year. Soils are usually strongly p/eyed. Typically a level or depressed site and/or a clayed soil.

Poorly drained: All soil horizons remain wet for several months each year. Soils are usually gleyed. Strongly mottled and/or have orange or rusty linings of root channels.

Imperfectly drained: Some soil horizons remain wet for periods of several weeks. Subsoils are often mottled and may have orange or rusty linings of root channels.

Moderately well drained: Some soil horizons may remain wet for a week after water addition. Soils are often whole colored but may be mottled at depth and of medium to clayed texture. **Wet drained:** No horizon remains wet for more than a few hours after water addition. Soils are usually of medium texture and not mottled. **Rapidly drained:** No horizon remains wet except shortly after water addition. Soils are usually of coarse texture, or shallow, or both, and are not mottled.

Internal Oxidation

The formation of isolated particles of corrosion products beneath the metal surface. This occurs as the result of preferential oxidation of certain alloy constituents by inward diffusion of oxygen, nitrogen, sulfur, and so forth.

International Air Pollution

Pollution that moves across national borders. The 1990 Clean Air Act includes provisions for cooperative efforts to reduce pollution that originates in one North American country and affects another.

Intumescence

The swelling or bubbling of a coating usually because of heating (term currently used in space and fire protection applications).

Inundation

The submergence of land by water, particularly in a coastal setting.

Invader

A term used to describe a plant capable of establishing on new sites and subsequently dominating those areas on which it was formerly scarce or absent. The invasion usually occurs as a result of some change in land management such as grazing pressure, cropping or fire.

Inventory

A detailed list showing quantities, descriptions, and values of property. It may also include units of measure and unit prices. The term is often confined to consumable materials but may also cover fixed assets. When an inventory covers all property of the enterprise and is priced as of a certain date, it is known as an appraisal.

Inversion

A layer of warm air in the atmosphere that prevents the rise of cooling air and traps pollutants beneath it. Inversion is the phenomenon of a layer of warm air pressing down on cooler air below it. Inversions are a special problem because they prevent the natural dispersion and dilution of air contaminants.

Invert

Elevation of the bottom of the inside pipe wall or fitting. The lowest portion of the internal surface of a channel or pipe. Where trick/e flows occur in earth channels, the invert may have to be lined with concrete or similar material to prevent erosion.

Ion

A charged atom, molecule, or radical that affects the transport of electricity through an electrolyte or, to a certain extent, through a gas. An atom or molecule that has lost or gained one or more electrons.

An atom, or group of atoms, that has gained or lost one or more outer electrons and thus carries an electric charge. Positive ions, or *cations*, are deficient in outer electrons. Negative ions, or *anions*, have an excess of outer electrons.

Ion Erosion

Deterioration of material caused by ion impact.

Ion Exchange

The reversible interchange of ions between a liquid and solid, with no substantial structural changes in the solid. (1) A chemical process involving reversible interchange of ions between a liquid and a solid, but no radical change in structure of the solid. (2) A chemical process in which ions from two different molecules are exchanged. (3) The reversible transfer or sorption of ions from a liquid to a solid phase by replacement with other ions from the solid to the liquid. See also REGENERATION.

Iron (Fe)

Iron is a vital metal for human beings, for example, the iron in red blood cells helps to bind the oxygen in the blood. Negative effects can be created by iron-oxide particles in smoke from iron-processing industries which are thought to produce a benign form of pneumoconiosis, which can in turn increase the risk of lung cancer.

Iron Rot

Deterioration of wood in contact with iron-based alloys.

Irrigation

The artificial application of water to lands to meet the water needs of growing plants not met by rainfall.

Irrigation Channel

An irrigation channel is an open channel that transports water in order to irrigate agricultural land.

Irrigation Requirement

The quantity of water, exclusive of precipitation, that is required for crop production. It includes surface evaporation and other economically unavoidable water waste.

Irrigation Return Water

Drainage water from irrigated farmlands, generally containing high concentrations of dissolved salts and other materials that have been leached out of the upper layers of the soil.

Irrigation Water Use

Water application on lands to assist in the growing of crops and pastures or to maintain vegetative growth in recreational lands, such as parks and golf courses.

Irritant

A substance that causes irritation of the skin, eyes, or respiratory system. Effects may be acute from a single high-level exposure, or chronic from repeated low-level exposures to such compounds as chlorine, nitrogen dioxide, and nitric acid.

Isohyet

A line on a map joining centers which receive equal amounts of rainfall.

ISO 14001

An eco management standard. Whereas EMAS only applies within the European Union (EU), ISO 14001 is international and is used by companies

both within and outside the EU. ISO 14001 is one of a “family” of international standards governing the environment. Work on developing other standards for areas such as environmental audits, environmental performance, eco labelling and life cycle assessments is in progress. See also ECO MANAGEMENT SYSTEMS. ISO 14001 is often used in environmental discussions between suppliers and customers.

Isoconcentration

More than one sample point exhibiting the same isolated concentration.

Iso corrosion Diagram

A graph or chart that shows constant corrosion behavior with changing solution (environment) composition and temperature.

Isokinetic Sampling

Sampling at such a rate that the average velocity of the gas entering the sample nozzle is the same as that of the gas in the duct at the sampling point.

Isovel

A line representing points of equal velocity. Isovels are used to graphically demonstrate the distribution of flow velocities in channels.

J

Jacket

A form of facing applied over insulation. It may be integral with the insulation, or field applied using sheet materials. Jacket is a covering placed over insulation for various functions.

Jacketed Pump

A pump equipped with jackets around the cylinders, heads, and stuffing boxes through which steam or other heat may be forced to permit the handling of such materials as pitch, resin, and asphalt that are solid when cold but melt on heating; when the pump handles materials at high temperatures, cold water may be substituted for steam or heat.

Jackson Turbidity Unit (JTU)

A standard unit of turbidity based on the visual extinction of a candle flame when viewed through a column of turbid water containing suspended solids. It varies with the solids composition (barium sulfate, diatomaceous earth, and so on). The JTU has largely been replaced by the more reproducible nephelometric turbidity unit.

Jar Test

A laboratory procedure for evaluating coagulation, flocculation, and sedimentation processes in a series of parallel comparisons.

Jet

The stream of water under pressure issuing from an orifice, nozzle, or tube.

Joint

(1) A surface of contact between two bodies or masses of material of like or different character or composition. (2) A connection between two lengths of pipe, made either with or without the use of a third part. (3) A length or piece of pipe.

Joint Implementation

Joint implementation is a concept where industrialized countries meet their obligations for reducing their greenhouse gas emissions by receiving credits for investing in emissions reductions in developing countries.

JTU

The Jackson Turbidity Unit (JTU) is a measurement of the cloudiness in water caused by stirred sediments.

Jump Up

The term jump up, which is also known as vertical riser, is often used to describe a sewerage house connection branch.

K

Kaolinite

Clay material comprising a group of aluminosilicate minerals with a $1:1$ crystal lattice structure. They are generally stable clays with low shrink-swell potential and low cation exchange capacity.

Karst Topography

Regions that are characterized by formations underlain by carbonate rock typified by the presence of limestone caverns and sinkholes.

Kick Out

Accidental release or failure of a cross brace.

Killed Steel

Thoroughly deoxidized steel, for example, by addition of aluminium or silicon, in which the reduction between carbon and oxygen during solidification is suppressed.

Kilowatt-hour (kWh)

Standard unit for measuring electrical energy consumption-kilowatts \times hours.

Kinematic Viscosity

Ratio of absolute viscosity, expressed in poises (grams per centimeter per second [g/cm s]), and the density, in grams per cubic centimeter (g/cm^3), at room temperature.

Kinetics

The study of the rates at which changes occur in chemical, physical, and biological treatment processes.

Knife-Line Attack

Intergranular corrosion of an alloy, usually stabilized stainless steel, along a line adjoining or in contact with a weld after heating into the sensitization temperature range.

Kraft Process

Wood-pulping process in which sodium sulfate is used in the caustic soda pulp-digestion liquor. Also called Kraft pulping or sulfate pulping.

Kraus Process

A modification of the activated-sludge process in which aerobically conditioned supernatant liquor from anaerobic digesters is added to activated sludge aeration tanks to improve the settling characteristics of the sludge and to add an oxygen resource in the form of nitrates.

Kilovar

One thousand reactive volt amps (see POWER).

Kilovolt

One thousand volts.

Kilowatt

One thousand watts.

Kilowatt-hour

The units of electrical energy equal to 1 kilowatt of electrical power in an electrical circuit for 1 h.

Knee Walls

Walls of varying length. Used to provide additional support to roof rafters with a wide span or to finish off an attic.

K-Value (Conductivity)

The measure of heat in Btus that pass through one square foot of a homogeneous substance, 1 inch thick, in an hour, for each degree F temperature difference. The lower the K value, the higher the insulating value.

Kyoto Protocol

An international agreement adopted in December 1997 in Kyoto, Japan. The Protocol sets binding emission targets for developed countries that would reduce their emissions on average 5.2% below 1990 levels.

L

L10, L50 and L90

The Sound levels exceeding 10%, 50% and 90% of the total time intervals during a particular period are designated as L10, L50 and L90 respectively.

Laboratory Procedures

Modes of conducting laboratory processes and analytical tests consistent with validated standard testing techniques.

Lacing

A method of joining or securing insulation materials, reinforcements, or finishes for insulation materials using eyelets, hooks, wire, cord, etc.

Lacing Wire (Tie Wire)

Light gage wire, single or multistrand, used for lacing together adjacent edges of mattresses or of metal covering, or for securing insulating material on substantially flat surfaces.

Lacustrine Flat

The large flat area exposed in a dry lake bed, typically characterized by the presence of accumulated lake sediments.

LAER (Lowest Achievable Emission Rate)

Under the Clean Air Act, the rate of emissions that reflects (a) the most stringent emissions limitation in the state implementation plan identified for a source unless the owner or operator demonstrates such limitations are not achievable or (b) the most stringent emissions limitation achieved in practice, whichever is more stringent.

Lag

Preformed rigid insulation for longitudinal application to cylinders larger than those for which pipe sections are available. There are three type as follows:

(a) Plain lags

Lags having rectangular cross section, for use on cylinders of such diameter that this shape conforms sufficiently closely to the surface.

(b) Bevelled lags

Lags similar to plain lags, but with one or more edges bevelled.

(c) Radiused and bevelled lags

Bevelled lags with faces curved to fit the surface of the cylinders (sometimes known as curved and bevelled lags).

Lag Growth Phase

The initial period following bacterial introduction during which the population grows slowly as the bacteria acclimates to the new environment.

Lagging Insulation

A block material for insulating tanks and boilers, usually curved or tapered and can be made from any of several insulation materials.

Lagoon

Constructed basin lined with either soils with very low permeability or a synthetic material, surrounded with berms and which contains at least three feet of wastewater which utilizes sunlight, wind or mechanical aeration, and natural bacteria to break down waste via physical, chemical, and biological processes. A natural closed depression tilled with water that is typically salty or brackish bounded at least in part by forms aggraded or built up by waves or reef building organisms.

Lagoon, Evaporation

Lagoon where wastewater is stored and the water is allowed to evaporate over time.

Lagoon, Storage

Lagoon where some form of wastewater is stored before it is either conveyed to another component for further processing or is reused.

Lake

A natural closed depression facilitating the collection of runoff and its storage as still water.

Lambda Value

Lambda value (Thermal conductivity) is a physical coefficient which measures the heat transmission behaviour of a material. The lower the Lambda value, the better the thermal efficiency of the material. Unit: W/m K.

Laminar Flow

The flow of a viscous fluid in which particles of the fluid move in parallel layers, each of which has a constant velocity but is in motion relative to its neighbouring layers. Also called streamline flow, viscous flow.

Lamellar Tearing

Occurs in the base metal adjacent to weldments due to high through-thickness strains introduced by weld metal shrinkage in highly restrained joints. Tearing occurs by decohesion and linking along the working direction of the base metal; cracks usually run roughly parallel to the fusion line and are sleep-like in appearance. Lamellar tearing can be minimized by designing joints to minimize weld shrinkage stresses and joint restraint. See also COLD CRACKING, HOT CRACKING, and STRESS-RELIEF CRACKING.

Land

The surface of the earth's outer crust not covered by bodies of water. The term land is also used in a comprehensive, integrating sense to encompass the physical environment within a profile from the atmosphere above the earth's surface down to some meters below the surface. Land therefore includes climate, landform, soils, hydrology and vegetation, to the extent that these influence potential for land use.

Land Application

The recycling, treatment, or disposal of wastewater or wastewater solids to the land under controlled conditions. The beneficial use of bio solids based upon crop needs. The application of bio-solids to land improves soil properties and plant productivity, and reduces dependence on inorganic fertilizers.

Land Appraisal

The survey, classification and evaluation of land resource data to assess and predict the performance or response of land when used for specified purposes under given management. It provides information necessary for decisions on the use and management of land, and socioeconomic factors form part of the appraisal. The aim of land appraisal is to provide planners and land use decision makers with comprehensive data upon which to make informed and use policies and to implement these in an efficient and effective manner. It is also a most useful approach to resolving problems between alternate and conflicting land uses and changing land use patterns; enabling better understanding and appreciation of the effects of land use on the environment; and providing a mechanism for public participation in the land use planning process.

Land Capability

The ability of land to accept a type and intensity of use permanently, or for specified periods under specific management, without permanent damage. It is an expression of the effect of biophysical land resources, including climate, on the ability of land to sustain use without damage under various uses, such as crop production requiring regular tillage, grazing, woodland, or wildlife. Land capability involves consideration of; the various land resource attributes; *the production to be obtained from the land; the activities or inputs required to achieve that production;

the risks of damage to the land, on-site or off-site, resulting from those activities; and the inter-relations of the above. Land capability is included in land suitability and in its most highly developed forms may approach the latter. If the land is used beyond its capability it ultimately loses its productive capacity. Therefore, land capability forms an essential basis for land use planning.

Land Capability Classification

The systematic arrangement of land into various categories according to their capability for particular land uses and the treatment required to sustain those uses without land degradation. In a soil conservation context, land capability classification is based on a balance between usage and conservation measures which allow the most intensive use of the land without soil erosion and with a permanently sustained level of usage. It relates to the degree of hazards and limitations in managing the land, and thus the classification is primarily concerned with the risk of erosion.

Land Conversion

Final harvest of the forest with subsequent land-use conversion to agriculture, residential or commercial development, mining or highway construction.

Land Degradation

The decline in quality of natural land resources, commonly caused through improper use of the land by humans. Land degradation encompasses soil degradation and the deterioration of natural landscapes and vegetation. It includes the adverse effects of overgrazing, excessive tillage, over clearing, erosion, sediment deposition, extractive industries, urbanization, disposal of industrial wastes, road construction, decline of plant communities and the effects of noxious plants and animals.

Land Development Characteristics

A manmade change to, or construction on, the land surface that changes its runoff characteristics.

Land Imprinter

A heavy roller with a cross-cross pattern which imparts a series of indentations to the soil surface to assist retention of rainfall on rangeland. The pattern of ridges and furrows thus formed also help to restrict wind and water erosion.

Land Information System

A mapping and land information data base designed for interactive use by land managers. Such a system is frequently computerized.

Land Management

The application to land of cultural, structural, vegetative or any other types of measures, either singly or in combination, in order to achieve a desired land use. In a soil conservation context and management includes provision for the control and/or prevention of soil erosion.

Land Reclamation

Making land capable of more intensive use by changing its general character, as by drainage of excessively wet land, or recovery of submerged land from seas lakes, and rivers. Large-scale reclamation projects usually are carried out through collective effort. Simple improvements, such as clearing of stumps or stones from land, should not be referred to as land reclamation.

Land Resource

The total amount of land available for the supply of natural products from which living organisms, including humans, can draw, to provide their

requirements for life. The land resource may be subdivided into individual basic constituent land resources—land resource at tributaries—which include physical, chemical and biological elements. The physical attributes which are of particular relevance to soil conservation are climate, geology, soils, landform, vegetation and hydrology. Most of the physical land resources are limited and exhaustible and thus, the use to which they are put must be carefully planned to realize their optimum potential. Because they are fixed in their location and extent they must, in general, be developed at their location. This often leads to conflicts in land use potential and highlights the need for land appraisal.

Land Resource Attribute

An individual land resource constituent that includes *physical*, chemical and biological elements. For example, soil is a land resource attribute, made up of numerous individual elements such as sand, clay and organic matter.

Land Resource Evaluation

The determination of the extent of one or more land resource attributes, the assessment of the potential land uses to which the resources could or should be put, and the effect upon the land if the resources are used for particular purposes. It is an integral part of land appraisal. In a soil conservation context, land resource evaluation relates to the assessment of the possible uses of land, with respect to the prevention and control of soil erosion.

Land Resource Study

The systematic analysis of an area of land to assess the land's potential for development under particular land uses. It incorporates both land resource survey and land resource evaluation but differs from land appraisal in that socio-economic factors are not considered. However a land resource study would form part of the data base for a land appraisal.

Land Resource Survey

The systematic examination, description, classification and mapping of one or more land resource attributes within a given area. The primary objective of land resource survey is to provide an inventory of data about the particular attribute/s. Such surveys may be categorized according to the kind and intensity of field examination as in soil survey or reconnaissance soil survey. Land resource survey is an integral part of land appraisal.

Land Suitability

The potential uses of the land based upon the consideration of physical, technical and socio-economic conditions prevailing. Full suitability evaluation involves a multi-disciplinary approach for land evaluation and includes a basic inventory of land resource data; an understanding of the ecological requirements of the land use contemplated; basic data on the economics of land use, land improvement, new technologies, marketing and transport, and a knowledge of the attitudes and goals of people affected by the proposed changes.

Land System

An area, or group of areas, commonly delineated on a map, throughout which there is a recurring pattern of topography, soils and vegetation.

Land Unit

An area of common landform, and frequently with common geology, soils and vegetation types, occurring repeatedly at similar points in the landscape over a defined region. It is a constituent part of a land system.

Land Use

The purpose for which and is used. The term encompasses the entire spectrum from generalized descriptions such as rural land use to specific conditions such as improved pasture production.

Land Use Planning

The conscious pursuit of goals, relating to the purpose for which land may be used, by means of the formulation and implementation of strategies, policies and programs based on scientific and technical studies,

Land Use Survey

The systematic examination, description, classification and mapping of the existing land uses within a defined area. Although other land resource attributes and/or other elements of the land may be mapped during the survey, its principal function is to describe, classify and map the uses to which the land is currently put.

Landform

Any one of the various features that make up the surface of the earth. The detail with which landform is described depends on the purpose for which it is being classified or evaluated. For example, in land capability classification, the degree of slope and the morphological type are commonly the only land form attributes recorded. These attributes provide the essential landform data necessary to evaluate capability. The basic unit chosen to describe, classify and map landform is the "landform individual". Depending on the map scale fixed for the survey, the "land form element" model or the "landform pattern" model may be utilized. In general, large scale surveys (1:5,000, 1:10,000) may describe elements, while those of smaller scales (1:50,000, 1:100,000) would describe patterns. The landform element model is suitable for Landform individuals that are within a toposequence. Such elements may be described by the attributes of slope, morphological type, dimensions, mode of geomorphological activity and geomorphological agent. The landform pattern model is applicable for landform individuals that include the whole toposequence. Such patterns may be described by the attributes of relief, modal slope, stream channel occurrence, mode and status of geomorphological

activity, geomorphological agent and component landform elements. An example of a landform pattern is undulating low hills, with its component landform elements intruding crest, hill slope, tower slope and drainage depression.

Landfill

The disposal of solid wastes or sludges by placing on land, compacting, and covering with a thin layer of soil.

Landfills

Landfills are a modern type of rubbish dump which comply with certain environmental requirements; there has to be some form of foundation plate under the waste which makes it possible to collect and treat the rainwater which is polluted by the toxins stored in the landfill. Dumping waste at a landfill means that it is deposited at a rubbish dump instead of being incinerated or recycled.

Landform

Physical, recognizable forms or features on the earth surface, having a characteristic shape and produced by natural causes.

Landholder

Any individual, group of individuals or organization which owns, occupies or manages land for any purpose.

Landscape

Portion of the land surface that the eye can comprehend in a single view. That part of the land's surface, more or less extensive, being viewed or under study, that relates to all aspects of its physical appearance, including various vegetation

associations and landforms. Underlying geology and soils, and land use, may influence the character of a landscape.

Landscape Position

Specific geomorphic component of the landscape in which a site is located; two-dimensional landscape positions may be summit, shoulder, back slope, side slope, foot slope, or toe slope; three dimensional views of geomorphic landscape position can be described as head slope, nose slope, side slope, base slope, etc.

Landslide (Slide)

A general term used to encompass the types of mass movement where the material is displaced down slope and along distinct surfaces of separation. The term encompasses a wide variety of materials but relates specifically to slope failures that involve the "sliding" of the moving material over the ground surface. As well as classification of landslides based on their constituent materials, subdivision is commonly related to whether the material in motion is greatly deformed or not, and to whether the slide is rotational or translational. In rotational slides, the movement is due to forces that cause a turning movement about a point above the center of gravity of the unit and the surface of separation is concave upward. Translational slides involve movements predominantly along more or less planar surfaces and are typically controlled by surfaces of weakness, such as faults and bedding planes, variations in shear strength between layers of material, or by the contact between bedrock and overlying material. Examples of this form of landslide classification are:

BLOCK GLIDE

Describes a slide where the material in motion is not greatly deformed and moves down slope along a more or less planar surface of weakness.

SLUMP

Describes a slide where the material in motion is not greatly deformed but has backward rotation on a more or less horizontal axis, that is,

displacement along a concave surface of separation, Landslides that “slide” for only relatively short distances and that are composed predominantly of debris and/or earth materials are, in practical terms, the most relevant to soil conservation. Such landslides are termed lands lips and in many instances conventional soil conservation measures, such as tree planting, can be applied to effect their control.

Landslip (Slip)

A general term used to encompass those landslides that are composed predominantly of soil and underlying weathered material, are initiated by finite shear failure along one or more distinct slip laces and move down slope for only relatively short distances. In many instances conventional soil conservation measures. such as tree planting, can be applied to effect their control. Classification of landslips follows similar principles to those for landslides and include:

SOIL SLIP

A shallow landslip where surface soil is displaced due to a marked change in shear strength between it and the subsoil. Generally soil slips revegetate naturally with lime, but may become a serious problem on soils overlying bedrock.

ROTATIONAL SLIP

A Landslip where the material is not greatly deformed and the surface of separation is concave upward as in a slump.

Land-Use

Any activities that takes place on land, such as construction, farming, or tree removal.

Langelier Saturation Index

An index calculated from total dissolved solids, calcium concentration, total alkalinity, pH and solution temperature that shows the tendency of a water solution to precipitate or dissolve calcium carbonate.

Lateral

Pipe, tubing or other conveyance used to carry and distribute effluent.

Lateral Volume

Amount of liquid required to fill a lateral.

Laterals

Laterals is sewers collecting the effluent from two or more sublaterals discharging to “Mains”.

Latitude

The location north or south in reference to the equator, which is designated at zero (0) degrees. Lines of latitude are parallel to the equator and circle the globe. The North and South poles are at 90 degrees North and South latitude.

Lagoon Sludge

Lagoon sludge is a relatively shallow basin, or natural depression, used for the storage or digestion of sludge, sometimes for its ultimate detention or dewatering.

Layered System

Two or more distinctly different soil or rock types arranged in layers; micaceous seams or weakened planes in rock or shale are considered layered.

Layout

Staking out the system on the site, including staging areas required for completion of the project.

LC50

The concentration of a toxicant or percentage dilution of an effluent that is predicted to be lethal to 50% of a test population of organisms.

Ldn

The day-night equivalent value of sound level. The day is counted from 6 AM to 9 PM (15 h) and night from 9 PM to 6 AM (9 h).

Leachate

Liquid that has percolated through solid waste or other permeable material and extracted soluble dissolved or suspended materials from it.

Leachate

Liquid containing dissolved minerals and salts as a result of leaching. Under natural conditions, refers to seepage water containing dissolved minerals and salts. In a mining context, the minerals and salts are dissolved as water seeps through an ore body or waste material. In some waste treatment processes, chemicals are added to promote leaching. In a soil context, the leachate may be formed naturally by water seeping through the soil, or artificially in the laboratory in certain soil testing procedures. In a landfill context, the leachate may result from water passing through waste material such as at a garbage disposal site.

Leaching

The process by which soluble materials in the soil, such as salts, nutrients, pesticide chemicals or contaminants, are washed into a lower layer of soil or are dissolved and carried away by water. The removal in solution of the more soluble minerals and salts by water seeping through a soil, rock, ore body or waste material.

Lead (Pb)

A heavy metal that is hazardous to health if breathed or swallowed. Its use in gasoline, paints, and plumbing compounds has been sharply restricted or eliminated by laws and regulations. **Lead** is a grey-white metal that is soft, malleable, ductile, and resistant to corrosion. Sources of lead resulting in concentrations in the air include industrial sources and crustal weathering of soils followed by fugitive dust emissions. Health effects from exposure to lead include brain and kidney damage and learning disabilities. Lead is the only substance that is currently listed as both a criteria air pollutant and a toxic air contaminant.

Lead Poisoning

Damaging the body (specifically the brain) by absorbing lead through the skin or by swallowing.

Leak

An uncontrolled fluid release from a pipeline and other sources.

Leak Consequences

The result of a pipeline leak and other sources in terms of human safety and damage to the environment. Economic loss such as cost of repair and deferred production are not taken into account in the leak consequence evaluation methodology given in this Standard.

Leak Expectancy

The probability of occurrence of a leak.

Leakage

Uncontrolled loss of water from artificial structures as a result of hydrostatic pressure.

Leakage Detector

A device or appliance, the principle of which is the audibility of water flowing through a leak. Most of these devices are marketed under descriptive trade names.

Least-Cost Planning

A process for satisfying consumers' demands for energy services at the lowest societal cost.

Least Developed Country

A country with low indicators of socioeconomic development and human resources, as well as economic vulnerability, as determined by the United Nations.

Ledeburite

The eutectic of the iron-carbon system, the constituents of which are austenite and cementite. The austenite decomposes into ferrite and cementite on cooling below the temperature at which transformation of austenite to ferrite or ferrite plus cementite is completed.

Lentic Waters

Ponds or lakes (standing water).

Lethal Concentration

The concentration of a test material that causes death of a specified percentage of a population, usually expressed as the median or 50% level (L_{50}).

Leukemia

A form of bone marrow cancer marked by an increase in white blood cells.

Levee

A natural or manmade earthen barrier along the edge of a stream, lake, or river. Land alongside rivers can be protected from flooding by levees. A long linear rise bordering a watercourse, comprising part of the floodplain formed by deposition of sediment from overbank flow during floods. Relief is low and the outer slope very gentle. A constructed embankment designed to prevent flooding of selected areas. It is usually built along the banks of a watercourse to prevent inundation of adjacent land, or around a facility to prevent access of flood water to it.

Level

(1) Instrument for observing levels, having a sighting device (usually telescopic) and capable of being made precisely horizontal; also called a surveyor's level; (2) observation made with such an instrument.

Level, Laser

Level that employs the use of a laser projected on a target.

Level, Optical

Level consisting of a high-powered telescope with a spirit level attached to it in such a manner that when its bubble is centred, the line of sight is horizontal.

Level, Rotating-Beam Laser

Laser level providing a plane of reference over open areas.

Level, Self-Levelling

Optical level with a prismatic device suspended on fine, nonmagnetic wires, such that when it is approximately centred the force of gravity on the

prismatic device causes the optical system to swing into a position so that the line of sight is horizontal.

Level, Single-Beam Laser

Laser level projecting a string line that can be seen on a target regardless of lighting conditions.

Level, Spirit

Device for determining true horizontal or vertical directions by the cantering of a bubble in a slightly curved glass tube or tubes filled with alcohol or ether.

Licensure

Granting of licenses especially to practice a profession; the state of being licensed.

Life Cycle Assessment

A life-cycle assessment (LCA) is a technique to assess environmental impacts associated with all the stages of a product's life from-cradle-to-grave (i.e., from raw material extraction through materials processing, manufacture, distribution, use, repair and maintenance, and disposal or recycling).

Lifecycle Cost

Total cost of a system over its design period including capital costs and ongoing operation and maintenance costs; expressed as a total present value or a monthly value over the expected life; costs in future years are discounted to the present.

Lift Station

A structure that contains pumps and appurtenant piping, valves, and other mechanical and electrical equipment for pumping water, wastewater, or other liquid. Also called a pumping station.

Ligand

The molecule, ion, or group bound to the central atom in a chelate or a coordination compound.

Light Pollution

Environmental pollution consisting of harmful or annoying light.

Lighting Panel

An enclosure carrying numerous low-voltage breakers, switches, and fuses serving lights or receptacles in an area.

Lime

Any of several compounds consisting of calcium hydroxide ($\text{Ca}(\text{OH})_2$) or calcium oxide (CaO). Any of a family of chemicals consisting essentially of calcium hydroxide made from limestone (calcite) composed almost wholly of calcium carbonate or a mixture of calcium and magnesium carbonate; used to increase pH to promote precipitation reactions or for lime stabilization to kill parthenogenetic organisms.

Lime

A naturally occurring calcareous material used to raise the pH of acid soils and/or supply nutrient calcium for plant growth. The term normally

refers to ground limestone (CaCO_3) but may also include processed forms such as hydrated lime ($\text{Ca}(\text{OH})_2$) or burnt lime (CaO). The processed forms are also effective for treating dispersible soils. The effectiveness of lime application depends on its fineness and subsequent incorporation into the top few centimeters of soil. The finer grades of lime are more effective.

Lime Requirement Test

A laboratory test used to determine the amount of lime required to raise the pH of a soil to a pre-determined level, normally in the range of 6.0–6.5.

Liming

The application of lime to the soil.

Limit of Disturbance

Line drawn on a plan that differentiates between the construction, clearing and traffic area required for the completion of an installation and the area that is to be left as found; the area is delineated on the site using a silt fence or hay bales that prevent the transportation of any fines outside the construction area as a result of surface runoff.

Limiting Condition

Soil or site characteristic that reduces efficacy of soil treatment and thus restricts design options for a system; typically defined from a regulatory standpoint.

Limiting Current Density

The maximum current density that can be used to obtain a desired electrode reaction without undue interference such as from polarization.

Line, Air

Piping that conveys air from the source to the point of diffusion.

Line, Main

Supply line in a spray dispersal system between a pump discharge assembly and a flow splitter.

Line, Sub-Main

Portion of the main line located after a flow splitter that carries a portion of flow to a spray dispersal field.

Line, Supply

Piping between a source of effluent and the associated gravity-flow or pressure distribution system.

Line of Sight

Straight line passing through the center of the barrel of a telescope used in surveying; always parallel to the datum.

Linear Elastic Fracture Mechanics

A method of fracture analysis that can determine the stress (or load) required to induce fracture instability in a structure containing a crack like flaw of known size and shape. See also FRACTURE MECHANICS and STRESS-INTENSITY FACTOR.

Linear Polarization Resistance (LPR)

(See POLARIZATION RESISTANCE). At small applied polarization potentials, the Relationship between applied potential approximates the polarization resistance.

Linear Shrinkage

The decrease in one dimension of a soil sample when it is oven dried, at 105 °C for 24 h, from the moisture content at its liquid limit, expressed as a percentage of the original dimension.

Liner

Impermeable synthetic or natural material used to prevent or restrict infiltration and/or exfiltration.

Lining

A protective covering over all or a portion of the perimeter of a conduit or reservoir intended to prevent seepage losses, withstand pressure, or resist erosion. In the case of conduits, lining is also sometimes installed to reduce friction losses.

Lipids

A group of organic compounds that make up the fats and other esters with analogous properties.

Lipophilic

Having an amenity for oil.

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. Liquefaction is (1) Act or process of liquefying or of rendering or becoming liquid; reduction to a liquid state. (2) Act or process of converting a solid or a gas to a liquid by changes in temperature or pressure, or the changing of the

organic matter in wastewater from a solid to a soluble state.

Liquid

A substance that flows freely; characterized by free movement of the constituent molecules among themselves, but without the tendency to separate from one another, which is characteristic of gases. Liquid and fluid are often used synonymously, but fluid has the broader significance of including both liquids and gases.

Liquid Chlorine

Elemental chlorine converted to a liquid state by compression and refrigeration of the dry, purified gas. Liquid chlorine is shipped under pressure in steel containers.

Liquid Limit

Moisture content at which soil becomes unstable and will flow; measured by ASTM Standard Test Method ASTM D4318 (2005).

Liquid Metal Embrittlement

Catastrophic brittle failure of a normally ductile metal when in contact with a liquid metal and subsequently stressed in tension.

Liquid Solids Separation

The process of separating the liquids and solids in a given wastewater. Liquid/solids separation comes in one of 3 processes: (1) If the solids sink (specific gravity greater than 1) use a clarifier. (2) If the solids float (specific gravity less than 1) use a floatation unit (DAF). (3) If neither sink or float (specific gravity is 1) try using a screen (rotary or parabolic).

Lister

A type of plough used to throw up ridges and/or excavate furrows useful in erosion control. Various configurations have application in wind and/or water erosion control work, particularly in semi-arid areas.

Lithosol (Skeletal Soil)

A shallow soil showing minimal profile development and dominated by the presence of weathering rock and fragments there from. Such soils are typically found on steep slopes, exposed hillcrests and rocky ranges where natural erosion exceeds the formation of new soil material.

Litter

Waste material which is discarded on the ground or otherwise disposed of improperly or thoughtlessly. The uppermost layer of organic material in a soil, consisting of freshly fallen or slightly decomposed organic materials which have accumulated at the ground surface.

Littoral

A term applied to deposits of soil materials arranged or transported by tidal water.

Littoral Drift

The movement of sedimentary material in the littoral zone under the influence of waves and currents.

Littoral Zone

Generally, the zone related to the shoreline of a sea or lake. Strictly, the zone bounded by high and low tide levels.

Livestock Water Use

Water used for livestock watering, feed lots, dairy operations, fish farming, and other on-farm needs.

Load or Loading

The introduction of an amount of matter or thermal energy into a receiving water; may be either caused by man (pollutant loading) or natural (background loading).

Load

The amount of electrical power required at any specified point or points on an electrical system. Load originates at the power-consuming equipment (see DEMAND).

Load Centre

A point at which the load of a given area is assumed to be concentrated.

Load Diversity

The difference between the sum of the individual maximum demands of two or more individual loads and the coincident maximum demand of those loads.

Load Factor

The ratio of the average load in kilowatts supplied during a designated period to the peak or maximum load in kilowatts occurring in that period. Load factor, in percent, may be derived by multiplying the kilowatt-hours used in the period by 100 and then dividing by the product of the maximum demand in kilowatts and the number of hours in the period.

Load Level Indicator

Device that enables a service provider to monitor the liquid level in a cargo tank.

Loading

Quantity of material applied to a device at one time. Amount of a substance entering the environment (soil, water, or air).

Loading Rate, Areal

Quantity of effluent applied to the footprint of the soil treatment area (or the absorption area of an above-grade soil treatment area) expressed as volume per area per unit time, e.g., cubic meter per day per square meter.

Loading Rate, Biochemical

Quantity of BOD₅ delivered to a treatment component expressed as mass per time (e.g., pounds of BOD₅ per day).

Loading Rate, Biological

Quantity of organic matter delivered to a treatment component expressed mass per time (e.g., pounds per day).

Loading Rate, Contour

Cumulative total of effluent applied to the soil profile at the down gradient end of a dispersal system installed on a slope, expressed as volume per unit length per unit time along the contour (e.g., gpd/ft).

Loading Rate, Hydraulic

Quantity of water applied to a given treatment component, usually expressed as volume per unit of infiltrative surface area per unit time, e.g., gallons per day per square foot (gpd/ft²).

Loading Rate, Instantaneous

Quantity of effluent discharged to a unit area of the infiltrative surface during a dosing event expressed as volume per unit time, e.g., gallons per minute per square foot (gpm/ft²).

Loading Rate, Linear

Quantity of effluent applied along the length of a lateral, trench or bed, typically expressed as volume per unit length per unit time (e.g. Gallons per foot per day).

Loading Rate, Mass

Sum of organic and inorganic effluent constituents delivered to a treatment component in a time interval, expressed as mass per time.

Loading Rate, Nutrient

Sum of organic and inorganic nutrients (primarily nitrogen and phosphorus) delivered to a treatment component in a specified time interval expressed as mass per time.

Loading Rate, Organic

Biodegradable fraction of chemical oxygen demand (biochemical oxygen demand, biodegradable FOG, and volatile solids) delivered to a

treatment component in a specified time interval expressed as mass per time or area; e.g., pounds per day or pounds per cubic foot per day (retreatment); pounds per square foot per day (infiltrative surface or pre-treatment); typical residential system designs assume biochemical loading equals organic loading.

Loam

A medium-textured soil of approximate composition 10 to 25% clay, 25 to 50% silt, and less than 50% sand. Such a soil is typically well-graded.

Local Action

Corrosion due to the action of "local cells," that is, galvanic cells resulting from inhomogeneities between adjacent areas on a metal surface exposed to an electrolyte.

Local Cell

A galvanic cell resulting from inhomogeneities between areas on a metal surface in an electrolyte. The inhomogeneities may be of physical or chemical nature in either the metal or its environment.

Local Limits

Conditional discharge limits imposed by municipalities upon industrial or commercial facilities that discharge to the municipal sewage treatment system.

Localized Corrosion

Corrosion at discrete sites, stress-corrosion cracking.

Log Dump (Log Landing) (for)

An area where forest products are assembled prior to loading them on to a truck for transport to processing plants or markets.

Log Growth Phase

Initial stage of bacterial growth, during which there is an ample food supply, causing bacteria to grow at their maximum rate.

Long-Line Current

Current that flows through the earth from an anodic to a cathodic area of a continuous metallic structure. Usually used only where the areas are separated by considerable distance and where the current results from concentration-cell action.

Long Lines

Fishing lines stretching for dozens of miles and baited with hundreds of hooks. Longlines are indiscriminate and unintentionally catch and kill immature fish along with a wide variety of other animals in the Atlantic including tunas, sharks, marlins, sailfish, sea turtles and occasionally pilot whales and dolphins.

Long Wave Radiation

Radiation emitted in the spectral wavelength greater than about 4 micrometres, corresponding to the radiation emitted from the Earth and atmosphere. It is sometimes referred to as "terrestrial radiation" or "infrared radiation," although somewhat imprecisely.

Long-Term Acceptance Rate (LTAR)

Design parameter expressing the rate that effluent enters the infiltrative surface of the soil treatment area at equilibrium, measured in volume per area per time, e.g. gallons per square foot per day ($\text{g}/\text{ft}^2/\text{day}$).

Loose Fill

Insulation material (usually mineral wool, vermiculite, or cellulose) used for pouring or blowing into the space to be insulated.

Loose-Fill Insulation

Material in the form of powder, granules, foamed, expanded or exfoliated aggregate or loose or pelleted fibers, used in the dry state as a filling for cavities, casings or jackets. Insulation in granular, nodular, fibrous, powdery or similar form designed to be installed by pouring, blowing or hand placement.

Loss of Head

(1) The decrease in energy between two points resulting from friction, bend, obstruction, expansion, or any other cause. It does not include changes in the elevation of the hydraulic grade unless the hydraulic and energy grades parallel each other. (2) The difference between the total heads at two points in a hydraulic system.

Lost Time Injury Rate

Lost Time Injury Rates (LTIR) are calculated as the number of occurrences of injury, divided by the total number of hours worked by all workers in the recording unit, for 200,000 h worked.

Low Density Residential Development

A level of urban development which provides for the construction of roads, drainage and services to cater for subdivision allotments typically between 0.5 and 2 hectares. In most new subdivisions of this type, especially those adjoining established urban centers, water supply is usually provided but sewerage may or may not be available.

Low-Emission Vehicles

Vehicles which emit little air pollution compared to conventional internal combustion engines.

Low-Energy Bulbs

Produce the same amount of light as a normal bulb but consume 5–6 times less energy. Their service life is 8–10 times longer than that of a corresponding standard bulb.

Low-Impact Camping

Camping that does not damage or change the land, where campers leave no sign that they were on the land.

Low NOx Burners

One of several combustion technologies used to reduce emissions of nitrogen oxides.

Low-Rate Filter

A trickling filter designed to receive a small load of BOD per unit volume of filtering material and to have a low dosage rate per unit of surface area,

usually 2 to 5 mgd/ac (2.23102^5 to 5.43102^5 m³/m² s) generally without recirculation. The organic loading (BOD) rate is usually in the range of 5 to 25 lb/1,000 cu ft (80 to 400 g/m³). Also called a standard rate filter.

Low-Wall

A sloping face in an open-cut mine, located at the rear or backfill side of the cut.

Lowest Achievable Emission Rate (LAER)

Considered to be the lowest rate of emissions from a source category which is contained in the State Implementation Plan, or which is achieved in practice by such category of sources. This term is most often associated with a nonattainment area. Under the Clean Air Act, the most stringent emission limitation derived from either (1) the most stringent emission limitation in the implementation plan of any state for such source or category of source; or (2) the most stringent emission limitation achieved in practice by such class or category of sources.

Lubricity

A measure of the ability of an oil or other compound to lubricate (reduce friction) between two surfaces in contact.

Luggin Probe (Luggin Haber Capillary)

A small tube or capillary filled with electrolyte, terminating close to the metal surface under study, and used to provide an ionically conducting path without diffusion between an electrode under study and a reference electrode.

Lumber

Wood or wood products used for construction.

Lunette

A crescent-shaped dune at the margin of a playa or lake. The sediments comprising the lunette are typically fine-grained and originate from the floor of the playa or lake during dry periods. Lunettes are formed by wind and wave action.

Lung Diseases

Any disease or damaging conditions in the lung or bronchia such as cancer or emphysema.

Lymphoma

A tumour marked by swelling in the lymph nodes.

Lysimeter

A device to measure the quantity or rate of water movement through or from a block of soil, usually undisturbed and in situ, or to collect such percolated water for quality analysis.

M

Macroscopic

Visible at magnifications to 25×.

Macrostructure

The structure of metals as revealed by macroscopic examination of the etched surface of a polished specimen.

Magnetite

Naturally occurring magnetic oxide of iron (Fe_3O_4).

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.

Maintenance

Routine or periodic action taken to assure proper system performance, extend system longevity, and/or assure a system meets performance requirements.

Maintenance (Forestry)

Maintenance includes upkeep of permanent road and trail systems, prescribed burning for fuel reduction or habitat selection, and use of herbicides.

Major Source

A source that emits or has the potential to emit more than 100 tons of any pollutant regulated under the federal Clean Air Act, more than 10 tons of any hazardous air pollutants or 25 tons of all hazardous air pollutants.

Makeup Water

Water supplied to replenish the water of a system.

Malfunction

Condition in which a component is not performing as designed/installed.

Malfunction, Hard

Component malfunction that constitutes an imminent health risk.

Malfunction, Soft

Component malfunction that can typically be corrected via maintenance or operational activities.

Mammal

An animal that feeds its young with milk secreted from mammary glands and has hair on its skin.

Managed Growth

Growth or expansion that is controlled so as not to be harmful.

Management, Distributed

Method to manage wastewater infrastructure where a responsible management entity combines onsite, cluster, and centralized treatment in a cost effective and sustainable structure.

Management, System

Complete range of activities necessary to conduct operational services on wastewater treatment systems, including operation, maintenance, monitoring, and compensation.

Management Entity

Person or organization that administers a set of activities associated with system management (e.g., the owner, homeowners' association, contracted management service); the owner is ultimately responsible.

Management entity, Responsible (RME)

(1) Person or organization that administers and conducts a comprehensive set of activities recognized by the regulatory authority; (2) Legal entity

that has the managerial, financial, and technical capacity to ensure the long-term, cost-effective operation of onsite and/or cluster wastewater treatment systems in accordance with applicable regulations and performance requirements (e.g., a wastewater utility or wastewater management district).

Management Information System

Computer-based system capable of capturing, storing, analyzing, and displaying specifically referenced information.

Management Program

Comprehensive, life-cycle series of elements and activities that address issues critical to wastewater treatment systems, including planning, education, maintenance, residuals management, training certification, licensing, inspections, monitoring, corrective action and enforcement, recordkeeping, inventorying, reporting, financial assistance, and funding.

Management Service

Provision of one or more activities required to ensure that the wastewater treatment performance requirements established by the regulatory authority are achieved; may include planning, design, permitting, inspection, construction/installation, operation, maintenance, monitoring, enforcement, etc.; ideally, management services are provided by properly trained personnel and tracked by means of a management information system.

Management Zone

An area within the water source to which daily extraction limits are defined. Management zones are designated only where the water source to which the plan applies is divided into areas and daily extraction limits are defined for each area.

Manholes

Manholes are used in sewer mains as junction points and sediment traps, and to provide access for maintenance and inspection.

Manifold

Piping network having several outlets or inlets through which a liquid or gas is distributed or collected.

Manifold, Bottom Feed

Configuration in which a short manifold is located at the lower elevation of a soil treatment area.

Manifold, Center Feed

Configuration in which a long manifold is installed perpendicular to two sets of distribution laterals that extend in opposite directions along the slope; the supply line may connect to the manifold in the center or at one end; used on level or nearly-level sites.

Manifold, Dual

Configuration in which the supply line is connected to a manifold at two points.

Manifold, Looped

Configuration in which the supply line connects to the manifold and a return line is installed to create a complete connection; used in drip distribution.

Manifold, Return

Manifold that allows effluent from two or more laterals to be collected and conveyed to a return line.

Manifold, Side Feed

Configuration in which a long manifold is installed perpendicular to one set of distribution laterals that extend in one direction along the slope; the supply line may connect to the manifold in the center or at one end; used on level or nearly-level sites.

Manifold, Supply

Manifold that allows effluent to be distributed to two or more laterals.

Manifold, Top Feed

Configuration in which a short manifold is installed at the higher elevation of a soil treatment area.

Manning Formula

A formula for open-channel flow published by Manning in 1890. It gives the value of c in the Chezy formula. See also MANNING ROUGHNESS COEFFICIENT.

Manning Roughness Coefficient

The roughness coefficient in the Manning formula for determination of the discharge coefficient in the Chezy formula.

Manometer

An instrument for measuring pressure. It usually consists of a U-shaped tube containing a liquid, the surface of which moves proportionally in one end of the tube with changes in pressure in the liquid in the other end; also, a tube-type of differential pressure gauge.

Masonry

Describes a structure built with stone, concrete, brick or similar material. Such structures have a solid framework providing an erosion-resistant surface. Small holes or gaps may be incorporated to cater for seepage. Masonry structures are typically used where there is a high risk of failure associated with vegetative methods of soil erosion control.

Manual Welding

Welding in which the means of making the weld are held in the hand.

Manufacturer-Assembled

Component provided to the contractor in an operable condition ready for final plumbing and/or electrical connections at the site.

Man Way

Main portal for human entry into a cargo tank; access is usually at the highest point in the tank shell.

Marine Mammal

A mammal that lives in the ocean, such as a whale.

Marker Rip

A line across the land surface, formed by a tined implement, to indicate the intended tine for the construction of a soil conservation bank or similar structure.

Marsh

A wet area, periodically inundated with standing or slow moving water, that has grassy or herbaceous vegetation and often little peat accumulation; the

water may be salt, brackish or fresh, wetland, swamp, or bog.

Martensite

A generic term for microstructures formed by diffusionless phase transformation in which the parent and product phases have a specific crystallographic relationship. Martensite is characterized by an acicular pattern in the microstructure in both ferrous and nonferrous alloys. In alloys where the solute atoms occupy interstitial positions in the martensitic lattice (such as carbon in iron), the structure is hard and highly strained; but where the solute atoms occupy substitutional positions (such as nickel in iron), the martensite is soft and ductile. The amount of high-temperature phase that transforms to martensite on cooling depends to a large extent on the lowest temperature attained, there being a rather distinct beginning temperature (M_s) and a temperature at which the transformation is essentially complete (M_f).

Mass Movement

A general term encompassing erosion processes in which gravity is the primary force acting to dislodge and transport land surface materials. It is a function of the gravitational stress acting on the land surface and the resistance of the materials to dislodgement. When the gravitational stress exceeds this resistance, mass movement occurs. The occurrence of mass movement depends upon the interaction of various factors including landform, lithology, soil type, rainfall intensity and duration, drainage characteristics, vegetal cover, and human intervention. There are various ways to classify mass movement including age, cause and degree of disruption of the displaced mass, but the preferred classification is based on the type of material—bedrock, debris and earth and the type of movement—fall, topple, lateral spread, flow and slide. The main categories of mass movement relevant to soil conservation are earth/lows, landslides and landslips.

Mass Spectrometer

A device that permits observation of the masses of molecular fragments produced by destructible bombardment of the molecule with electrons in a vacuum; coupled with gas chromatography (GC-MS), mass spectrometry can yield very specific compound identification.

Mass Spectrometry

A means of sorting ions by separating them according to their masses.

Massive

Refers to that condition of a soil layer in which the layer appears as a coherent, or solid, mass which is largely devoid of peds, and is more than 6 mm thick.

Master Plan

A comprehensive plan to guide long-term development in a particular area that is broad in scope. It focuses on the analysis of a system for the purpose of outlining a framework for use in future individual projects. A Wastewater and Water Servicing Master Plan developed by Halton Region identified the need for expanding the Mid-Halton STP.

Material Safety Data Sheets (MSDSs)

Product safety information sheets prepared by manufacturers and marketers of products containing toxic chemicals. These sheets can be obtained by requesting them from the manufacturer or marketer. Some stores, such as hardware stores, may have material safety data sheets on hand for products they sell.

Mastic

Tar-like (asphalt or bituminous) material used to establish a watertight seal between parts of a device or component, such as between a septic tank and access riser, between riser sections or between the tank and lid. A relatively thick consistency protective finish capable of application to thermal insulation or other surfaces, usually by spray or trowel, in thick coats, greater than 0.75 mm.

Material Safety Data Sheet (MSDS)

A standard formatted information sheet, prepared by a material manufacturer, describing the potential hazards, physical properties, and procedures for safe use of a material.

Material R-Value

Thermal resistance determined by dividing thickness by thermal conductivity, excluding surface air film resistances.

Matrix

Finer-grained traction, typically a cementing agent within a soil or rock in which larger particles are embedded.

Mattress

A flexible construction comprising an insulating material faced on one side or both sides, or totally enclosed with fabric, film, paper, wire netting, expanded metal or similar covering attached mechanically to the insulating material.

Maximum Achievable Control Technology (MACT)

Federal emissions limitations based on the best demonstrated control technology or practices in similar sources to be applied to major sources emitting one or more federal hazardous air pollutants. Maximum Achievable Control Technology (MACT) is EPA standards mandated by the 1990 amendments to the federal Clean Air Act for the control of toxic emissions from various industries. Industries range from dry cleaners to petroleum refineries.

Maximum Available Control Technology (MACT)

The emission standard for sources of air pollution requiring the maximum reduction of hazardous emissions, taking cost and feasibility into account. Under the Clean Air Act Amendments of 1990, the MACT must not be less than the average emission level achieved by controls on the best performing 12% of existing sources, by category of industrial and utility sources.

Maximum Contaminant Level (MCL)

The designation given by the U.S. Environmental Protection Agency (EPA) to water-quality standards promulgated under the Safe Drinking Water Act. The MCL is the greatest amount of a contaminant that can be present in drinking water without causing a risk to human health.

Maximum Hourly Average

The maximum hourly average is the highest hourly reading of air pollution obtained during the time period under study.

Maximum Permissible Velocity

The highest average velocity at which water may flow in a channel without causing erosion. For soil conservation purposes vegetated channels

are in common use, and the maximum permissible velocity is dependent upon the type, condition and density of vegetation, the erodibility of the soil, and channel slope. Uniformity of vegetative cover is important, as the stability of the most sparsely vegetated section controls the stability of the whole channel.

Mean

(1) The arithmetic average of a group of data. (2) The statistical average (50% point) determined by probability analysis.

Mean Cell Residence Time (MCRT)

The average time that a given unit of cell mass stays in the activated-sludge aeration tank. It is usually calculated as the total mixed liquor suspended solids in the aeration tank divided by the combination of solids in the effluent and solids wasted.

Mean High Water (MHW)

Tidal datum described by the average of all the high water heights observed over the National Tidal Datum Epoch (the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken and reduced to obtain mean values for tidal data).

Mean Sea Level (MSL)

Tidal datum described as the arithmetic mean of hourly heights observed over the National Tidal Datum Epoch.

Mean Tide Level (MTL)

Tidal datum described as the arithmetic mean of mean high water and mean low water; half-tide level.

Meandering

The natural winding of channels, which results from a complex geomorphological process involving stream bank erosion and alluvial deposition.

Measuring Tape

A device ranging in length from 3 to 100 meters, having uniformly spaced graduations which can vary from 1 meter down to 1 millimeter, used to determine distances. Measuring tapes may be made of fiberglass or steel, with or without a special coating to minimize rust, and are contained in specially made winders or are wound on canvas or leather reels.

Mechanical Aeration

(1) The mixing, by mechanical means, of wastewater and activated sludge in the aeration tank of the activated-sludge process to bring fresh surfaces of liquid into contact with the atmosphere.
(2) The introduction of atmospheric oxygen into a liquid by the mechanical action of paddle, paddle wheel, spray, or turbine mechanisms.

Mechanical Aerator

A mechanical device for the introduction of atmospheric oxygen into a liquid. See also MECHANICAL AERATION.

Mechanical Plating

Plating wherein fine metal powders are peened onto the work by tumbling or other means.

Mechanical Rake

A machine-operated mechanism used for cleaning debris from racks located at the intakes of conduits supplying water to hydroelectric power

plants, water supply systems, or for other uses, and conveying wastewater to pumps or treatment processes.

Mechanical Stability

The ability of a dry soil to maintain its structure under the influence of mechanical agents, such as tillage or abrasion from windborne materials. It relates to soil coherence and is characterized in the laboratory by repeated dry sieving on a rotary sieve.

Mechanically Cleaned Screen

A screen equipped with a mechanical cleaning apparatus for removal of retained solids.

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.

Media, Distribution

Media used to provide void space (usually in a dispersal component) through which effluent flows and is stored prior to infiltration (e.g., washed rock, aggregate, polystyrene blocks or beads, chambers, pipe, etc.).

Medfly

The Mediterranean fruit fly, a flying insect.

Media, Treatment

Non- or slowly-degradable media used for physical, chemical, and/or biological treatment in a wastewater treatment component.

Median

In a statistical array, the value having as many cases larger in value as cases smaller in value.

Megacities

Cities with populations over 10 million.

Melting Point

The temperature at which a solid becomes a liquid. At this temperature, the solid and the liquid have the same vapor pressure.

Membrane Filter Test

A sample of water is passed through a sterile filter membrane. The filter is removed and placed on a culture medium and then incubated for a preset period of time. Coliform colonies, which have a pink to dark-red color with a metallic sheen, are then counted using the aid of a low-power binocular wide-field dissecting microscope. The membrane filter test is used to test for the presence and relative number of coliform organisms.

Mercaptans

Aliphatic organic compounds that contain sulfur. They are noted for their disagreeable odor and are found in certain industrial wastes.

Mercury (Hg)

Mercury has unique technical characteristics as it melts at a temperature as low as -39°C . Vapour is produced at temperatures of as little as 20°C , even if its boiling point is 375°C . Mercury in metallic form does not affect the environment, but metallic vapour is easily absorbed by the respira-

tory system and collects in the central nervous system, for example, and gradually causes damage to the human heart and kidneys. Mercury easily combines with other substances thus becoming highly toxic. It also becomes easily absorbed by plants and animals and causes serious damage. When mercury emissions are large-scale, the mercury is stored in the body, as more mercury is supplied than the body can dispose of. The further up the food chain you come, the higher the accumulation. This has affected the reproductive capability of animals, for instance birds. A teaspoonful of mercury is sufficient to pollute an entire lake and, because of its toxicity and volatility, mercury should therefore not be used but should be left in the earth's crust in inactive form. Metal which has already been extracted should be stored in such a way that it does not leak into the environment.

Mercury Gauge

A gauge in which the pressure of a fluid is measured by the height the fluid pressure will sustain a column of mercury.

Mesh

One of the openings or spaces in a screen. The value of the mesh is usually given as the number of openings per linear inch. This gives no recognition to the diameter of the wire; thus, the mesh number does not always have a definite relationship to the size of the hole.

Mesophilic

That group of bacteria that grow best within the temperature range of $20\text{--}40^{\circ}\text{C}$ ($68\text{--}104^{\circ}\text{F}$).

Mesophilic Digestion

Digestion by biological action at $27\text{--}38^{\circ}\text{C}$ ($80\text{--}100^{\circ}\text{F}$).

Mesophilic Range

Operationally, that temperature range most conducive to the maintenance of optimum digestion by mesophilic bacteria, generally accepted as between 27 and 38 °C (80 and 100 °F).

Mesosphere

The layer of the Earth's atmosphere above the stratosphere and below the thermosphere. It is between 35 and 60 miles from the Earth.

Metabolism

- (1) The biochemical processes in which food is utilized and wastes formed by living organisms.
- (2) All biochemical reactions involved in cell synthesis and growth.

Metal-Arc Welding

Arc welding using a consumable electrode.

Metal Cleading/Jacketing

Sheet metal fitted as a protective finish over insulation.

Metal Dusting

Accelerated deterioration of metals in carbonaceous gases at elevated temperatures to form a dust-like corrosion product; a unique form of high temperature corrosion which forms a dust-like corrosion product and sometimes develops hemispherical pits on a susceptible metal surface; simultaneous carburization is generally observed.

Metal Flue

Metal chamber through with hot air, gas, steam or smoke may pass.

Metal Ion Concentration Cell

A galvanic cell caused by a difference in metal ion concentration at two locations on the same metal surface.

Metallic Glass

An alloy having an amorphous or glassy structure. See also AMORPHOUS SOLID.

Metallizing

- (1) The application of an electrically conductive metallic layer to the surface of nonconductors.
- (2) The application of metallic coatings by non-electrolytic procedures such as spraying of molten metal and deposition from the vapor phase.

Metals

Consist of many different substances, all of which are elements and therefore cannot disappear or be broken down. They can, however, combine with other substances and thereby acquire different characteristics and environmental impacts.

Metazoan

A group of animals having bodies composed of cells differentiated into tissues and organs and usually having a digestive cavity lined with specialized cells.

Meteor Perforation

Perforation of material in outer space resulting from meteor strikes.

Meter

An instrument for measuring some quantity such as the rate of flow of liquids, gases, or electric currents.

Meter, Elapsed Time

Device used to detect an electrical signal in order to measure and record the total length of time a component has been in the operation phase.

Meter, Flow

Device that measures the instantaneous and/or cumulative amount of liquid that passes a designated point and is delivered to the next component.

Methane (CH₄)

A colourless, odourless, flammable, gaseous hydrocarbon present in natural gas and formed by the anaerobic decomposition of organic matter, or produced artificially by heating carbon monoxide and hydrogen over a nickel catalyst. See also ANAEROBIC DIGESTION. A hydrocarbon that is a greenhouse gas with a global warming potential most recently estimated at 25 times that of carbon dioxide (CO₂). Methane is produced through anaerobic (without oxygen) decomposition of waste in landfills, animal digestion, decomposition of animal wastes, production and distribution of natural gas and petroleum, coal production, and incomplete fossil fuel combustion. The GWP is from the IPCC's Fourth Assessment Report (AR4).

Methane Bacteria

A specialized group of obligate anaerobic bacteria that decompose organic matter to form methane.

Methane Fermentation

A reaction sequence that produces methane during the anaerobic decomposition of organic waste. In the first phase, acid-forming bacteria produce acetic acid; in the second, the methane bacteria use this acid and carbon dioxide to

produce methane. Fermentation results in the conversion of organic matter into methane gas.

Methanol

A single carbon alcohol, generally produced from natural gas (methane).

Methyl Bromide

The gaseous compound CH₃Br used primarily as an insect fumigant; found to be harmful to the stratospheric ozone layer which protects life on earth from excessive ultraviolet radiation.

Metric Ton

Common international measurement for the quantity of greenhouse gas emissions. A metric ton is equal to 2205 lbs or 1.1 short tons.

MGD

Million gallons per day; a measure of flow equal to 1.547 cu ft/sec, 681 gpm, or 3785 m³/d.

mg/L

Milligrams per liter; a measure of concentration equal to and replacing ppm in the case of dilute concentrations.

Micro-(μ)

The metric prefix for one millionth of the unit that follows.

Microbial Activity

The activities of microorganisms resulting in chemical or physical changes.

Microbial Film

A gelatinous film of microbial growth attached to or spanning the interstices of a support medium. Also called biological slime.

Microbiologically-Influenced Corrosion (MIC)

Corrosion which is substantially increased as the result of the presence of bacteria (such as sulfate reducing bacteria, S.R.B.; or acid-producing bacteria, A.P.B.).

Micron

A unit of length equal to one thousandth of a millimetre, or about 1/25,000 of an inch.

Microgram (μg)

One millionth of a gram: $1 \mu\text{g} = 10^{-6} \text{g} = 0.001 \text{mg}$.

Micrograms per Cubic Meter ($\mu\text{g}/\text{m}^3$)

The mass in micrograms of a substance contained within a cubic meter of another substance or vacuum. This is the standard unit of measure for the mass density (concentration) of particles suspended in air; also sometimes used for the concentration of gases in air.

Micrometer (μm), Micron

One millionth of a meter: $1 \mu\text{m} = 10^{-6} \text{m}$.

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. Very small organisms, either plant or animal, invisible or barely visible to the naked eye. Examples are algae, bacteria, fungi, protozoa, and viruses.

Micro Porous Insulation

Material in the form of compacted powder or fibers with an average interconnecting pore size comparable to or below the mean free path of air molecules at standard atmospheric pressure. Micro porous insulation may contain pacifiers to reduce the amount of radiant heat transmitted.

Microrelief

Minor variation in the configuration of the land surface such as is caused by the presence of gullies. Rabbit holes, ploughing and scalding.

Microscopic

Very small, generally between 0.5 and 100 μm , and visible only by magnification with an optical microscope.

Microscopic Examination

(1) The examination of water to determine the presence and amounts of plant and animal life, such as bacteria, algae, diatoms, protozoa, and crustacea. (2) The examination of water to determine the presence of microscopic solids. (3) The examination of microbiota in process water, such as the mixed liquor in an activated-sludge plant.

Microstructure

The structure of a prepared surface of a metal as revealed by a microscope at a magnification exceeding 25 \times .

Migration

Migration is the regular movements of animals, often between breeding places and winter feeding grounds.

MIG-Welding

Metal-Inert Gas arc welding using a consumable electrode.

Milli

A prefix meaning 1/1,000.

Milligram (mg)

One-thousandth of a gram.

Milligrams per Liter (mg/l)

A unit of the concentration of a constituent in water or wastewater. It represents 0.001 gram of a constituent in 1 liter of water. It is approximately equal to one part per million (PPM).

Million Gallons per Day (Mgd)

A rate of flow of water equal to 133,680.56 cubic feet per day, or 1.5472 cubic feet per second, or 3.0689 acre-feet per day. A flow of one million gallons per day for 1 year equals 1,120 acre-feet (365 million gallons).

Mill Scale

An oxide layer on metals or alloys produced by metal rolling, hot forming, welding or heat treatment. Especially applicable to iron and steel.

Mineral Fibre

A generic term for all non-metallic inorganic fibers.

Mineral Fibre (Mineral Wool)

Insulation composed principally of fibers manufactured from rock, slag, or glass with or without binders.

Mineral Wool

A generic term for mineral fibers of a woolly consistency, normally made from molten glass, rock or slag.

Minimum Liquid Level

(1) Distance from the bottom of a dosing tank to pump off elevation; coincides with the minimum volume required to maintain pump submergence; (2) Elevation at which a siphon completes a dose.

Minimum Tillage

A general term describing a conservation tillage system in which the crop is grown with the fewest possible tillage operations. Herbicides and/or grazing may be used for fallow weed control.

Mining

The removal of minerals (like coal, gold, or silver) from the ground.

Mining Water Use

Water use during quarrying rocks and extracting minerals from the land.

Miscible

Capable of being mixed with other substances.

Mist

Fine liquid droplets of such small size that gravity separation is hindered. Fog is a water mist. A suspension of droplets in a gas, liquid particles up to 100 microns in diameter.

Mitigation

A human intervention to reduce the human impact on the climate system; it includes strategies to reduce greenhouse gas sources and emissions and enhancing greenhouse gas sinks. Act of fixing a system that has malfunctioned, preceded by an evaluation of all the components (source, collection and storage, pretreatment, final treatment, and dispersal) to determine the reason for the malfunction; certain jurisdictions may require a permit before mitigation occurs.

Mitred Joint

A joint made by cutting (mitring) preformed pipe sections to fit around bends in a pipeline.

Mixed-Flow Pump

A centrifugal pump in which the head is developed partly by centrifugal force and partly by the lift of the vanes on the liquid. This type of pump has a single inlet impeller; the flow enters axially and leaves axially and radially.

Mixed Liquor

The combination of primary effluent and active biological solids (return sludge) in the activated sludge process that is fed into the aeration tank.

A mixture of raw or settled wastewater and activated sludge contained in an aeration tank in the activated-sludge process. See also MIXED LIQUOR SUSPENDED SOLIDS.

Mixed Liquor Suspended Solids (MLSS)

Suspended solids in the mixed liquor of an aeration tank. The concentration of suspended solids in activated-sludge mixed liquor, expressed in milligrams per liter (mg/L). Commonly used in connection with activated-sludge aeration units.

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. That fraction of the suspended solids in activated-sludge mixed liquor that can be driven off by combustion at 550 °C (1022 °F); it indicates the concentration of microorganisms available for biological oxidation.

Mixed-Media Filter

A filter containing filtering media of different particle size or density.

Mixed Media Gravity Filter

A filter using more than one filtering media (such as coal and sand).

Mixed Potential

The potential of a specimen (or specimens in a galvanic couple) when two or more electrochemical reactions are occurring. Also called galvanic couple potential.

Mixing Basin

A basin or tank in which agitation is applied to water, wastewater, or sludge to increase the dispersion rate of applied chemicals; also, tanks used for general mixing purposes.

Mixing Depth

The expanse in which air rises from the earth and mixes with the air above it until it meets air of equal or warmer temperature.

Mixing Zone

An area where an effluent discharge undergoes initial dilution and is extended to cover the secondary mixing in the ambient water body. A mixing zone is an allocated impact zone where water quality criteria can be exceeded as long as acutely toxic conditions are prevented.

Mixing Chamber

A chamber used to facilitate the mixing of chemicals with liquid or the mixing of two or more liquids of different characteristics. It may be equipped with a mechanical device that accomplishes the mixing.

Mixing Channel

A channel provided in a water or wastewater treatment plant; the hydraulic characteristics of the waterway or its construction features are such that chemicals or liquids are thoroughly mixed.

Mobile Source

A moving source of air pollution; includes cars, trucks, motorcycles, and airplanes.

Modified Aeration

A modification of the activated-sludge process in which a shortened period of aeration (1.5–3 h) is used with a reduced quantity of suspended solids (200–500 mg/L MLSS) in the mixed liquor. Sludge settling is usually poor; high suspended solids concentration may be expected in effluent.

Moist Soil

Condition in which a soil looks and feels damp; moist, cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

Moisture

Condensed or diffused water collected on or excluded to a surface. Moisture refers to the presence of water, often in trace amounts. Excessive moisture is usually undesirable in buildings as it can cause decay in timber or other organic material, corrosion in metals, and electrical short circuits.

Moisture Content

The amount of water or lost from the soil upon drying to a constant weight, expressed as the weight per unit weight of dry soil or as the volume of water per unit bulk volume of the soil. For a fully saturated medium, moisture content equals the porosity; in the vadose zone, moisture content ranges between zero and the porosity value for the medium. See POROSITY, VADOSE ZONE, SATURATED ZONE. The quantity of water present in soil, wastewater sludge, industrial waste sludge, and screenings, usually expressed in percentage of wet weight.

Molal Solution

Concentration of a solution expressed in moles of solute divided by 1000 g of solvent.

Molar Solution

Aqueous solution that contains 1 mole (gram-molecular weight) of solute in 1 L of the solution.

Mold and Mildew Resistance

The property of a material that enables it to resist the formation of fungus growth.

Mole

One mole is the mass numerically equal (in grams) to the relative molecular mass of a substance. It is the amount of substance of a system that contains as many elementary units (6.023×10^{23}) as there are atoms of carbon in 0.012 kg of the pure nuclide C^{12} ; the elementary unit must be specified and may be an atom, molecule, ion, electron, photon, or even a specified group of such units. (1) Molecular weight of a substance, normally expressed in grams. (2) A device to clear sewers and pipelines. (3) A massive harbor work, with a core of earth or stone, extending from shore into deep water. It serves as a breakwater, a berthing facility, or a combination of the two.

Molecular Diffusion

Process where molecules of various gases tend to intermingle and eventually become evenly dispersed.

Molecular Weight

The amount of mass in mole of molecules of a substance determined by summing the masses of the individual atoms comprising the molecule. One mole is equivalent to 6.02×10^{23} the molecules.

Monitoring (Monitor)

Measurement of the types and amounts of air pollution. The 1990 Clean Air Act requires states to monitor community air in polluted areas to check on whether the areas are being cleaned up according to schedules set out in the law. Also, the 1990 Clean Air Act requires certain large polluters to perform enhanced monitoring to provide an accurate picture of their pollutant releases such as keeping detailed records, participating in periodic inspections, and installing Continuous Emissions Monitoring Systems (CEMS). Routine observation, sampling, and testing of designated locations or parameters to determine the efficiency of treatment or compliance with standards or requirements. The procedure or operation of locating and measuring radioactive contamination by means of survey instruments that can detect and measure, as dose rate, ionizing radiations, the physical, chemical and biological analysis of water quality parameters as well as predictive measures of assessing nonpoint source water quality impacts. Act of verifying performance for a regulatory authority or a manufacturer (e.g., qualitative or quantitative monitoring as part of service visit).

Monitoring Bore

A bore constructed for the purpose of measuring water levels and/or taking samples for water quality analysis.

Monitoring Site

An area of land having defined boundaries within which long-term changes in environmental conditions, such as soils, vegetation and/or land use, can be studied.

The site may be left undisturbed to examine natural changes or may be specifically managed to examine the effects of particular treatments. Monitoring techniques include transect inventory, site photography, aerial photography, and remote sensing.

Monoculture

A cropping system where only one type of crop is grown.

Monod Equation

A mathematical expression first used by Monod in describing the relationship between the microbial growth rate and concentration of growth-limiting substrate.

Monomer

A molecule usually an organic compound, having the ability to join with a number of identical molecules to form a polymer.

Montmorillonite

Clay material comprising a group of aluminosilicate minerals with a 2:1 expanding crystal lattice structure. They are reactive clays generally with high shrink/swell potential and high cation exchange capacity.

Monument

Permanent surveyor's bench mark.

Most Probable Number (MPN)

That number of organisms per unit volume which, in accordance with statistical theory, would be more likely than any other number to yield the observed test result or would yield the observed test result with the greatest frequency. Expressed as density of organisms/100 mL. Results are computed from the number of positive findings of coliform group organisms resulting from multiple portion decimal dilution plantings. Used commonly for coliform bacteria.

Mottles, Soil

Subordinate color in a soil horizon of a differing Munsell color system notation.

Mottling

The presence of more than one soil color in the same soil horizon, not including different nodule colors. The sub-dominant colors normally occur as scattered blobs or blotches, which have definable differences in hue, value or chroma from the dominant color. Mottling is often indicative of stow internal drainage, but may also be a result of parent material weathering.

Motor Controller

A specialized type of controller whose typical functions performed by a motor controller include starting, accelerating, stopping, reversing, and protecting motors.

Mound

Above-grade soil treatment area designed and installed with at least 12 inches of clean sand (ASTM C-33) between the bottom of the infiltrative surface and the original ground elevation; utilizes pressure distribution; a final cover of suitable soil material stabilizes the surface and supports vegetative growth. An artificial elevation of earth, proportionally similar in length and width, typically constructed as a temporary storage of soil materials or permanently constructed for landscaping purposes during the rehabilitation of disturbed terrain. Small mounds are sometimes used for erosion control in horticultural crops.

Mound, Modified

Above-grade soil treatment area designed and installed with greater than 0 and less than 12 inches of clean sand (ASTM C-33) between

the bottom of the infiltrative surface and the original ground elevation; utilizes pressure distribution; a final cover of suitable soil material stabilizes the surface and supports vegetative growth.

Mount Pinatubo

A volcano in the Philippine Islands that erupted in 1991. The eruption of Mount Pinatubo ejected enough particulate and sulfate aerosol matter into the atmosphere to block some of the incoming solar radiation from reaching Earth's atmosphere. This effectively cooled the planet from 1992 to 1994, masking the warming that had been occurring for most of the 1980s and 1990s.

Moving Average

Trend analysis tool for determining patterns or changes in treatment process. For example, a 7-day moving average would be the sum of the datum points for 7 days divided by 7.

Mudballs

(1) Accretions of siliceous incrustations on the exterior surface of sand grains. From these incrustations grow numerous filamentous organisms over which there is a gelatinous coating. Mudballs are approximately spherical in shape and vary in size from that of a pea up to 1 or 2 in. (2.5 to 5.1 cm) or more in diameter. They are formed principally by the retention and gradual building up of growths that are not completely removed by the washing process. (2) Balls of sediment sometimes found in debris-laden flow and channel deposits.

Mudflats

Mudflats are area of mud that do not support any vegetation and are often covered by water.

Mud Blanket

A layer of flocculant material that forms on the surface of a sand filter.

Mulch

Leaves, straw or compost used to cover growing plants to protect them from the wind or cold. A natural or artificial layer of plant residue or other material on the soil surface, which provides protection against erosion and aids plant establishment mainly by restricting moisture loss. It may also increase infiltration and minimize temperature fluctuations. Mulches most commonly used in soil conservation are:

Bitumen: Applied as an even layer. Slow breaking anionic bitumen emulsion is used as a mulch following the broadcasting of seed and fertilizer, it is also used to secure other mulches, such as straw, to the exposed surface.

Mesh/Netting: Although these materials are principally used to secure other types of mulch, they themselves can be applied directly as a mulch, particularly those with a fine weave.

Straw/Hay: Provides a protective mulch it at least 3–5 cm deep, but preferably should be 6–10 cm deep, spread evenly over the surface.

Wood Pulp/Paper Pulp: Typically used in conjunction with hydro mulching and hydro seeding.

Mulching

The application or retention of a mulch. Usually refers to the application of mulch to disturbed areas as a temporary expedient to assist the establishment of permanent vegetative cover, or the retention of plant residues on arable land between cropping phases to assist in erosion control.

Mullock

Discarded rock which does not contain ore that can be economically extracted.

Multimedia Exposure

Exposure to a toxic substance from multiple pathways such as air, water, soil, food, and breast milk.

Multimedia Filter Beds

A filtration apparatus consisting of two or more media, such as anthracite and sand, through which wastewater flows and by which it is cleansed. Media may be intermixed or segregated.

Multiple-Hearth Incinerator

A counter current-type of incinerator frequently used to dry and burn partially dried sludges. Heated air and products of combustion pass by finely pulverized sludge that is continuously raked to expose fresh surfaces.

Multiple-Stage Sludge Digestion

The progressive digestion of waste sludge in two or more tanks arranged in series.

Multistage Pump

A centrifugal pump with two or more sets of vanes or impellers connected in series in the same casing. Such a pump may be designated as two-stage, three-stage, or more, according to the number of sets of vanes used. The purpose is to increase the head of the discharging fluid.

Municipal Discharge

Discharge of effluent from wastewater treatment plants operated by municipalities or public sewerage authorities; may include wastewater from households, commercial establishments, and industries.

Municipal Solid Waste (MSW)

Residential solid waste and some non-hazardous commercial, institutional, and industrial wastes. This material is generally sent to municipal landfills for disposal.

Municipal Wastewater Treatment

Generally includes the treatment of domestic, commercial, and industrial wastes.

Municipal Water System

A water system that has at least five service connections or which regularly serves 25 individuals for 60 days; also called a public water system.

Munsell Color System

Color designation system that specifies the relative degrees of the three variables of color: hue, value, and chroma; for example: 10YR 6/4 is the color called 'strong brown' with a hue=10YR, value=6, and chroma=4; part of the classification system is commonly used to specify soil color.

Mutagenic

The ability of a chemical or physical agent to produce heritable changes in the DNA of living cells.

N

Nappe

The sheet or curtain of water overflowing a weir or dam. When freely overflowing any given structure, it has a well-defined upper and lower surface.

National Ambient Air Quality Standards (NAAQS)

Health-based pollutant concentration limits established by EPA that apply to outside air (see CRITERIA POLLUTANTS).

National Emissions Standards for Hazardous Air Pollutants (NESHAPS)

Emissions standards set by EPA for air pollutants not covered by NAAQS that may cause an increase in deaths or in serious, irreversible, or incapacitating illness; includes toxic emissions such as benzene.

National Low Emissions Vehicle Program (NLEV)

A program that creates voluntary requirements that U.S. automakers can adopt in lieu of compliance with other vehicle emission control measures. The program applies to the manufacture of

new light-duty vehicles and new light-duty trucks up to 6,000 lb gross vehicle weight rating (GVWR).

National Pollutant Discharge Elimination System (NPDES)

A permit that is the basis for the monthly monitoring reports required by most states in the United States.

National Pollutant Release Inventory (NPRI)

A Canadian program, created in 1992, to provide information on pollutants released to the environment and transferred for disposal. Reporting of NPRI is mandated under the Canadian Environmental Protection Act (CEPA) and is due by June 1 of the following year. Each year, Environment Canada updates the NPRI substance list and revises reporting criteria after consultation with stakeholders.

Natural Gas

Natural gas is a mixture of hydrocarbons (mainly methane (CH₄)) and is produced either from gas wells or in conjunction with crude oil production.

Because of the gaseous nature of this fuel, it must be stored onboard a vehicle in either a compressed gaseous state (CNG) or in a liquefied state (LNG).

Natural Resources

Natural resources include renewable (forest, water, soil, wildlife, etc.) and non-renewable (oil, coal, iron ore, etc.) resources that are natural assets. The naturally-occurring components of the environment which are of value to the human population. Including land, soil, water, flora, fauna, minerals and energy sources. The value may be direct in that the resource fulfills an immediate human need and can be bought or sold (e.g. fish, timber), or it may be indirect, in that it is needed to support or provide amenities important to humans (e.g. landscape). Natural resources may also be classified according to the nature of their supply. In this way they are categorized as renewable (e.g. forests), non-renewable (e.g. fossil fuels) or continuous (e.g. solar energy). In the broadest sense, soils are a renewable resource, because their formation is an ongoing natural process. However, under current Australian conditions particularly this process is so slow that for soil conservation purposes they should be regarded as nonrenewable. The value of natural resources also involves a time component in that it may depend on future availability or technology.

Natural Sources

Natural sources are the non-manmade emission sources, including biological and geological sources, wildfires, and windblown dust.

Natural Systems

Ecologically based biological wastewater treatment systems such as constructed wetlands having minimal dependence on mechanical elements.

Natural Variability

Variations in the mean state and other statistics (such as standard deviations or statistics of extremes) of the climate on all time and space scales beyond that of individual weather events. Natural variations in climate over time are caused by internal processes of the climate system, such as El Niño, as well as changes in external influences, such as volcanic activity and variations in the output of the sun.

Natural Ventilation

An air space bounded by one or more permeable surfaces allowing a degree of air movement (e.g. an attic space below an unsarked tiled roof), "Natural Ventilation".

Negative Head

(1) The loss of head in excess of the static head (a partial vacuum). (2) A condition of negative pressure produced by clogging of rapid sand filters near the end of a filter run.

Negative Pressure

A pressure less than the local atmospheric pressure at a given point.

Nematode

Member of the phylum (Nematoda) of elongated cylindrical worms parasitic in animals or plants or free-living in soil or water.

Nephelometer

An instrument for comparing turbidities of solutions by passing a beam of light through a transparent tube and measuring the ratio of the intensity of the shattered light to that of the incident light.

Nephelometric Turbidity Unit (NTU)

Unit of measure for the turbidity of water. Essentially, a measure of the cloudiness of water as measured by a nephelometer. Turbidity is based on the amount of light that is reflected off particles in the water. Units of a turbidity measurement using a nephelometer.

Net Available Head

The difference in pressure between the water in a power conduit before it enters the water wheel and the first free water surface in the conduit below the water wheel.

Netting

Coarse mesh material usually placed on top of a mulch to prevent its displacement and thus provide protection to the soil surface from erosion during the early stages of revegetation. Netting can also be laid directly on the surface as a protective measure in certain circumstances, such as on a steep rocky batter prone to mass movement. Common netting materials are wire, plastic, paper, cotton or other woven synthetic or fibrous materials. The netting should be pinned firmly to the ground surface and not traversed by vehicles.

n Factor

Values of the roughness coefficient used in Manning formula or Kutter formula. See also ROUGHNESS COEFFICIENT, MANNING FORMULA.

Neurological Disorders

Disorders of the central nervous system (brain, brainstem and cerebellum), the peripheral nervous system (including cranial nerves), and the autonomic nervous system (parts of which are

located in both central and peripheral nervous system). Major conditions include, headache; dementia, including Alzheimer's disease; seizures and epilepsy; sleep disorders; infections; movement disorders such as Parkinson's disease; and spinal cord disorders.

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.

New Source Performance Standards (NSPS)

Pollutant emission limits for newly constructed sources. U.S. federal standards promulgated for major and minor sources on a category-category basis. NSPS are national emission standards that are progressively tightened over time to achieve a steady rate of air quality improvement without unreasonable economic disruption. The NSPS imposes uniform requirements on new and modified sources through the nation. These standards are based on the best demonstrated technology (BDT).

New Source Review (NSR)

New source review (NSR) typically means any new source locating in a, e.g., ozone nonattainment area that will emit volatile organic compounds (VOCs) and/or oxide of nitrogen (NO) in certain amounts. These sources must: undergo a new source review that provides for offsetting emissions for any increases in the emissions of these two pollutants; use the lowest achievable emissions technology to control emissions; apply for a construction permit; and meet other state requirements before the new emission from the source can be permitted. Existing sources, located in the ozone nonattainment area, that emit these two pollutants and plan to change their operational methods that will cause an increase in the

emissions of these two pollutants must apply for a modification permit and undergo a review similar to a new source. New Source Review (NSR) is a permitting procedure for new or modified stationary sources. NSR applies if the emissions from the new source are above a trigger level.

NIST Cert of Standards

The National Institute of Standards and Technology (NIST) provides standard reference materials used to confirm the accuracy and traceability of standards for calibrating instrumentation used to measure atmospheric concentrations of air pollutants.

Nitrate (NO₃⁻)

An oxygenated form of nitrogen.

Nitric Oxide (NO)

Precursor of ozone, NO₂, and nitrate; usually emitted from combustion processes. Converted to nitrogen dioxide (NO₂) in the atmosphere, it then becomes involved in the photochemical process and/or particulate formation.

Nitrification

Biological oxidation of ammonium (NH₄⁺) to nitrite (NO₂⁻) and nitrate (NO₃⁻), or a biologically induced increase in the oxidation state of nitrogen. The oxidation of ammonia nitrogen to nitrate nitrogen in wastewater by biological or chemical reactions. See also DENITRIFICATION.

Nitrifying Bacteria

Bacteria capable of oxidizing nitrogenous material.

Nitrite (NO₂)

An intermediate oxygenated form of nitrogen.

Nitrogen (N)

Essential chemical element and nutrient for all life forms; molecular formula (N₂), constitutes 78% of the atmosphere by volume; nitrogen is present in surface water and groundwater as ammonia (NH₃), nitrite (NO₂⁻), nitrate (NO₃⁻), and organic nitrogen; excess levels of nitrogen in marine areas may contribute to eutrophication.

Nitrogen Cycle

The natural circulation of nitrogen among the atmosphere, plants, animals, and microorganisms that live in soil and water. Nitrogen takes on a variety of chemical forms throughout the nitrogen cycle, including nitrous oxide (N₂O) and nitrogen oxides (NO_x). A graphical presentation of the conservation of matter in nature showing the chemical transformation of nitrogen through various stages of decomposition and assimilation. The various chemical forms of nitrogen as it moves among living and nonliving matter are used to illustrate general biological principles that are applicable to wastewater and sludge treatment.

Nitrogen Dioxide (NO₂)

The result of nitric oxide combining with oxygen in the atmosphere; major component of photochemical smog.

Nitrogen Fixation

Generally, the conversion of free nitrogen to nitrogen combined with other elements. Specifically in soils, the assimilation of atmospheric nitrogen

from the soil air by soil organisms to produce nitrogen compounds that eventually become available to plants.

Nitrogen, Kjeldahl

Combination of ammonia nitrogen (NH_3) and organic nitrogen in a wastewater sample; total Kjeldahl nitrogen is operationally defined by a method that involves digestion of a sample followed by distillation and determination of ammonia (NH_3) in the distillate.

Nitrogen, Nitrate (NO_3^-)

Stable oxidized form of nitrogen; nitrifying bacteria can convert nitrite (NO_2^-) to nitrate (NO_3^-) in the nitrogen cycle.

Nitrogen, Nitrite (NO_2^-)

Unstable oxidized form of nitrogen.

Nitrogen, Organic

Nitrogen bound in plant and animal matter, primarily amino acids and proteins; the amount of organic nitrogen can be obtained by separately measuring the ammonia nitrogen and subtracting that value from the total Kjeldahl nitrogen.

Nitrogen Oxides (NOx)

A criteria air pollutant. Nitrogen oxides are produced from burning fuels, including gasoline and coal. Nitrogen oxides are smog formers, which react with volatile organic compounds to form smog. Nitrogen oxides are also major components of acid rain. Nitrogen oxides (Oxides of Nitrogen, Nox) is a general term pertaining to compounds

of nitric oxide (NO), nitrogen dioxide and other oxides of nitrogen. Nitrogen oxides are typically created during combustion, combustion processes, and are major contributors to smog formation and acid deposition. NO_2 is a criteria air pollutant and may result in numerous adverse health effects. They are produced in the emissions of vehicle exhausts and from power stations. An essential nutrient that is often present in wastewater as ammonia, nitrate, nitrite, and organic nitrogen. The concentrations of each form and the sum (total nitrogen) are expressed as milligrams per liter (mg/L) elemental nitrogen. Also present in some groundwater as nitrate and in some polluted groundwater in other forms. See also NUTRIENT. This nutrient is present in various forms in wastewater, principally ammonia and nitrate. An element essential to the growth and development of plants; occurs in manure and chemical fertilizer and, in excess, can cause waters to become polluted by promoting excessive growth of algae and other aquatic plants.

Nitrogen Oxides (NOx, Frequently Pronounced "nox")

Gases formed in great part from atmospheric nitrogen and oxygen when combustion takes place under conditions of high temperature and high pressure; considered a major air pollutant and precursor of ozone.

Nitrogenous Oxygen Demand (NOD)

A quantitative measure of the amount of oxygen required for the biological oxidation of nitrogenous material, such as ammonia nitrogen and organic nitrogen, in wastewater; usually measured after the carbonaceous oxygen demand has been satisfied. See also BIOCHEMICAL OXYGEN DEMAND, NITRIFICATION, SECOND-STAGE BOD.

Nitrogen, Total

Measure of the complete nitrogen content in wastewater including nitrate (NO_3^-), nitrite (NO_2^-), ammonia (NH_3), ammonium (NH_4^+), and organic nitrogen, expressed as mg/L of N; all these forms of nitrogen (as well as nitrogen gas [N_2]) can be biochemically converted from one form to another and are constituents of the nitrogen cycle.

Nitrogen, Total Kjeldahl (TKN)

Measure of the total concentration of organic nitrogen, ammonia, and ammonium nitrogen.

Nitrogen Removal

The removal of nitrogen from wastewater through physical, chemical, or biological processes, or by some combination of these.

Nitrosomonas

A genus of bacteria that oxidize ammonia to nitrate.

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.

Nitrogen oxides (NOx)

A criteria air pollutant. Nitrogen oxides are produced from burning fuels, including gasoline and coal. Nitrogen oxides are smog formers, which react with volatile organic compounds to form smog. Nitrogen oxides are also major components of acid rain.

NOA

Naturally occurring asbestos (NOA) is the six asbestos minerals that have been identified as toxic air contaminants and occur naturally in rocks and soils. During many earth-disturbing activities, asbestos minerals may be released from rocks and soils, become airborne and inhaled deep into the lung.

Noble Metal

A metal which is not very reactive (as silver, gold, or copper) and may be found naturally in metallic form on earth.

Nocardia

Irregularly bent, short filamentous organisms that are characterized in an activated-sludge system when a dark chocolate mousse foam is present.

Nodule (Concretion)

A small segregated mass of material that has accumulated in the soil because of the concentration of one or more particular constituents, usually by chemical or biological action. Nodules vary widely in size, shape, hardness and color, and may be composed of iron or manganese compounds, calcium carbonate or other materials.

Noise

Noise is unwanted sound.

Noise Pollution

Environmental pollution made up of harmful or annoying noise.

Non-Aqueous Phase Liquid (NAPL)

Contaminants that remain as the original bulk liquid in the subsurface.

Non-Attainment Area

A geographic area in which a criteria air pollutant level is higher than allowed by the federal standards. A single geographic area may have an acceptable level for one criteria air pollutant, but have unacceptable levels of one or more other criteria air pollutants. Thus, an area can be both an attainment and non-attainment area at the same time. Sixty percent of Americans are estimated to live in non-attainment areas. *Nonattainment Area is defined geographic area that does not meet one or more of the federal air quality standards for the criteria pollutants.*

Nonattainment Transitional

A subcategory of the nonattainment designation category for state standards that signals progress and implies the area is nearing attainment. Districts with nonattainment-transitional status may revise their attainment plans to delay adoption of control measures anticipating attainment without the measures.

Nonclogging Impeller

An impeller of the open, closed, or semi closed type designed with large passages for passing large solids.

Non-Combustible Construction

Buildings in which walls, partitions, structural elements, floors, ceilings, roofs and exits are made of non-combustible materials and which require higher fire resistance ratings than combustible construction.

Non-Combustibility

The property of a material that enables it to withstand high temperatures without ignition. SAINT-GOBAIN ISOVER basic glass and stone wool insulation materials have a natural fire resistance, and are considered non-combustible when tested in accordance with international standards.

Non-Carcinogenic Effects

Non-cancer health effects which may include birth defects, organ damage, morbidity and death.

Non-Industrial Source

Any of a large number of sources—such as mobile, area-wide, indirect and natural sources—which emit substances into the atmosphere.

Non-Methane Hydrocarbon (NMHC)

The sum of all hydrocarbon air pollutants, excluding methane; significant precursors to ozone formation.

Non-Methane Organic Gases (NMOG)

The sum of all organic air pollutants, excluding methane. NMOG account for aldehydes, ketones, alcohols, and other pollutants that are not hydrocarbons but are precursors of ozone.

Non-Methane Volatile Organic Compounds (NMVOCs)

Organic compounds, other than methane, that participate in atmospheric photochemical reactions.

Non-Plastic

Describes soil malarial which shows no plastic behavior, irrespective of its moisture content.

Non-Point Sources

Diffuse pollution sources that are not recognized to have a single point of origin. Diffused pollutants that are washed off the land (runoff) during the natural process of rainwater flowing across the land to rivers, lakes, oceans and other water bodies. A source of pollution which cannot be pinpointed. In a soil conservation context it typically applies to a sediment source which is spread over a wide area. For example, an area of cropping land could be a nonpoint source of sediment contributing to the blocking of a road culvert.

Nonpoint Source Assessment

An evaluation of the state's waters on a watershed basis, consisting of the calculation of ordinal values for a number of NPS pollution related water quality impacting criteria, and resulting in (1) the nominal scaling of these criteria measures into three ranks, and (2) the creation of an overall NPS pollution water quality assignment similarly ranked.

Nonpoint Source Pollution

Sources of water pollution not associated with a distinct discharge source; includes rainwater, erosion, runoff from roads, farms, and parking lots, and seepage from soil-based wastewater disposal systems.

Non-Potable

Water that is not known to be safe to drink because it may either contain pollutants, contaminants, minerals, or infectious agents or may contain harmful constituents due to it not being a "permitted" source of drinking water.

Non-Road Emissions

Pollutants emitted by combustion engines on farm and construction equipment, gasoline-powered lawn and garden equipment, powerboats, outboard motors, and some portable equipment.

Nonsettleable Solids

Suspended matter that will stay in suspension for an extended period of time. Such a period may be arbitrarily taken for testing purposes as 1 h. See also SUSPENDED SOLIDS.

Nonuniform Flow

A flow in which the slope, cross-sectional area, and velocity change from section to section in the channel.

Non-Ventilated

Air space enclosed by non permeable building materials.

No-Observed-Adverse-Effect-Level (NOAEL)

A term used in risk assessment. An exposure level at which there are no statistically or biologically significant increases in the frequency or severity of adverse effects between an exposed population and a comparable non-exposed population.

No-Observed-Effect-Level (NOEL)

A term used in risk assessment. An exposure level at which there are no statistically or biologically significant difference or severity of any effect between an exposed population and a comparable non-exposed population.

Normalizing

Heating a ferrous alloy to a suitable temperature above the transformation range and then cooling in air to a temperature substantially below the transformation range.

No-Tillage (Zero Tillage)

A minimum tillage practice in which the crop is sown directly into a soil not tilled since the harvest of the previous crop. Weed control is achieved by the use of herbicides and stubble is retained for erosion control. It is typically practiced in arable areas where fallowing is important.

Nozzle

(1) A short, cone-shaped tube used as an outlet for a hose or pipe. The velocity of the emerging stream of water is increased by the reduction in cross-sectional area of the nozzle. (2) A short piece of pipe with a flange on one end and a saddle flange on the other end. (3) A side outlet attached to a pipe by riveting, brazing, or welding.

Nozzle Aerator

An aerator consisting of a pressure nozzle through which water is propelled into the air in a fine spray. Also called spray aerator.

Nutrient

Any substance that is assimilated by organisms and promotes growth; generally applied to nitrogen and phosphorus in wastewater, but also to other essential and trace elements.

Nuclear Energy

Energy or power produced by nuclear reactions (fusion or fission).

Nuclear Reactor

An apparatus in which nuclear fission may be initiated, maintained, and controlled to produce energy, conduct research, or produce fissile material for nuclear explosives.

Nuclear Tests

Government tests carried out to supply information required for the design and improvement of nuclear weapons, and to study the phenomena and effects associated with nuclear explosions.

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.

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 Sensitive Waters

Waters subject to excessive growth of microscopic and macroscopic vegetation that need additional nutrient management. In general, management strategies for point and nonpoint source pollution control are designed to prevent any increase in nutrients over background levels.

O

Ocean Acidification

Increased concentrations of carbon dioxide in sea water causing a measurable increase in acidity (i.e., a reduction in ocean pH). This may lead to reduced calcification rates of calcifying organisms such as corals, mollusks, algae and crustaceans.

Oceanography

The study of the ocean and ocean life.

Octane Number

A numerical measure of the antiknock properties of gasoline used as a motor fuel. The higher the octane number, the greater the antiknock properties.

Octanol-Water Partition Coefficient (K_{ow})

A coefficient representing the ratio of solubility of a compound in octanol to its solubility in water. As K_{ow} increases, water solubility decreases.

Odor

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

Odor Control

Prevention or reduction of objectionable odors by chlorination, aeration, or other processes, or by masking with chemical aerosols.

Odor Threshold

The point at which, after successive dilutions with odorless water or air, the odor of a sample can barely be detected. The threshold odor is expressed quantitatively by the number of times the sample is diluted with odorless water or air.

Off-Peak Power

That part of the available load or energy that can be produced at off-peak hours outside the load curve when the combined primary and secondary load has fallen below plant capacity.

Offset

A method used in the 1990 Clean Air Act to give companies which own or operate large (major) source in a nonattainment area flexibility in meeting overall pollution reduction requirements when changing production processes. If the owner or operator of the source wishes to increase release of a criteria air pollutant, an offset (reduction of a somewhat greater amount of the same pollutant) must be obtained either at the same plant or by purchasing offsets from another company.

Offsets

Offsets are tradable credits that represent greenhouse gas emissions reductions that are made in areas or sectors not covered by a cap-and-trade program. Under a greenhouse gas cap-and-trade program, covered entities could buy offset credits in lieu of buying allowances or reducing their greenhouse gas emissions on-site. One offset credit would be equal to one metric ton of greenhouse gas emissions. Offsets must meet rigorous criteria that demonstrate that the emissions reductions are real, permanent, verifiable, enforceable and quantifiable.

Off-Take

A controllable device usually located within a Weir or a Channel which allows water to be diverted to a stream other than the main Water Course, or to a storage area.

Ohm

The unit of measurement of electrical resistance. It is that resistance through which an electromotive force of one volt will produce a current of one ampere.

OHSAS 18001

OHSAS 18001 is an Occupation Health and Safety Assessment Series for health and safety management systems. It is intended to help an organizations to control occupational health and safety risks. It was developed in response to widespread demand for a recognized standard against which occupational safety management systems can be assessed. It is compatible with ISO 9001 and ISO 14001. It covers issues such as planning for hazard identification, risk assessment/control, OHS management, awareness and competence, training, communication, emergency preparedness and response, performance measuring and improvement.

Oil

A black, sticky substance used to produce fuel (petroleum) and materials (plastics).

Oil Interceptor

Oil interceptor is a device designed to remove small oil globules by gravity from the water by limiting the flow velocity and the overflow rate.

Oil Separation

(1) Removal of insoluble oils and floating grease from municipal wastewater. (2) Removal of soluble or emulsified oils from industrial wastewater.

Oil Spills

The harmful release of oil into the environment, usually in the water, sometimes killing area flora and fauna. Oil spills are very difficult to clean up.

Olefin

A class of unsaturated hydrocarbons having the general formula C_nH_{2n} . Olefins in gasoline are responsible for the formation of deposits in storage tanks, fuel ducts and injectors. Therefore, their volume is limited by the reformulated gasoline regulation.

On Allocation

On Allocation is the normal operation condition where water extracted is deducted from Allocation.

On-Board Diagnostics (OBD)

Devices that are incorporated into the computer systems of new motor vehicles to monitor components and systems that affect emissions when malfunctioning. If a problem is detected, the OBD system illuminates a warning lamp on the vehicle instrument panel to alert the driver. This warning lamp typically contains the phrase Check Engine or Service Engine Soon. The system will also store important information about the detected malfunction so that a repair technician can accurately find and fix the problem.

On-Board Vapor Recovery

Devices placed on vehicles to capture gasoline vapor during refueling and then route the vapours to the engine when the vehicle is started so that they can be efficiently burned.

On-Farm Storage

A privately owned water holding structure in which water taken from one of these water sources is often held for later use.

One-Coat Cement

A mixture of various insulation fibers, fillers and binders with hydraulic-setting cement. The material can be applied directly to fittings to match adjacent insulation thickness in one application and smoothed to provide a hard finish.

Onsite

Local wastewater treatment for a single house or small community.

Opacity

The amount of light obscured by particle pollution in the atmosphere. Opacity is used as an indicator of changes in performance of particulate control systems.

Open Burning

The uncontrolled burning of waste materials in the open, in outdoor incinerators, or in an open dump, either intentionally or accidentally.

Open Cell Foam

A material comprised predominantly of interconnecting cellular voids.

Open Centrifugal Pump

A centrifugal pump in which the impeller is built with a set of independent vanes.

Open Channel

Any natural or artificial water conduit in which water flows with a free surface (Fig. 13).

Fig. 13 Open channel**Open-Channel Flow**

Flow of a fluid with its surface exposed to the atmosphere. The conduit may be an open channel or a closed conduit flowing partly full.

Open-Circuit Potential

The *potential* of an electrode measured with respect to a reference electrode or another electrode when no current flows to or from it.

Open-Cut Mine

A mining operation where the extraction of the ore is carried out from the ground surface, working downwards removing overburden and spoil until the required seam of ore is reached, Removal is by surface based machinery and vehicles. Rehabilitation of the area after such a mining operation may involve considerable filling and extensive reshaping of the land surface as well as top soiling, revegetation and the implementation of a range of soil conservation measures.

Open Impeller

An impeller without attached side walls.

Operating Level

Elevation of effluent in a tank; for a septic tank, operating level is determined by the invert of the outlet piping; for a pump tank, operating level is determined by the elevation of operational controls.

Operating Pressure

Operating Pressure is the internal mains pressure that occurs at a particular time and at a particular point in a water supply system.

Operators

(1) Persons employed to operate a treatment facility. (2) Mechanism used to manipulate valve positions.

Ordinary High Water Level

Elevation delineating the highest water level that has been maintained for a sufficient period of time to leave evidence upon the landscape; commonly the point where the natural vegetation changes from predominantly aquatic to predominantly terrestrial.

Ore

Rock or other geologic material from which minerals are extracted. The economics of mineral extraction are determined by the relationship between the costs of mining and concentrating the minerals, and their current market value.

Orebody

Generally a solid and fairly continuous mass of ore, which may include low-grade and waste as well as pay ore, but is differentiated by form or character from adjoining country rock.

Organic

Substances that come from animal or plant sources. Organic substances always contain carbon. (Inorganic materials are chemical substances of mineral origin.) Refers to volatile, combustible, and sometimes biodegradable chemical compounds containing carbon atoms (carbonaceous) bonded together with other elements. The principal groups of organic substances found in wastewater are proteins, carbohydrates, and fats and oils. See also INORGANIC. Compounds containing carbon.

Organic Acid

A chemical compound with one or more carboxyl radicals (COOH) in its structure; examples are butyric acid, $\text{CH}_3(\text{CH}_2)_2\text{COOH}$; maleic acid, $\text{HOOCCH}=\text{CHCOOH}$; and benzoic acid, $\text{C}_6\text{H}_5\text{COOH}$.

Organic Chemicals

Naturally occurring (animal or plant-produced or synthetic) substances containing mainly carbon, hydrogen, nitrogen, and oxygen.

Organic Compounds

A large group of chemical compounds containing mainly carbon, hydrogen, nitrogen, and oxygen. All living organisms are made up of organic compounds. Organic Compounds are a large group of chemical compounds that contain carbon. All living organisms are made up of organic compounds. Some types of organic gases, including olefins, substituted aromatics and aldehydes, are highly reactive—i.e., have high ozone-producing potential.

Organic Loading

The pounds of BOD per day applied to a unit process. The amount of organic material, usually measured as BOD_5 , applied to a given treatment process; expressed as weight per unit time per unit surface area or per unit weight.

Organic Material

Material that can be broken down by bacteria (fats, meats, plant life).

Organic Matter

Plant and animal residues, or substances made by living organisms. All are based upon carbon compounds.

Organic Nitrogen

Nitrogen chemically bound in organic molecules such as proteins, amines, and amino acids.

Organic Soil

A soil in which soil organic matter dominates the profile. The surface 30 cm should contain 20% or more organic matter if the clay content of the mineral soil is 15% or lower, or 30% or more organic matter if the clay content of the mineral soil is higher than 15%.

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.

Organic Zinc Coating

A paint containing zinc powder pigment and an organic (containing carbon) resin.

Organic Zinc-Rich Paint

Coating containing zinc powder pigment and an *organic* resin.

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.

Organisms

Organisms are living thing, animal or plant, that is capable of carrying out life processes.

Orientation

Position relative to true north, to points on the compass, or to a specific place or object.

Orifice

(1) An opening with a closed perimeter, usually of regular form, in a plate, wall, or partition through which water may flow; generally used for the purpose of measurement or control of such water. The edge may be sharp or of another configuration. (2) The end of a small tube such as a pitot tube or piezometer.

Orifice Plate

A plate containing an orifice. In pipes, the plate is usually inserted between a pair of flanges and the orifice is smaller in area than the cross section of the pipe.

Orifice Shield

Part or device used to protect an orifice from external blockage.

Orthophosphate

(1) A salt that contains phosphorus as $(\text{PO}_4)^{2-}$. (2) A product of hydrolysis of condensed (polymeric) phosphates. (3) A nutrient required for plant and animal growth. See also NUTRIENT, PHOSPHORUS REMOVAL.

Osmosis

The process of diffusion of a solvent through a semipermeable membrane from a solution of lower concentration to one of higher concentration.

OTEC—Ocean Thermal Energy Conversion Technology

Which uses the temperature differential between warm surface water and cold deep water to run heat engines to produce electrical power.

Out of Pit Emplacement

A stockpile of overburden material away from the excavation of an open-cut or strip-mine. The material is often used to fill the final void, for landscaping purposes during rehabilitation, or is left at the site of emplacement, landscaped and stabilized.

Outcrop

The exposure at the surface of rock that is inferred to be continuous with underlying bedrock.

Outdoor Wood-Fired Hydronic Heaters (OWHH)

Also known as an “Outdoor Wood Heater,” “Outdoor Wood Boiler,” or “Outdoor Wood Furnace”, these units burn wood to heat water that is piped underground to a nearby structure (usually a home) resulting in heat for the building. An OWHH resembles a small shed with a smokestack, typically located on the outside of the building to be heated. Outdoor wood-fired hydronic heaters can be substantially dirtier and less efficient than most other home heating technologies. With their smouldering fires and short smokestacks (usually no more than 6–10 feet tall), OWHHs can create heavy smoke and release it close to the ground, where it may linger and expose people in the area to nuisance conditions and health risks.

Outfall

The discharge pipe that carries sewage treatment plant effluent to a receiving body of water. The effluent leaves the pipe through a series of

“diffuser ports”, not unlike giant shower heads, that ensure the effluent is rapidly and effectively diffused into the lake environment to minimize environmental impacts. (1)The point, location, or structure where wastewater or drainage discharges from a sewer, drain, or other conduit. (2) The conduit leading to the ultimate disposal area. place where effluent is discharged into receiving waters.

Outlet

A point on the wiring system at which the current is taken to supply utilization equipment. The point at which water discharges from a river, creek or other flow line; lake, tidal basin or drainage depression; or pipe, channel, dam or other hydrologic structure.

Outlet Channel

A natural or constructed channel used primarily to carry water away from hydrologic structures such as banks and dams.

Outstanding Resource Waters

Unique waters of exceptional state or national recreational or ecological significance that require special protection to maintain existing uses.

Overaging

Aging under conditions of time and temperature greater than those required to obtain maximum change in a certain property, so that the property is altered in the direction of the initial value.

Overall Tine Spacing

The lateral distance between tine centers across a tillage implement, rather than along a rank. This distance is usually uniform across the implement.

Overburden

Soil and rock material which must be excavated to expose an ore body or coal seam in preparation for open' cut mining.

Overclearing

The removal of trees and shrubs, particularly from steep areas, to an extent which makes the land susceptible to appreciable soil erosion. The presence of permanent tree cover on many steep lands ensures their stability. However, removal of the trees increases erosion hazard due mainly to the slope and the typical shallowness and erodibility of soils on such land, and can also cause soil salting. It may also leave insufficient shade and shelter for livestock. In arid and semi-arid areas the removal of trees and shrubs increases the risk of wind erosion.

Over-Development

Expansion or development of land to the point of damage.

Overdraw

The excess over an Allocation which, under certain circumstances and subject to conditions, may be taken in advance of the following Water Year.

Overfall

An abrupt vertical drop in the bed of a flow line. For soil conservation purposes it usually applies to the rim of a gully head over which runoff falls, it also applies to vertical or near vertical drops in the gully floor further downstream, which may be associated with rock outcrops.

Over-Fishing

Fishing beyond the capacity of a population to replace itself through natural reproduction.

Overflow Rate

One of the criteria in the design of settling tanks for treatment plants; expressed as the settling velocity of particles that are removed in an ideal basin if they enter at the surface. It is expressed as a volume of flow per unit water surface area.

Overflow Weir

Any device or structure over which any excess water or wastewater beyond the capacity of the conduit or container is allowed to flow or waste.

Over-Grazing

Grazing livestock to the point of damage to the land. Continued grazing of pasture or rangeland at a level which permanently and adversely affects its plant components. This leads to a reduced capacity to produce forage, deterioration in pasture or range condition and increased erosion hazard.

Overheating

Heating a metal or alloy to such a high temperature that its properties are impaired. When the original properties cannot be restored by further heat treating, by mechanical working, or by a combination of working and heat treating, the overheating is known as *burning*.

Overland flow

(1) The flow of water over the ground before it enters some defined channel. (2) A type of wastewater irrigation.

Overland Flow Land Treatment

Partially treated wastewater is applied to relatively impermeable soils at the top of a grass-covered gradient. The waste is cleaned by the vegetation and microbial action, and excess water is captured at the bottom of the slope.

Overload

When a metal part has been subjected to a single stress beyond its tensile strength, it can fail by overload. The fracture can be either ductile or brittle, depending on factors such as the metal's hardness and operating temperature. In most cases, a single fracture results.

Over Pumping

Usage is apportioned on a daily basis according to orders. Over pumping represents the usage over and above the reconciled orders.

Override

(1) Operating parameter that allows for pump activation when the effluent level reaches a pre-set, excessively high level and allows continued operation until the level of effluent is below alarm activation level; (2) an override sensor; (3) act of manually initiating an event that normally occurs automatically.

Overturn

The phenomenon of vertical circulation that occurs in large bodies of water because of the increase in density of water above and below 39.2 °F (4 °C). In the spring, as the surface of the water warms above the freezing point, the water increases in density and tends to sink, producing vertical currents; in the fall, as the surface water becomes colder, it also tends to sink. Wind may also create such vertical currents.

Overspray

Airborne spray loss of polyurethane foam that leads to undesirable depositions of spray foam insulation on nearby surfaces.

Overstocking

The placement of a number of grazing animals on a given area of pasture or rangeland that will adversely affect its plant components by the end of the grazing period. The effect may only be temporary, and in this respect the term differs from overgrazing. However, continued overstocking will lead to overgrazing.

Overvoltage

The difference between the actual electrode potential when appreciable electrolysis begins and the reversible electrode potential.

Oxidant

A chemical substance capable of promoting oxidation, for example, O₂, O₃, and Cl₂. See also OXIDATION, REDUCTION. Oxidant is an air pollutant containing oxygen that can react chemically with other substances. Ozone, and nitrogen compounds are examples of oxidants.

Oxidation

(1) A chemical reaction in which the oxidation number (valence) of an element increases because of the loss of one or more electrons by that element. Oxidation of an element is accompanied by simultaneous reduction of the other reactant. See also REDUCTION. (2) The conversion of organic materials to simpler, more stable forms with the release of energy. This may be accomplished by chemical or biological means. (3) The addition of oxygen to a compound. The conversion of organic material to a more stable form using bacteria, chemicals, or oxygen. (4) A reaction in which there is an increase in valence resulting from a loss of electrons. Contrast with *reduction*. (5) A corrosion reaction in which the corroded metal forms an oxide; usually applied to reaction with a gas containing elemental oxygen, such as air.

Oxidation Ditch

A secondary wastewater treatment facility that uses an oval channel with a rotor placed across it to provide aeration and circulation. The screened wastewater in the ditch is aerated by the rotor and circulated at approximately 1–2 ft/sec (0.3 m/s). See also SECONDARY TREATMENT.

Oxidation Ponds

Oxidation ponds are basins in which wastewater undergoes a biological oxidation treatment by action of algae and bacteria. Oxidation Pond A relatively shallow body of wastewater contained in an earthen basin of controlled shape in which biological oxidation of organic matter is effected by natural or artificially accelerated transfer of oxygen.

Oxidation Direct

Oxidation direct is oxidation of substances in sewage without the benefit of living organisms, by the direct application of air or oxidizing agents such as chlorine.

Oxidation Process

Any method of wastewater treatment for the oxidation of the putrescible organic matter.

Oxidation–Reduction Potential (ORP)

The potential required to transfer electrons from the oxidant to the reductant and used as a qualitative measure of the state of oxidation in wastewater treatment systems.

Oxidation Sewage

Oxidation sewage is the process whereby, through the agency of living organisms in the presence of oxygen, the organic matter that is contained in sewage is converted into a more stable or a mineral form.

Oxidize

To chemically transform a substance by combining it with oxygen.

Oxidized Sludge

Sludge in which the organic matter has been stabilized by chemical or biological oxidation.

Oxidized Surface (On Steel)

Surface having a thin, tightly adhering, oxidized skin (from straw to blue in color), extending in from the edge of a coil or sheet.

Oxidized Wastewater

Wastewater in which the organic matter has been stabilized.

Oxidizing Agent

A compound that causes *oxidation*, thereby itself being reduced.

Oxyacetylene Welding

Gas welding in which fuel gas is acetylene and which is burnt in an oxygen atmosphere.

Oxygen (O)

A necessary chemical element. Typically found as O₂ and used in biological oxidation. It constitutes approximately 20% of the atmosphere.

Oxygen Concentration Cell

A galvanic cell resulting from difference in oxygen concentration between two locations; See DIFFERENTIAL AERATION CELL.

Oxygenate

An organic molecule that contains oxygen. Oxygenates are typically ethers and alcohols. The most common oxygenate is ethanol in gasoline, which now runs about 10% by volume. The purpose of the oxygenate is to help the gasoline burn more completely, reducing carbon monoxide emissions. This is especially important during the winter months.

Oxygen Consumed

Oxygen consumed is the quantity of oxygen taken up from potassium permanganate in solution by a liquid containing organic matter. Commonly regarded as an index of the carbonaceous matter present. Time and temperature must be specified.

Oxygen Demand

Chemical and biological oxygen demand (COD and BOD) are measures of the oxygen consumed when a substance degrades. Materials such as food waste and dead plant or animal tissue use up dissolved oxygen in the water when decomposed through chemical or biological processes.

Oxygen Dosing Station

An Oxygen Dosing Station is a device designed to dose sewage with oxygen.

Oxygen Transfer Ratio

Amount of oxygen absorbed by a liquid compared to the amount delivered into the liquid through an aeration or oxygenation device, usually expressed as the percentage equivalent; used to compare performance of aeration systems.

Oxygenated Fuel (Oxyfuel)

A special type of gasoline, which burns more completely than regular gasoline in cold start conditions; more complete burning results in reduced production of carbon monoxide, a criteria air pollutant. In some parts of the country, where carbon monoxide release from cars starting up in cold weather makes a major contribution to pollution, gasoline refiners must market oxygenated fuels, which contain higher oxygen content than regular gasoline.

Oxygenation Capacity

In treatment processes, a measure of the ability of an aerator to supply oxygen to a liquid.

Oxygen Consumed

A measure of the oxygen-consuming capability of inorganic and organic matter present in water or wastewater. See also CHEMICAL OXYGEN DEMAND.

Oxygen Deficiency

- (1) The additional quantity of oxygen required to satisfy the oxygen requirement in a given liquid; usually expressed in milligrams per liter (mg/L).
- (2) Lack of oxygen.

Oxygen Transfer

- (1) Exchange of oxygen between a gaseous and a liquid phase.
- (2) The amount of oxygen absorbed by a liquid compared to the amount fed into the

liquid through an aeration or oxygenation device; usually expressed as percent.

Oxygen Uptake Rate

The oxygen used during biochemical oxidation, typically expressed as mg O₂/L/h in the activated sludge process.

Oxygen Utilization

(1) The portion of oxygen effectively used to support aerobic treatment processes. (2) The oxygen used to support combustion in the degradation of sludge by incineration or wet-air oxidation.

Ozonation

The process of contacting water, wastewater, or air with ozone for purposes of disinfection, oxidation, or odor control.

Ozone (O₃)

Oxygen in a molecular form with three atoms of oxygen forming each molecule. A gas which is a variety of oxygen. The oxygen gas found in the air consists of two oxygen atoms stuck together; this is molecular oxygen. Ozone consists of three oxygen atoms stuck together into an ozone molecule. Ozone occurs in nature; it produces the sharp smell you notice near a lightning strike. High concentrations of ozone gas are found in a layer of the atmosphere—the stratosphere—high above the Earth. Stratospheric ozone shields the Earth against harmful rays from the sun, particularly ultraviolet B. Smog's main component is ozone; this ground-level ozone is a product of reactions among chemicals produced by burning coal, gasoline and other fuels, and chemicals found in products such as solvents, paints, and hair sprays. A powerfully oxidizing allotropic

form of the element oxygen. The ozone molecule contains three atoms (O₃). Ozone gas is decidedly blue, and both liquid and solid ozone are an opaque blue-black color, similar to that of ink.

Ozone, Ground-Level (GLO)

GLO is considered “bad”. Motor vehicle exhaust and industrial emissions, gasoline vapors, and chemical solvents as well as natural sources emit NO_x and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant.

Ozone Depletion

The reduction in the stratospheric ozone layer. Stratospheric ozone shields the Earth from ultraviolet radiation. The breakdown of certain chlorine and/or bromine-containing compounds that catalytically destroy ozone molecules in the stratosphere can cause a reduction in the ozone layer. Ozone Depletion is destruction of the stratospheric ozone layer, which shields the earth from ultraviolet radiation. This destruction is caused by the breakdown of certain chlorine and/or bromine-containing compounds (chlorofluorocarbons or halons) that catalytically destroy ozone molecules in the stratosphere.

Ozone Depleting Substance (ODS)

A family of man-made compounds that includes, but are not limited to, chlorofluorocarbons (CFCs), bromofluorocarbons (halons), methyl chloroform, carbon tetrachloride, methyl bromide, and hydrochlorofluorocarbons (HCFCs). These compounds have been shown to deplete stratospheric ozone, and therefore are typically referred to as ODSs.

Ozone Generator

Some indoor “air purifiers” or air cleaners emit ozone, a major component of outdoor smog, either intentionally or as a by-product of their design. Those that intentionally emit ozone are often called “ozone generators”.

Ozone Hole

Thin place in the ozone layer located in the stratosphere high above the Earth. Stratospheric ozone thinning has been linked to destruction of stratospheric ozone by CFCs and related chemicals. The 1990 Clean Air Act has provisions to reduce and eliminate ozone destroying chemicals’ production and use. Ozone holes have been found above Antarctica and above Canada and northern parts of the United States, as well as above northern Europe.

Ozone Layer

A layer of ozone in the lower portion of the stratosphere—12–15 miles above the Earth’s surface—which helps to filter out harmful ultraviolet rays from the sun. It may be contrasted with the ozone component of photochemical smog near the Earth’s surface, which is harmful.

Ozone Precursors

Chemicals such as non-methane hydrocarbons and oxides of nitrogen, occurring either naturally or as a result of human activities, which contribute to the formation of ozone, a major component of smog.

P

P (Phosphorus)

This nutrient, which is present in wastewater, acts as a fertilizer for algae in surface waters.

Package Plant

Term commonly used to describe a modular aerobic treatment system unit serving multiple dwellings or establishments with relatively large flows (greater than 1,500 gallons per day).

Package Sewage Treatment Plant

A package sewage treatment plant is a compact sewage treatment system suitable for treating the waste generated by populations of up to 5000 people.

Paddle Aerator

A device, similar in form to a paddle wheel, that is used in the aeration of water.

Pan (Hardpan)

A hardened, compacted and/or cemented horizon, or part thereof, in the soil profile. Such pans frequently reduce soil permeability and root

penetration and thus may give rise to plant growth and drainage problems. Deep ripping or chisel ploughing is used to overcome such problems. The hardness is caused by mechanical compaction or cementation of soil particles with organic matter or with materials such as silica, sesquioxides, or calcium carbonate. The hardness does not change appreciably with changes in moisture content, and pieces of the hard layer are not subject to slaking.

Pan Evaporation

The depth of evaporation from a free water surface determined by use of an evaporimeter and expressed in millimeters. The figure is used to estimate evapotranspiration in field areas and for water balance studies.

Panel Board

One or more panel units designed for assembly into a single panel, including buses, and with or without switched and/or automatic overcurrent devices. Panel boards are used to control light, heat, or power circuits of small individual or grouped loads. They are designed to be set in a cabinet box or in or against a wall or partition and are accessible from the front only (see SWITCHBOARD).

Panel Insulation

A prefabricated unit of insulation and lagging.

Paper

Thin sheet of material made of cellulose pulp, derived mainly from wood, but also from rags and certain grasses, and processed into flexible leaves or rolls. Used primarily for writing, printing, drawing, wrapping, and covering walls.

Paper Mills

Mills (factories) that produce paper from wood pulp.

Paper Products

Materials such as paper and cardboard, produced from trees.

Parasite

Parasite is an organism that lives upon and at the expense of another organism.

Parent Metal

Metal to be joined, base metal.

Parkerizing

Trade name for process for the production of phosphate coating on steel articles by immersion in an aqueous solution of manganese or zinc acid with phosphate.

Parshall Flume

A calibrated device developed by Parshall for measuring the flow of liquid in an open conduit consisting essentially of a contracting length, a

throat, and an expanding length. At the throat is a sill over which the flow passes at Belanger's critical depth. The upper and lower heads are each measured at a definite distance from the sill. The lower head need not be measured unless the sill is submerged more than about 67%.

Partial Annealing

An imprecise term used to denote a treatment given cold-worked material to reduce its strength to a controlled level or to effect stress relief. To be meaningful, the type of material, the degree of cold work, and the time-temperature schedule must be stated.

Partial Pressure

The pressure exerted by each gas independently of the others in a mixture of gases. The partial pressure of each gas is proportional to the amount (percent by volume) of that gas in the mixture.

Particle

A small discrete mass of solid or liquid matter. Generally, discrete solids suspended in water or wastewater that can vary widely in size, shape, density, and charge.

Particle Size Analysis

The science which deals with the measurement of the dimensions and determination of the shape of particles. Determination of the various amounts of the different soil separates in a soil sample, usually by sedimentation, sieving, micrometry, or combinations of these methods.

Particle Size Analysis; Granulometric Analysis

The whole of the operations by which a particle size (granulometric) distribution may be obtained.

Particle Size Distribution; Granulometric Distribution

A presentation, in the form of tables of numbers or of graphs, of the experimental results obtained using a method or an apparatus capable of measuring the equivalent diameter of particles in a sample or capable of giving the proportion of particles for which the equivalent diameter lies between defined limits. Relative amounts or proportions based on size, of various inorganic separates in a sample, often expressed as mass percentages.

Particulate

A particle of solid or liquid matter; soot, dust, aerosols, fumes and mists. Solid matter, in a gas stream, that is solid at normal temperature and pressure.

Particulates: Particulate Matter (PM-10)

Particulate matter is a criteria air pollutant and is a finely divided particle with an aerodynamic diameter of 10 micrometers or less. Particulate matter includes dust, soot and other tiny bits of solid materials that are released into and move around in the air. Particulates are produced by many sources, including burning of diesel fuels by trucks and buses, incineration of garbage, mixing and application of fertilizers and pesticides, road construction, industrial processes such as steel making, mining operations, agricultural burning (field and slash burning), and operation of fireplaces and wood stoves. Particulate pollution can cause eye, nose, and throat irritation and other health problems.

Particulate Matter (PM)

Any material, except pure water, that exists in the solid or liquid state in the atmosphere. The size of particulate matter can vary from coarse, wind-blown dust particles to fine particle combustion products. For more information:

Particulates: Particulate Matter (PM2.5)

Includes tiny particles with an aerodynamic diameter less than or equal to a nominal 2.5 microns. This fraction of particulate matter penetrates most deeply into the lungs.

Parting

The selective attack of one or more components of a solid solution alloy; e.g. dezincification, dealumination, etc.

Parts per Billion (ppb)

Units commonly used to express contamination ratios, as in establishing the maximum permissible amount of contaminant in water, land, or air.

A measure of proportion by weight, equivalent to one unit weight of a material per billion (10^9) unit weights of compound. One part per billion is equivalent to 1 mg/kg.

Parts per Million (ppm)

Parts per million (ppm) is parts by mass in sewage analysis, ppm by mass is equal to milligrams per litre divided by the relative density (specific gravity). In water analysis ppm is always understood to imply mass/mass ratio (mg/kg), even though in practice a volume may be measured instead of a mass. The number of weight or volume units of a minor constituent present with each 1 million units of a solution or mixture. The more specific term, milligrams per litre (mg/L), is preferred. A measure of proportion by weight, equivalent to one unit weight of a material per million (10^6) unit weights of compound.

Passivation

A reduction of the anodic reaction rate of an electrode involved in electro-chemical action such as corrosion.

Passivator

A type of *inhibitor* that appreciably changes the potential of a metal to a more noble (positive) value.

Passive

The state of a metal when it is much more resistant to corrosion than its position in the EMF series would predict. Passivation is a surface phenomenon.

Passive-Active Cell

(1) A cell, the emf of which is due to the potential difference between a metal in an active state and the same metal in a passive state. (2) A corrosion cell in which the *anode* is a metal in the *active* state and the *cathode* is the same metal in the *passive* state.

Passive Solar

Using or capturing solar energy (usually to heat water) without any external power.

Passivity

A metal or alloy which is thermodynamically unstable in a given electrolytic solution is said to be passive when it remains visibly unchanged for a prolonged period. The following should be noted:

- During passivation the appearance may change if the passivating film is sufficiently thick (e.g. interference films).
- The electrode potential of a passive metal is always appreciably more noble than its potential in the active state.
- Passivity is an anodic phenomenon and thus control of corrosion by decreasing cathodic

reactivity (e.g. amalgamated zinc in sulphuric acid) or by cathodic protection is not passivity.

Pasture

Grasses, legumes and/or other herbage used or suitable for the grazing of animals. The term also includes the land covered by such herbage and used or suitable for grazing.

Annual/Perennial Pasture

Consists largely of annual/perennial grasses and/or legumes respectively. Four pasture types are commonly recognized:

Native Pasture

Consists of indigenous species which are well adapted to the prevailing environmental conditions including climatic factors, soil nutrient status and natural grazing patterns. Their biomass, nutritional value and palatability are often less than that of improved pastures, but they have advantages in long term persistence under drought conditions if managed adequately, and often prefer conditions of low soil fertility.

Improved Pasture

Consists of introduced species not indigenous to the area being considered. Many of the legume pasture species, such as the white clovers, have been introduced into Australia. Pasture Improvement increases grazing productivity per unit area but requires careful management, such as fertilizer application and weed control, to maintain sustained production.

Semiimproved Pasture

Pasture where improved species have been encouraged to invade native pasture by such practices as broadcast seeding and fertilizer application.

Naturalised Pasture

Pasture where a balance between improved and native species has been reached, It results from the spread of improved species by natural seed and vegetative distribution or the deterioration of improved pastures by the invasion of native species.

Pasture Renovation

The upgrading of a pasture by sod seeding or mechanical treatment using such implements as an aerator or pasture harrows. Such treatments increase water infiltration and improve soil aeration.

Pasture Topping

The application of herbicides to pasture to improve the composition of the established sward by suppressing growth and reducing seed set of undesirable species.

Pathogenic

Disease causing or harmful to man.

Pathogenic Bacteria

Bacteria that cause disease in the host organism by their parasitic growth.

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.

Pathogen

Disease-causing biological agent such as a bacterium, virus, or fungus.

Pathogens

Pathogenic or disease-producing organisms.

Patina

The coating, usually green, that forms on the surface of metals such as copper and copper alloys exposed to the atmosphere. Also used to describe the appearance of a weathered surface of any metal.

Peak

(1) The maximum quantity that occurs over a relatively short period of time. Also called peak demand, peak load. (2) The highest load carried by an electric generating system during any specific period. It is usually expressed in kilowatts (kW).

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.

Peak Discharge

The maximum discharge resulting from a set of hydrological conditions.

Peak Enable

(1) Operating parameter that increases the frequency of timer operation of a pump to result in effluent delivery equal to design flow rate; (2) Sensor that controls the peak enable function in a timed dose system.

Peak Flow

The maximum instantaneous discharge of a stream or river at a given location. It usually occurs at or near the time of maximum stage.

Peak Levels

A level of airborne pollutants that is much higher than average. They can occur over a short period of minutes or hours in response to sudden releases, or they can occur due to a longer term build-up over several days.

Peak Load

(1) The maximum average load carried by an electric generating plant or system for a short time period such as 1 hour or less. (2) The maximum demand for water placed on a pumping station, treatment plant, or distribution system; expressed as a rate. (3) The maximum rate of flow of wastewater to a pumping station or treatment plant. Also called peak demand.

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.

Pearlite

A metastable lamellar aggregate of ferrite and cementite resulting from the transformation of austenite at temperatures above the bainite range.

Ped

An individual, natural soil aggregate.

Pedal

Describes a soil in which some or all of the soil material occurs in the form of peds in the moist state. Strongly pedal soils have two thirds or more of their soil material in the form of peds, and weakly pedal soils have less than one third of their soil material in the form of peds.

Pediment

A land surface worn down by erosion to a nearly flat or broadly undulating plain, typically with numerous rapidly migrating and very shallow stream channels. Pediments are eroded, and locally aggraded, by frequently active stream flow or sheet flow, with sub-ordinate wind erosion.

Pediplain

A land surface worn down by erosion to a nearly flat or broadly undulating plain with no stream channels. By extension the term is also used for the plateau formed by the uplifting of such a surface.

Pedology

The study of soils, particularly their formation, morphology, distribution and classification.

Peen Plating

Deposition of the coating metal, in powder form, on the substrate by a tumbling action in presence of peening shot.

Peneplain

A land surface worn down by erosion to a nearly flat or broadly undulating plain with sparse slowly migrating alluvial stream channels.

Penetrability

The ease with which a probe can be pushed into the soil. May be expressed in units of distance, speed, force or work depending on the type of penetrometer used.

Penetration

The ratio of the quantity of particles leaving a filter, dust separator or a droplet separator, to the quantity entering it. Opening in the wall of a container through which a pipe or electrical conduit enters.

Penetrometer

An instrument used to measure resistance to penetration in soil. Such measurements are important in relation to soil density studies or the location of pans.

Penstock Valve

A penstock valve, is a large square slide style valve used as a flow stop, as in a well inlet, mounted flush to a wall.

Per Capita Use

The average amount of water used per person during a standard time period, generally per day.

Per Cent 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.

Perceived Noise Levels (PNL)

The noise of aircraft is described in terms of Perceived Noise Levels (PNL), a scale of noisiness, expressed in pNdB.

Percentile

A percentile is a value below which that percentage of data will either fall or equal. For instance, the 98th percentile of values for a year is the value below which 98% of all of the data in the year will fall, or equal.

Perchloroethylene (Perc)

The substance with the chemical formula 'C₂Cl₄,' also known by the name 'tetrachloroethylene' which has been identified by the ARB and listed as a toxic air contaminant (title 17, California Code of Regulations, section 93000).

Percolation

The flow of liquid through a filtering medium. Percolation is the movement of water downwards and radially through the subsurface soil layers, usually continuing downward to the ground water. The downward movement of water through soil, contributing to internal drainage.

Perennial Plant

A plant whose life cycle extends for more than two years and continues to live from year to year. Some perennials, such as grasses and herbs, have aboveground parts which die down in the autumn, leaving an underground structure, such as a bulb or rhizome, to overwinter and produce new growth in the spring. Woody perennials, such as shrubs and trees, have permanent woody stems from which the plant makes new growth each year.

Perimeter Bank

A temporary barrier of compacted soil or hay bales located along the boundary of a construction site to control the movement of runoff and sediment from the site.

Permanent Clearing

The removal and non-replacement of trees and shrubs to facilitate an alternative term of land use, such as pasture or cereal cropping.

Permanent Seeding

The establishment of perennial vegetation intended to remain on an area for many years.

Permanent Wilting Point

A laboratory measure of the amount of water held in a soil at the point when foliage wilts and does not recover when placed in a humid atmosphere. Expressed as a percentage of the oven dry weight of the soil. In the held existing foliage withers and dies as a result of moisture stress. However, in the long term, plants may recover if more water becomes available, due to the production of new shoots.

Permissible Velocity (Non-Erosive Velocity)

A velocity at which water may flow safely in a channel without causing erosion.

Performance Standard

A limitation on the emission or discharge of a pollutant that may be expressed as an emission or discharge standard or as a requirement for specific operating procedures.

Percolation Test

Usually called a “perk test”; measurement of the drop in water level in a boring as water moves into the surrounding soil material.

Performance Standard, Operation-Based

Specific, measurable, and enforceable standard that establishes minimum frequency of and requirements for operation and maintenance activities and reporting the operational status of a system.

Performance Standard, Water Quality-Based

Specific, measurable, and enforceable standard that establishes limits and measurement frequency for pollutant concentrations or mass loads in treated wastewater discharged to groundwater or surface water.

Performance Standards

Minimum performance criteria established by the regulatory or proprietary authority to ensure compliance with the public health and environmental goals of the state or community.

Perimeter Insulation

Insulation installed on the sidewalls of a crawl space to reduce heat loss. Also protects plumbing in the space from freezing temperatures. Perimeter insulation should only be used at the express approval of your utility.

Period

(1) The interval required for the completion of a recurring event. (2) Any specified duration of time.

Perlite

A glossy volcanic rock which expands when heated. Processed perlite is used as loose fill insulation material or bound into slabs.

Period of Grace

The time period after the issuing of the periodical Invoice for Water Access and Usage Charges during which penalty interest charges are not incurred on outstanding payments.

Peripheral Weir

The outlet weir extending around the inside of the circumference of a circular settling tank over which the effluent discharges.

Permafrost

Perennially (continually) frozen ground that occurs where the temperature remains below 0 °C for several years.

Permeability

Ability of a porous medium such as soil to transmit fluids (liquids or gases).

A measure of a soils resistance to fluid flow. Permeability, along with fluid viscosity and density are used to determine fluid conductivity. Permeability is (1) The property of a material that permits appreciable movement of water through it when it is saturated; the movement is actuated by hydrostatic pressure of the magnitude normally encountered in natural subsurface water. Perviousness is sometimes used in the same sense as permeability. (2) The capacity of a rock or rock material to transmit a fluid. See also PERMEABILITY COEFFICIENT. (3) The time rate of water vapor transmission through unit area of a material of unit thickness induced by unit vapor pressure difference between two specific surfaces, under specified temperature and humidity conditions.

Permeability Coefficient

A coefficient expressing the rate of flow of a fluid through a cross section of permeable material under a hydraulic or pressure gradient. The standard coefficient of permeability used in the hydrologic work of the U.S. Geological Survey (USGS), known also as the Meinzer unit, is defined as the rate of flow of water in gallons per day (gpd) at 60 °F through a cross section of 1 ft (0.3 m) under a hydraulic gradient of 100%. See also FIELD PERMEABILITY COEFFICIENT.

Perm

A unit of water vapor transmission defined as 1 grain of water vapor per square foot per hour per inch of mercury pressure difference (1 inch mercury=0.49 psi). Metric unit of measure is $\text{ng/m}^2 \text{ s Pa}$. 1 perm= $55 \text{ ng/m}^2 \text{ s Pa}$.

Permeance

A measure of the transmission of water vapor through a material or combination of materials, measured in perms.

Permit

A document that resembles a license, required by the Clean Air Act for big (major) sources of air pollution, such as power plants, chemical factories and, in some cases, smaller polluters. Usually permits will be given out by states, but if EPA has Disapproval Authorization, license, or equivalent control document issued by the appropriate regulatory authority to implement the requirements of a regulation.

Peroxyacetyl Nitrate (PAN)

A group of compounds formed from the photochemical reactions of nitrogen and organic compounds. PANs are components of smog and known to cause eye irritation.

Persistence

Refers to the length of time a compound stays in the atmosphere, once introduced. A compound may persist for less than a second or indefinitely.

Personal Watercraft (PWC)

Watercraft that do not have outboard, inboard, or stern drive engines. This encompasses the watercraft typically referred to as Jet Skis, Waverunners, etc.

Pervious

Possessing a texture that permits water to move through perceptibly under the head differences ordinarily found in subsurface water. See also PERMEABILITY.

pH

A measure of acidity or alkalinity of water, or any given substance. The scale is 1 to 14 with 7 being neutral. Over 7 is alkaline or caustic, under 7 is acid or base, numerical measure of hydrogen ion activity with a scale of 0 to 14. Neutral is pH 7; values below 7 are acid, and values above 7 are alkaline. Waters that are too acid or alkaline can be unfit for animal or plant life. A measure of the hydrogen-ion concentration in a solution, expressed as the logarithm (base 10) of the reciprocal of the hydrogen-ion concentration in gram moles per liter (g/mole/L). On the pH scale (0 to 14), a value of 7 at 25 °C (77 °F) represents a neutral condition. Decreasing values indicate increasing hydrogen-ion concentration (acidity); increasing values indicate decreasing hydrogen-ion concentration (alkalinity). A measure of the acidity or alkalinity of a solution; The negative logarithm of the hydrogen-ion activity; it denotes the degree of acidity or basicity of a solution. At 25 °C (77 °F), 7.0 is the neutral value. Decreasing values below 7.0 indicate increasing acidity; increasing values above 7.0, increasing basicity.

pH (Soil)

A measure of the acidity or alkalinity of a soil. A pH of 7.0 denotes neutrality, higher values indicate alkalinity, and lower values indicate acidity. Strictly it represents the negative logarithm of the hydrogen ion concentration in a specified soil/water suspension on a scale of 0–14. Soil pH levels generally fall between 5.5 and 8.0 with most plants growing best in this range.

Soil pH is commonly measured in the field by a colorimetric method using Raupach's indicator. In the laboratory a number of methods may be used, depending on need. These are commonly based on more accurate electrical techniques

generally using or 1.5 mixtures of soil with water 0.01 M CaCl₂ solution. The CaCl₂ method gives pH values approximately 0.5 units lower than the water method. In reports quoting pH levels, the method of measurement should be noted.

Pharmaceutical and Personal Care Products (PPCP)

Chemical substances such as prescription or over-the-counter therapeutic drugs, fragrances, cosmetic, sunscreen agents, diagnostic agents, among others.

Phase

The physical form in which a substance is found. The three major phases are liquid, vapor and dissolved in pore water. Any portion of a physical system separated by a definite physical boundary from the rest of the system. The three physical phases are solid, liquid, and gas; colloids are the dispersed phase and liquids are the continuous phase.

Phenolic Compounds

Hydroxyl derivatives of benzene. The simplest phenolic compound is hydroxyl benzene (C₆H₅OH).

Phenolic Foam

A foamed insulation made from resins of phenols condensed with aldehydes.

Phenology

The timing of natural events, such as flower blooms and animal migration, which is influenced by changes in climate. Phenology is the study of such important seasonal events. Phenological events are influenced by a combination of climate factors, including light, temperature, rainfall, and humidity.

Phosphate

A salt or ester of phosphoric acid. See also ORTHOPHOSPHATE, PHOSPHORUS.

Phosphating

Forming an adherent phosphate coating on a metal by immersion in a suitable aqueous phosphate solution. Also called phosphatizing.

Phosphatizing

The forming of a thin inert phosphate coating on a surface, usually accomplished by treating with H_3PO_4 (phosphoric acid).

Phosphorus (P)

An essential chemical element and nutrient for all life forms. Occurs in orthophosphate, pyrophosphate, tripolyphosphate, and organic phosphate forms. Each of these forms and their sum (total phosphorus) is expressed as milligrams per liter (mg/L) elemental phosphorus. Chemical element and nutrient essential for all life forms, occurring as orthophosphate, pyrophosphate (P₂O₇-4), tripolyphosphate (P₃O₁₀-), and organic phosphate forms; each of these forms, as well as their sum (total phosphorus), is expressed in terms of milligrams per litre (mg/L) elemental phosphorus; occurs in natural waters and wastewater almost solely as phosphates; excess levels of phosphorus in fresh surface waters may contribute to eutrophication.

Phosphorus, Inorganic

Forms of phosphorus from mineral sources, such as orthophosphate, pyrophosphate (P₂O₇-4), and tripolyphosphate (P₃O₁₀-).

Phosphorus, Organic

Phosphorus formed primarily by biological processes; sources of organic phosphorus in sewage include bodily wastes, food residues, and the conversion of orthophosphates in biological treatment processes.

Phosphorus Removal

The precipitation of soluble phosphorus by coagulation and subsequent flocculation and sedimentation.

Phosphorus, Total (TP)

Sum of all forms of phosphorus in effluent.

Photochemical Process

The process by which sunlight acts upon various compounds, causing a chemical reaction to occur.

Photochemical Oxidants or Smog

Air pollutants formed by the action of sunlight on oxides of nitrogen and hydrocarbons.

Photochemical Reaction

A term referring to chemical reactions brought about by the light energy of the sun. The reaction of nitrogen oxides with hydrocarbons in the presence of sunlight to form ozone is an example of a photochemical reaction.

Photochemical Smog

Produced when hydrocarbons and oxides of nitrogen combine in the presence of sunlight to form ozone.

Photolysis

Chemical decomposition induced by light or other energy.

Photosynthesis

The synthesis of complex organic materials, especially carbohydrates, from carbon dioxide, water, and inorganic salts with sunlight as the source of energy and with the aid of a catalyst, such as chlorophyll.

Photosynthetic Bacteria

Bacteria that obtain their energy for growth from light by photosynthesis.

Phreatic Line

The line marking the upper surface of the zone of saturation in a body of soil material. Water movement through an earth embankment follows a pathway determined by this line, i.e. seepage will occur at or below it. Provided the water level behind the embankment is maintained, the line of seepage eventually reaches a steady state determined by the density and permeability of the material.

Physical Analysis

The examination of water and wastewater to determine physical characteristics such as temperature, turbidity, color, odors, and taste.

Physical-Chemical Treatment

Treatment of wastewater by unit processes other than those based on microbiological activity. Unit processes commonly included are precipitation with coagulants, flocculation with or without chemical flocculents, filtration, adsorption,

chemical oxidation, air stripping, ion exchange, reverse osmosis, and several others.

Physical Feature, Manmade

Prominent or conspicuous part or characteristic of a site that is created by humans.

Physical Feature, Natural

Prominent or conspicuous part or characteristic of a site that is not created by humans.

Physical Treatment

Any treatment process involving only physical means of solid–liquid separation, for example, screens, racks, clarification, and comminutors. Chemical and biological reactions do not play an important role in treatment.

Physical Vapor Deposition

A coating process whereby the cleaned and masked component to be coated is heated and rotated on a spindle above the streaming vapor generated by melting and evaporating a coating material source bar with a focused electron beam in an evacuated chamber.

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.

Physico-Chemical Treatment

A combination of physical and chemical treatment to achieve a specific result.

Physisorption

The binding of an adsorbate to the surface of a solid by forces whose energy levels approximate those of condensation. Contrast with *chemisorption*.

Phytoplankton

Plankton consisting of plants, such as algae.

Phosphorous (P)

An element essential to the growth and development of plants; occurs in manure and chemical fertilizer and, in excess, can cause waters to become polluted by promoting excessive growth of algae and other aquatic plants.

Pickle

A solution, usually acid, used to remove mill scale or other corrosion products from a metal.

Pickle/Pickling

Form of chemical and electrolytic removal or loosening of mill scale and corrosion products from the surface of a metal in a chemical solution (usually acidic). Electrolytic pickling can be anodic or cathodic depending on polarization of metal in the solution.

Piezometer

Instrument for estimating hydraulic pressure in a conduit, tank, or soil by determining the location of the free water surface. A narrow tube, open at each end, inserted down a hole in the ground to the depth of the water table, which enables measurement of its elevation or hydraulic head.

Piezometric Head

The level to which water from a given aquifer will rise by hydrostatic pressure. For the uppermost unconfined aquifer, the piezometric head is identical to the water table elevation. For confined aquifers, the piezometric head can be above or below the water table.

Piggy Back

Electrical plug configuration wherein a float switch plugs into an outlet and a pump plugs into the back of the float switch plug.

Pillar

A solid block of coal or ore left to support the roof of an underground mine.

Pin Floc

Small floc particles that settle poorly.

Piosphere

A zone of grazing pressure centered on a stock watering point in an arid area. Within the zone there is an interaction between the reliance of stock upon the watering point and their capacity to graze radially for food. This interaction is registered by the vegetation pattern such that there is a radial change in vegetation with distance from the watering point.

Pipe

A closed conduit that diverts or conducts water or wastewater from one location to another.

Pipe Diameter

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

Pipe Embedment

Portion of an excavation that includes the bedding, haunching and initial backfill of piping.

Pipe Fittings

Connections, appliances, and adjuncts designed to be used in connection with pipes; examples are elbows and bends to alter the direction of a pipe; tees and crosses to connect a branch with a main; plugs and caps to close an end; and bushings, diminishers, or reducing sockets to couple two pipes of different dimensions. A pipe fitting is a component of a pipeline, other than a pipe, which allows pipeline deviation, change of direction or bore.

Pipe Gallery

(1) Any conduit for pipe, usually of a size to allow a person to walk through. (2) A gallery provided in a treatment plant for the installation of conduits and valves and used as a passageway to provide access to them.

Pipe Insulation

Insulation in a form suitable for application to cylindrical surfaces.

Pipe Sections

Sections of insulating material in cylindrical form suitable for application to pipes.

Pipe Zone

Portion of an excavation where piping or other conduit is located.

Piping System

A system of pipes, fittings, and appurtenances within which a fluid flows.

Pipeline

A system of pipes and other components used for the transportation of fluids, between (but excluding) plants. A pipeline extends from pig trap to pig trap (including the pig traps and associated pipework and valves), or, if no pig trap is fitted, to the first isolation valve within the plant boundaries or a more inward valve if so nominated.

Piping Failure

The failure of an earthwork due to piping. The pipe which forms eventually allows water to flow freely through the wall and may ultimately cause its complete collapse.

Piston Pump

A reciprocating pump in which the cylinder is tightly fitted with a reciprocating piston.

Pit

A closed depression excavated by human activity. It may be relatively large as associated with gravel or coal extraction, or small as associated with soil profile examination. The term is also used synonymously with the noun "mine".

Pit Run

Unprocessed sand or gravel found in natural deposits; also known as bank gravel or bank run.

Pitting

Highly localized corrosion resulting in deep penetration at only a few spots.

Pitting Factor

Ratio of the depth of the deepest pit resulting from corrosion divided by the average penetration as calculated from weight loss.

Pivot Line

A line joining turning points on a strip cropping plan. It represents the projection along which each strip changes direction due to changes in topography. The angles either side of a pivot line, made by its intersection with the key lines, must be equal otherwise the strip widths either side will be unequal. The total angle of a bend in the strips must not be too small, to allow for turning machinery. Recommended minimum angle is 1300, but this is negotiable provided the landholder understands the problems.

Plain

A general term encompassing large, very gently inclined or level landforms of unspecified geomorphological origin.

Plain Lags

Lags having rectangular cross sections, for use on cylinders of such diameter that this shape conforms sufficiently closely to the surface.

Planimeter

An instrument used to measure areas on a map. Its main advantage lies in its ability to measure irregular shapes such as for catchment areas. Planimeters consist of a graduated measuring wheel pivoted on a tracer arm. The area is determined by the number of revolutions of the measuring wheel in relation to the map scale.

Planimetric Map

A map showing physical features and cultural detail in plan view only, omitting the dimension of relative heights.

Plan

Drawing or diagram made by projection on a horizontal plane.

Plan View

View from above; also known as bird's-eye or aerial view.

Plane Strain

The stress condition in *linear elastic fracture mechanics* in which there is zero strain in a direction normal to both the axis of applied tensile stress and the direction of crack growth (that is, parallel to the crack front); most nearly achieved in loading thick plates along a direction parallel to the plate surface. Under plane-strain conditions, the plane of fracture instability is normal to the axis of the principal tensile stress.

Plane Stress

The stress condition in *linear elastic fracture mechanics* in which the stress in the thickness direction is zero; most nearly achieved in loading

very thin sheet along a direction parallel to the surface of the sheet. Under plane-stress conditions, the plane of fracture instability is inclined 45° to the axis of the principal tensile stress.

Planimetric

Two-dimensional details that reflect accurate dimensions of and horizontal distances between features on a site.

Planning

Process of reviewing proposed actions and associated impacts to ensure that community values and long-term sustainability are incorporated.

Plans

Drawings showing locations and details of a system and its components, specifications, and other information as needed for bidding, staging, installation, inspection, and operation and maintenance of a system.

Plant Growth Index

A numerical representation of the probability of plant growth being restricted in a given area by the principal limiting factors of soil moisture, temperature and light.

Indices are derived for these factors such that each index has a numerical value ranging from zero, completely limiting, to unity, non-limiting. They are calculated from water balance data, and temperature/light/pasture production data. The most limiting of the three indices is taken as the plant growth index. The plant growth index is used to indicate lengths of growing seasons, periods when ground cover may deteriorate, and suitable tillage and sowing times.

Plant Hydraulic Capacity

The level of flow into a plant above which the system is hydraulically overloaded.

Plant Nutrient

Any element essential to the growth of plants or which can be beneficially utilized by them. Such nutrients are supplied from the soil or from application of fertilizer and include:

Major elements: Nitrogen, phosphorus, potassium.

Minor elements: Calcium, magnesium, sulfur,

Trace elements: Iron, copper, zinc, manganese, boron, molybdenum, chlorine, (sodium).

Planting

The placement of seedlings in the soil to allow for their subsequent growth.

Plasma Plating

Deposition on critical areas of metal coatings resistant to wear and abrasion, by means of a high velocity and high temperature ionized inert gas jet.

Plasma Spraying

A *thermal spraying* process in which the coating material is melted with heat from a plasma torch that generates a nontransferred arc: molten coating material is propelled against the base metal by the hot, ionized gas issuing from the torch.

Plastic Composition

Insulating material in loose, dry form, prepared for application as a paste or dough by mixing with water, usually on site, and normally setting under the influence of heat applied to the internal surface.

Plastic

Describes soil material which is in a condition that allows it to undergo permanent deformation without appreciable volume change or elastic rebound, and without rupture. The importance of this property in a soil conservation context relates to the soil's behavior when used in earthworks or when cultivated. This behavior is characterized according to the system of Atterberg Limits.

Plasticulture

Agricultural production practice, usually used with fruits and vegetables, that cover a large portion of the field with plastic to heat up the soil and control weeds; land is graded so that stormwater is quickly drained to minimize excessive soil moisture levels.

Plastic Deformation

The permanent (inelastic) distortion of metals under applied stresses that strain the material beyond its *elastic limit*.

Plastic Limit

Moisture content at which soil can be rolled into 1/8 inch diameter wire without breaking; represents the soil moisture content above which manipulation will cause compaction or smearing; measured by ASTM Standard Test Method ASTM D4318 (2005).

Plastic Media

Honeycomb-like products, manufactured from plastics of various compositions, with high surface area; volume ratios that are used in trickling filters in place of crushed stone. The product is available in large modules fabricated from sheets that may be cut to size on-site, and small discrete pieces to be loosely packed in the filter bed. See also TRICKLING FILTER.

Plasticity

(1) Degree to which a soil can be molded or deformed continuously and permanently using relatively moderate pressure without appreciable volume change or rupture; (2) Soil consistence term defined under wet conditions. The property that enables a material to undergo permanent deformation without rupture.

Plasticity Index

Numerical difference between the liquid limit and plastic limit of a soil; measured by ASTM Standard Test Method ASTM D4318 (2005).

Plastics

Durable and flexible synthetic-based products, some of which are difficult to recycle and pose problems with toxic properties, especially PVC plastic. A collective name for different materials with different characteristics consisting of long carbon chains. Plastic is made almost exclusively of fossil carbon from oil or natural gas which is mixed with different chemicals. Plastic can be divided up in different ways. One division is thermoplastics, which can be transformed when they are heated, and hardened plastics, which cannot be transformed when they are heated but are instead hardened. The environmental impact of plastic is included at every stage from the extraction of oil and gas to the production of plastic and subsequent waste handling. There are few extensive studies of the environmental impact of plastic and it is difficult to state categorically which plastic is better than others. It is, however, possible to say with some certainty that chlorine-based plastics (like PVC below) are worse than other thermoplastics from an environmental angle. This is largely due to the fact that the chlorine in the plastic can combine with organic compounds which often have a very negative effect on the environment.

Plate Press

A filter press consisting of a number of parallel plate units lined with filter cloth that rests on drainage channels in the plates. Pressure is exerted by the pumping of solids into chambers created between the cloths. The operation is carried out in batches.

Plateau

A level to rolling landform of plains, rises or low hills standing above a cliff or escarpment which extends around a large part of the plateau's perimeter. Plateau are commonly associated with flat-lying strata or lava flows.

Playa

A shallow closed depression flooded intermittently and at other times displaying a surface of salt or mud.

Plough-Pan

A pan made up of a layer of soil? compacted by repeated tillage at a constant depth over many years.

Ploughing

A primary tillage operation which is performed to loosen and shatter soil with partial or complete soil inversion. The operation also incorporates organic residues into the soil.

Plow, Chisel

(1) Shank tillage implement that disrupts the soil to loosen and roughen the surface. (2) Static plow shank used to slice the soil during installation of subsurface drip tubing.

Plow, Parabolic

Curved tillage implement used to disrupt a hardpan or plowman.

Plow, Static

Plow shank used for installing subsurface drip tubing; typically a disc leads the shank to cut the soil, grass, and other debris prior to shank passage.

Plow, Vibratory

Oscillating plow shank used for installing subsurface drip tubing and utility lines.

Plug Flow

Flow in which fluid particles are discharged from a tank or pipe in the same order in which they entered it. The particles retain their discrete identities and remain in the tank for a time equal to the theoretical detention time.

Plug-in Hybrid Electric Vehicle (PHEV)

A vehicle that is similar to traditional hybrids but is also equipped with a larger, more advanced battery that allows the vehicle to be plugged in and recharged in addition to refueling with gasoline. This larger battery allows you to drive on a combination of electric and gasoline fuels.

Plumbing

(1) The pipes, fixtures, and other apparatus inside a building for bringing in the water supply and removing the liquid and waterborne wastes. (2) The installation of the foregoing pipes, fixtures, and other apparatus.

Plumbing Fixtures

Receptacles that receive liquid, water, or wastewater and discharge them into a drainage system.

Plume

A visible or measurable discharge of a contaminant from a given point of origin that can be measured according to the Ringelmann scale. The path taken by effluent once it is discharged from an outfall into a receiving body of water, prior to its complete mixing with the receiving water.

Plunger Pump

A reciprocating pump with a plunger that does not come in contact with the cylinder walls, but enters and withdraws from it through packing glands. Such packing may be inside or outside the center, according to the design of the pump.

Plutonium

A heavy, radioactive, man-made, metallic element (atomic number 94) used in the production of nuclear energy and the explosion of nuclear weapons; its most important isotope is fissile plutonium-239, produced by neutron irradiation of uranium-238.

Pluviometer

An instrument for measuring rainfall which incorporates a continuous record in the form of a pen trace on a graduated time chart which is known as the PLUVIOGRAPH. The total amount of rainfall and its intensity at any time can be measured.

PM10 (Particulate Matter Less Than 10 Microns)

Tiny solid or liquid particles of soot, dust, smoke, fumes, and aerosols. The size of the particles (10 microns or smaller, about 0.0004 inches or less) allows them to easily enter the air sacs in the lungs where they may be deposited, resulting in adverse health effects. PM10 also causes visibility reduction and is a criteria air pollutant.

PM2.5 (Particulate Matter Less Than 2.5 Microns)

Tiny solid or liquid particles, generally soot and aerosols. The size of the particles (2.5 microns or smaller, about 0.0001 inches or less) allows them to easily enter the air sacs deep in the lungs where they may cause adverse health effects; PM2.5 also causes visibility reduction.

Pneumatic Ejector

A device for raising wastewater, sludge, or other liquid by alternately admitting it through an inward swinging check valve into the bottom of an airtight pot and then discharging it through an outward swinging check valve by admitting compressed air to the pot above the liquid.

Poaching

Poaching is illegal hunting.

Point Bar

A deposit of unconsolidated sediment on the inner bank of a stream channel meander. It forms because the velocity of flow in the channel is lower against the inner bank.

Point Gauge

A sharp-pointed rod attached to a graduated staff or vernier scale used for measuring the elevation of the surface of water. The point is lowered until the tip barely touches the water and forms a streak in flowing water and a meniscus jump in still water. It can also be used in a still well and can operate on an electric current with a buzzer or light that will operate when contact with the water is made.

Point Source

A source of pollution which can be pinpointed. In a soil conservation context it typically applies to a source of sediment which can be limited to one precise location,

For example, an activity eroding gully head could be a point source of sediment contributing to the blocking of an adjacent road culvert.

Point Source Pollution

A specific discharge that is traceable to a distinct source (pipe, ditch, container, well, etc.) such as those from wastewater treatment plants or industrial facilities, discharges of treated or untreated effluent from industries, wastewater treatment plants and other sources that can be traced back to a single point of discharge. Some sources (leaching landfills, hazardous wastes, brown fields, materials storage, airport deicing, underground storage tanks, etc.) are subject to question, as to whether they fall into the point or nonpoint source category. In these situations, where NPDES permitting applies, the state of Virginia considers the issue a point source pollution problem, and the topic is not addressed in this nonpoint source pollution management plan.

Point Transect

A series of individual sites where spot samples or other quantitative measurements of vegetation are recorded. The point transect typically follows a line along which points are identified by use of a wheel point or a system of step-pointing.

Poison

A chemical that adversely affects health by causing injury, illness, or death.

Polarization

The deviation from the open circuit potential of an electrode resulting from the passage of current.

Polarization Admittance

The reciprocal of *polarization resistance* (di/dE).

Polarization Curve

A plot of *r current density* versus *electrode potential* for a specific electrode-electrolyte combination.

Polarization Resistance

The slope (dE/di) at the corrosion potential of a potential (E) versus current density (i) curve. (It is inversely proportional to the corrosion current density when the polarization resistance technique is applicable).

Polishing

A general term for those treatment processes that are applied after conventional ones. See also ADVANCED WASTE TREATMENT, TERTIARY TREATMENT.

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.

Pollutant, Conservative

Pollutants that do not readily degrade in the environment, and which are mitigated primarily by natural stream dilution after entering receiving bodies of waters. Included are pollutants such as metals.

Pollutant, Non-Conservative

Pollutants that are mitigated by natural biodegradation or other environmental decay or removal processes in the receiving stream after in-stream mixing and dilution have occurred.

Pollutant Release and Transfer Register (PRTR)

A Mexican program, created in 2001, requiring mandatory reporting by industrial facilities of potentially hazardous polluted materials emitted or passed into the environment from various media. Similar to the Toxic Release Inventory (TRI) in U.S. and the National Pollutant Release Inventory (NPRI) in Canada.

Pollutants (Pollution)

Unwanted chemicals or other materials found in the air. Pollutants can harm health, the environment and property. Many air pollutants occur as gases or vapors, but some are very tiny solid particles: dust, smoke, or soot.

Pollutant Standards Index (PSI)

A system developed by the federal government for reporting air pollution concentrations to the public as numerical values between 0 and 500.

Polluted Runoff

Precipitation that captures pollution from agricultural lands, urban streets, parking lots and suburban lawns, and transports it to rivers, lakes or oceans.

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. Pollution is (1) Specific impairment of water quality by agricultural, domestic, or industrial wastes (including thermal and atomic wastes) to a degree that has an adverse effect on any beneficial use of the water. (2) The addition to a natural body of water any material that diminishes the optimal economic use of a water body by the population it serves and has an adverse effect on the surrounding environment.

Pollution Prevention

The use of materials, processes, or practices to reduce, minimize, or eliminate the creation of pollutants or wastes. It includes practices that reduce the use of toxic or hazardous materials, energy, water and/or other resources.

Polychlorinated Biphenyls (PCBs)

A class of aromatic organic compounds with two six-carbon unsaturated rings, with chlorine atoms substituted on each ring and more than two such chlorine atoms per molecule of PCB. They are typically stable, resist both chemical and biological degradation, and are toxic to many biological species.

Polycyclic Aromatic Hydrocarbons (PAHs)

Organic compounds which include only carbon and hydrogen with a fused ring structure containing at least two benzene (six-sided) rings. PAHs may also contain additional fused rings that are not six-sided. The combustion of organic substances is a common source of atmospheric PAHs.

Polyelectrolyte Flocculants

Polymeric organic compounds used to induce or enhance the flocculation of suspended and colloidal solids and thereby facilitate sedimentation or the dewatering of sludges.

Polyelectrolytes

Complex polymeric compounds, usually composed of synthetic macromolecules that form charged species (ions) in solution; water-soluble polyelectrolytes are used as flocculants; insoluble polyelectrolytes are used as ion exchange resins. See also POLYMERS.

Polyester

Resin formed by condensation of polybasic and monobasic acids with polyhydric alcohols.

Polyethylene

A closed-cell, thermoplastic material used for insulation.

Polyurethane

Polyurethane, commonly abbreviated PU, is any polymer consisting of a chain of organic units joined by urethane links. Polyurethane polymers are formed by reacting a monomer containing at least two isocyanate functional groups with another monomer containing at least two alcohol groups in the presence of a catalyst.

Polymer

Natural or synthetic chemical compounds composed of up to millions of repeated linked units, each of a relatively light and simple molecule. A chain of organic molecules produced by the joining of primary units called *monomers*.

Polymers

Synthetic organic compounds with high molecular weights and composed of repeating chemical units (monomers); they may be polyelectrolytes, such as water-soluble flocculents or water-insoluble ion exchange resins, or insoluble uncharged materials, such as those used for plastic or plastic-lined pipe and plastic trickling filter media.

Polyvinyl Chloride (PVC)

An artificial polymer made from vinyl chloride monomer ($\text{CH}_2\text{:CHCl}$); frequently used in pipes, sheets, and vessels for transport, containment, and treatment in water and wastewater facilities. See also POLYMERS.

Poorly-Graded

Material of uniform size with maximum void space; *also known as* well-sorted.

Poorly-Sorted

Material of variable size with minimum pore space; *also known as* well-graded.

POPs

Persistent Organic Pollutants (POPs) are chemical substances that persist in the environment as they are resistant to environmental degradation via chemical, biological or photolytic processes. The compounds are known to bioaccumulate through the food web and pose a risk of causing adverse effects to human health and the environment. These include dioxins and furans.

Population

Population is a group of closely related and interbreeding organisms.

Population Dynamics

The ever-changing numbers of microscopic organisms within the activated sludge process.

Population Equivalent

The estimated population that would contribute a given amount of a specific waste parameter (BOD₅, suspended solids, or flow); usually applied to industrial waste. Domestic wastewater contains material that consumes, on the average, 0.17 lb of oxygen/cap/d (0.08 kg/cap·d), as measured by the standard BOD test. For example, if an industry discharges 1000 lb of BOD/d (454 kg/d), its waste is equivalent to the domestic wastewater from 6000 persons (1000/0.17 approximately 6000). The equivalent, in terms of a fixed population, of a varying or transient population, of a hospital or restaurant, based upon a figure of 0.06.kg BOD per head per 120 L per head per day.

Pore

As applied to stone, soil, or other material, any small interstice or open space, generally one that allows the passage or adsorption of liquid or gas.

Pore Space

Open space in rock or granular material.

Pore Space

The fraction of the bulk volume or total space within soils that is not occupied by solid particles.

Porosity

(1) Open space or interstices in rock, other earth materials or synthetic media; (2) Ratio of the open space to the total volume often described as a percentage. (3)The volume fraction of a rock or unconsolidated sediment not occupied by solid

material but usually occupied by water and/or air. Porosity is a dimensionless quantity.

Porosity, Soil

Volume percentage of the total bulk not occupied by solid particles.

Positive Crankcase Ventilation (PCV)

An emission control system for a reciprocating internal combustion engine that involves recirculating gases that blow by the piston rings during combustion from the crankcase back into the intake manifold so they can be more completely burned.

Positive-Displacement Pump

Pump type in which liquid is induced to flow from the supply source through an inlet pipe and inlet valve. Water is brought into the pump chamber by a vacuum created by the withdrawal of a piston or pistonlike device, which, on its return, displaces a certain volume of water contained in the chamber and forces it to flow through the discharge valve and pipe.

Postaeration

The addition of air to plant effluent to increase the oxygen concentration of treated wastewater.

Postchlorination

The application of chlorine to wastewater following treatment.

Post Consumer Waste

Waste collected after the consumer has used and disposed of it (e.g., the wrapper from an eaten candy bar).

Porous Layer

A permeable layer of solid material in any form having interstices of small size, generally known as “pores”.

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.

Post-Harvest Site Restoration

all road, deck and skid trail restoration activities, mechanical site preparation, prescribed burning to remove logging debris, and tree planting to facilitate reforestation of the logged site.

Potable Water

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

Potable Water

Water that is safe for human consumption; presumed to meet safe drinking water standards.

Potential

Any of various functions from which intensity or velocity at any point in a field may be calculated. The driving influence of an

electrochemical reaction. See also ACTIVE POTENTIAL, CHEMICAL POTENTIAL, CORROSION POTENTIAL, CRITICAL PITTING POTENTIAL, DECOMPOSITION POTENTIAL, ELECTROCHEMICAL POTENTIAL, ELECTRODE POTENTIAL, ELECTROKINETIC POTENTIAL, EQUILIBRIUM (REVERSIBLE) POTENTIAL, FREE CORROSION POTENTIAL, NOBLE POTENTIAL, OPEN-CIRCUIT POTENTIAL, PROTECTIVE POTENTIAL, REDOX POTENTIAL, AND STANDARD ELECTRODE POTENTIAL.

Potential Surveys

Measurement of potential of a structure or pipeline relative to a reference electrode potential pitting.

Potentiodynamic (Potentiokinetic)

The technique for varying the *potential* of an electrode in a continuous manner at a preset rate.

Potentiostat

An electronic device which maintains an electrode at a constant potential; used in anodic protection devices.

Pot-Holing

Process of locating and excavating buried utilities.

POTW

Publically Owned Treatment Works (POTW) are facilities designed to collect, transmit and treat wastewater that may be generated by industrial, commercial and/or domestic sources. Treatment works include the wastewater treatment units

themselves, as well as intercepting sewers, out-fall sewers, sewage collection systems, pumping, power and other equipment.

Poultice Corrosion

A term used in the automotive industry to describe the corrosion of vehicle body parts due to the collection of road salts and debris on ledges and in pockets that are kept moist by weather and washing. Also called deposit corrosion or attack.

Pourbaix (Potential-pH) Diagram

A plot of the *redox potential* of a corroding system versus the pH of the system, compiled using thermodynamic data and the *Nernst equation*. The diagram shows regions within which the metal itself or some of its compounds are stable.

Powder Metallurgy

The art of producing metal powders and utilizing metal powders for production of massive materials and shaped objects.

Power (Apparent)

The mathematical product of the volts and amps of a circuit. The product generally is divided by 1000 and designated as kilovolt amperes (kVA).

Power (Electric)

The time rate of transferring or using electrical energy, usually expressed in kilowatts (kW).

Power (Reactive)

That portion of apparent power that does no work. It is usually measured in kilovars. Reactive power must be supplied to most types of magnetic equipment, such as motors, ballasts, transformers, and

relays. Typically, it is supplied by generators or by electrostatic equipment such as capacitors.

Power Plants

Facilities (plants) that produce energy.

Power Requirements

The rate of energy input needed to operate a piece of equipment, a treatment plant, or other facility or system. The form of energy may be electrical, fossil fuel, other types, or a combination.

Power Take-Off (PTO)

Device that conveys the power from the vehicle's main motor to the drive mechanism of an implement; e.g., the vacuum pump on a cargo tank.

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. Preaeration A preparatory treatment of wastewater consisting of aeration to remove gases, add oxygen, promote flotation of grease, and aid coagulation.

Precession

The wobble over thousands of years of the tilt of the Earth's axis with respect to the plane of the solar system.

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. The application of chlorine to wastewater at or near the treatment plant entrance. Often used after bar screens and grit chambers to control odors in primary settling tanks.

Precious Metal

One of the relatively scarce and valuable metals: gold, silver, and the platinum-group metals. Also called *noble metal(s)*.

Precipitate

(1) To condense and cause to fall as precipitation, as water vapor condenses and falls as rain. (2) The separation from solution as a precipitate. (3) The substance that is precipitated.

Precipitation

When a substance dissolved in a liquid passes out of solution and into solid form. An operation in which particles are separated from a gas stream in which they are suspended, by the action of an electrical field or a thermal gradient.

Precipitation Hardening

Hardening caused by the precipitation of a constituent from a supersaturated solution. See also AGE HARDENING and AGING.

Precipitation Hardening

Hardening caused by the precipitation of a constituent from a supersaturated solid solution. See also AGE HARDENING and AGING.

Precipitation Heat Treatment

Artificial aging in which a constituent precipitated from a supersaturated solid solution.

Precipitators

Any number of devices using mechanical, electrical, or chemical means to collect particulates. Used to measure, analyze, or control particulates.

Pre Cracked Specimen

A specimen that is notched and subjected to alternating stresses until a crack has developed at the root of the notch.

Precursor

Compounds that change chemically or physically after being emitted into the air and eventually produce air pollutants. For example, organic compounds are precursors for ozone.

Precursor, THM

Natural organic compounds found in all surface and groundwater. These compounds may react with halogens (such as chlorine) to form trihalo-methanes (THMs); they must be present in order for THMs to form.

Predator

Predator is a animal that feeds on other animals.

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.

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. Preliminary treatment is Unit operations, such as screening, comminution, and grit removal, that prepare the wastewater for subsequent major treatment.

Prescribed Burning

The planned application of fire to vegetation to achieve any specific objective on lands selected in advance of that application.

Prescriptive Requirements

Minimum specific physical standards or specifications for design, siting, and construction of system components.

Press Filter

A press operated mechanically for partially dewatering sludge. See also FILTER PRESS, PLATE PRESS.

Pressure

(1) The total load or force acting on a surface. (2) In hydraulics, unless otherwise stated, the pressure per unit area or intensity of pressure above local atmospheric pressure expressed in pounds per square inch (psi) or kilograms per square centimetre (kg/cm²).

Presswheel

One of a set of wheels, attached to the rear of a drill, which passes along a row after it has been sown and firms the soil around and/or over the seed. Single wheels and twin inclined wheels are used which may have a metal or rubber tyre. The tyre may have a convex or concave outer profile.

ZERO PRESSURE PRESS WHEELS have a rubber tyre with no internal air pressure and raised ribs around the circumference of the tyre are used to concentrate the soil-firming effect of the wheel. In contrast, PNEUMATIC PRESSWHEELS have a tyre with internal air pressure which firms the soil. Narrow section hollow steel wheels are common on imported machines and are often called "packer wheels".

Pressure Filter

(1) An enclosed vessel having a vertical or horizontal cylinder of iron, steel, wood, or other material containing granular media through which liquid is forced under pressure. (2) A mechanical filter for partially dewatering sludge. See also FILTER PRESS, PLATE PRESS.

Pressure Gauge

A device for registering the pressure of solids, liquids, or gases. It may be graduated to register pressure in any units desired.

Pressure Gradient

A pressure differential in a given medium, which tends to induce movement from areas of higher pressure to areas of lower pressure.

Pressure Loss

Change in pressure between two points in an operating system as a result of friction and/or a change in elevation.

Pressure Main

A pressure main is a pipeline that carries a fluid (typically water or sewage) at a pressure greater than atmospheric pressure.

Pressure Reducing Valve

A pressure reducing valve (PRV) is a valve used to reduce the pressure to a pre-set downstream pressure.

Pressure Relief Valve

A pressure relief valve (PRelV) is a type of valve used to limit pressure surges within the water main system. A pressure relief valve is designed to open when a preset maximum pressure is reached. These valves are also known as Safety Relief Valves.

Pressure-Relief Valve

Pressure-relief valve is a valve that opens automatically when the pressure reaches a preset limit to relieve stress on a pipeline.

Pressure Sustaining Valve

A pressure sustaining valve (PSV) is a type of valve that maintains pre-set minimum downstream pressure. This valve type is very similar to a safety relief valve.

Pressure Welding

A welding process in which a weld is made by a sufficient pressure to cause plastic flow of the surfaces, which may or may not be heated.

Pressure Tank

A tank used in connection with a water distribution system for a single household, for several houses, or for a portion of a larger water system that is airtight and holds both air and water and in which air is compressed and the pressure so created is transmitted to the water.

Pressure Transducer

Device that senses pressure, converting that information to an electrical signal; an associated microprocessor can then convert the signal to a measurement of pressure, depth, or flow.

ProCell Blue

ProCell is Blue an all-borate Type 2 thermal and acoustical cellulose fibre insulation manufactured from elected recycled paper and paperboard stock.

Pretreatment

Any component or combination of components that provides treatment of wastewater prior to conveyance to a final treatment and dispersal component or reuse; often, this treatment is designed to meet primary, secondary, tertiary, and/or disinfection treatment standards. Treatment of industrial wastewater at its source before discharge to municipal collection systems.

Pre-treatment 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 Pre-treatment Regulations or locally derived prohibited discharge requirements and local effluent limits. Compliance with effluent limits allows for a legal discharge to a POTW.

Prevention of Significant Deterioration (PSD)

An EPA program in which state and/or federal permits are required to restrict emissions in areas that meet federal standards for criteria pollutants.

A permitting program for new and modified stationary sources of air pollution located in an area that attains or is unclassified for national ambient air quality standards (NAAQS). The PSD program is designed to ensure that air quality does not degrade beyond those air quality standards or beyond specified incremental amounts. The PSD permitting process requires new and modified facilities above a specified size threshold to be carefully reviewed prior to construction for air quality impacts. PSD also requires those facilities to apply BACT to minimize emissions of air pollutants. A public notification process is conducted prior to issuance of final PSD permits.

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.

Prey

Prey is an animal that is eaten by another animal.

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 Current Distribution

The current distribution in an *electrolytic cell* that is free of *polarization*.

Primary Effluent

The liquid portion of wastewater leaving the primary treatment process.

Primary Ore (Primary Minerals)

Ore or minerals which retain their original form and composition and have not been subject to chemical change.

Primary Particles

Particles that are directly emitted from combustion and fugitive dust sources.

Primary Particles

The individual mineral particles of which a soil is made up, such as sand, silt and clay particles, in their non-aggregated state.

Primary Passive Potential (Passivation Potential)

The potential corresponding to the maximum active current density (critical anodic current density) of an electrode that exhibits active-passive corrosion behavior.

Primary Profile Form

The first division of the Factual Key soil classification system. Four primary profile forms are recognized—organic soils, uniform soils, gradational soils and duplex soils.

Primary Sedimentation Tank

The first settling tank for the removal of settleable solids through which wastewater is passed in a treatment works. Sometimes called a primary clarifier.

Primary Settlement Tank

A tank in which the majority of settleable solids are removed from the crude sewage flowing through it.

Primary Sludge

Sludge obtained from a primary sedimentation tank.

Primary Standard

A pollution limit based on health effects. Primary standards are set for criteria air pollutants.

Primary Treatment

Primary treatment is water purification based on the difference in density of the polluting substance and the medium, the former being removed either by rising or settling. This process can include screening, grit removal, sedimentation, sludge dig. 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. primary treatment is (1) The first major treatment in a wastewater treatment facility, used for the purpose of sedimentation. (2) The removal of a substantial amount of suspended matter, but little or no colloidal and dissolved matter. (3) Wastewater treatment processes usually consisting of clarification with or without chemical treatment to accomplish solid-liquid separation.

Primary Voltage

The voltage of the circuit supplying power to a transformer, as opposed to the output voltage or load-supplied voltage, which is called secondary voltage. In power supply practice, the primary is almost always the high-voltage side and the secondary the low-voltage side of the transformer.

Primary Wastewater Treatment

Removal of sand, grit, and larger solids from wastewater by screens, settling tanks and/or skimming devices, estion, and sludge disposal.

Prime

(1) Act of initiating pump operation by filling the pump housing with liquid; (2) Air pressure under the bell of a siphon that allows it to operate properly.

Prime Agricultural Land

Land which because of its soil, climate, topography and location is suitable for a wide range of agricultural uses. It is invariably associated with prime agricultural soils and high inputs are not necessary to ensure maintenance of long term productivity, soil fertility and soil stability.

Prime Agricultural Soil

A soil which has no significant physical or chemical limitations for agricultural use, and where high inputs are not necessary to ensure maintenance of long term productivity, fertility and stability.

Primer

The first coat of paint applied to a surface. Formulated to have good bonding and wetting characteristics; may or may not contain inhibiting pigments.

Principal Profile Form

The end point of the Factual Key soil classification system. A principal profile form code, such as Ug5.16, Gn2.23 or Dy3.41, describes the soil profile to such an extent that it will be possible to make a reasonably concise statement concerning the soils belonging to it. An EXTENDED

PRINCIPAL PROFILE FORM may include additional information describing the surface soil in more detail and/or material below the solurn.

Principal Stress (Normal)

The maximum or minimum value at the *normal stress* at a point in a plane considered with respect to all possible orientations of the considered plane. On such principal planes the shear stress is zero. There are three principal stresses on three mutually perpendicular planes. The state of stress at a point may be (1) uniaxial, a state of stress in which two of the three principal stresses are zero, (2) biaxial, a state of stress in which only one of the three principal stresses is zero, and (3) triaxial, a state of stress in which none of the principal stresses is zero. Multiaxial stress refers to either biaxial or triaxial stress.

Prior Appropriation Doctrine

The system for allocating water to private individuals used in most Western states. The doctrine of Prior Appropriation was in common use throughout the arid West as early settlers and miners began to develop the land. The prior appropriation doctrine is based on the concept of "First in Time, First in Right." The first person to take a quantity of water and put it to beneficial use has a higher priority of right than a subsequent user. The rights can be lost through nonuse; they can also be sold or transferred apart from the land. Contrasts with riparian water rights.

Prior Stream

The remnants of a former stream channel. Typically a long, generally sinuous flow ridge built up from materials originally deposited by channelized flow along the line of the former streambed. It can also include buried channels under alluvium which may still contain flowing water.

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.

Probable Maximum Flood

Probable Maximum Flood (PMF), is the flood resulting from Probable Maximum Precipitation (PMP), including catchment conditions that are conducive to generating floods.

ProCell Gold

ProCell Gold is a revolutionary type 2 thermal and acoustical spray-applied insulation that is ideal for both commercial and residential structures. ProCell Gold's excellent coverage, perfect fit and greater density applies quickly and easily and creates no seams or voids, minimizes air leakage and infiltration, and provides uniform coverage with a density over twice that of fiberglass batts.

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.

Profile Leveling

Method of finding the elevations of a series of points at measured, horizontal distances along a line or path; process used in the development of a topographic map.

Profilometer

An instrument used for assessing surface micro relief. Usually consists of a portable framework with a series of adjustable pins which drop onto the land surface when the instrument is placed on the ground. The upper ends of the pins then depict the surface profile which can be photographed or numerically recorded. A series of such records, usually from different cultural treatments, gives a measure of the roughness of the surface which is valuable in soil management studies. A GULLY PROFILOMETER is a similar instrument adapted for characterizing gully cross-sections.

Propellant

A gas with a high vapor pressure used to force formulations out of aerosol spray cans. Among the gases used are butanes, propanes and nitrogen.

Propeller Fan

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

Propeller Pump

A centrifugal pump that develops most of its head by the propelling or lifting action of the vanes on the liquid. Also called an axial-flow pump.

Propeller-Type Impeller

An impeller of the straight axial-flow type.

Proprietary

Held under a patent, trademark, or copyright.

Property Connection Sewer

A Property Connection Sewer is a short sewer, owned and operated by a Water Agency, which connects the main sewer or Sewer Access Point to the Customer Sanitary Drain; it includes a junction on the main sewer, a property connection fitting, in some cases a vertical riser, and sufficient straight pipes to ensure the property connection fitting is within the lot to be serviced.

Property Line

Legal boundary defining land parcels.

Property Service

The WSAA defines a Property Service as a portion of a property water service from the reticulation main to meter location.

Proportional Weir

A special type of weir in which the discharge through the weir is directly proportional to the head.

Protected Area

Protected area is any area of land that has legal measures limiting human use of the plants and animals within that area; it includes national parks, game reserves, biosphere reserves, etc.

Protective Potential

The threshold value of the *corrosion potential* that has to be reached to enter a *protective potential range*. The term used in *cathodic protection*

to refer to the minimum potential required to suppress corrosion.

Protective Potential Range

A range of *corrosion potential* values in which unacceptable corrosion resistance is achieved for a particular purpose.

Protective System

Method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

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. Protozoa is Small one-celled animals including amoebae, ciliates, and flagellates.

Prussian Blue

A paste or liquid used to show a contact area.

Pseudoscauld (gen)

A natural surface with a scald-like appearance. The original surface soil is present but the scald appearance results from a thin layer of clayey material which cracks on drying and reseals on wetting.

Psychrophilic Bacteria

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

pH Value

A convenient method of expressing small differences in the acidity or alkalinity of solutions. Neutrality = pH 7; lower values indicate increasing acidity, higher values indicate increasing alkalinity.

Potable Water

Water fit for human consumption.

Primary Waste Treatment

Mechanical separation of solids, grease, and scum from waste-water. With the aid of flocculating agents, primary treatment can eliminate 50–65% of the suspended solids. Solids removed by primary treatment may comprise as much as 30–40% of the original BOD of the water.

PTE (Potential to Emit)

Capacity (usually measured in tons per year) of a pollution source to release a particular pollutant or class of pollutants.

Public Health

The health or physical well-being of a whole community.

Public Land

Land owned in common by all, represented by the government (town, county, state, or federal).

Public Supply

Water withdrawn by public governments and agencies, such as a county water department, and by private companies that is then delivered to

users. Public suppliers provide water for domestic, commercial, thermoelectric power, industrial, and public water users. Most people's household water is delivered by a public water supplier. The systems have at least 15 service connections (such as households, businesses, or schools) or regularly serve at least 25 individuals daily for at least 60 days out of the year.

Public Transportation

Various forms of shared-ride services, including buses, vans, trolleys, and subways, which are intended for conveying the public.

Public Water Use

Water supplied from a public-water supply and used for such purposes as firefighting, street washing, and municipal parks and swimming pools.

Publicly Owned Treatment Works

Wastewater treatment plant.

Puddling

The act of destroying soil structure by compaction or tillage of the soil at high moisture content, thereby reducing its porosity, permeability and aggregation. Stock often damage soil structure in this way when they are tilled on wet or waterlogged pasture.

Pulp

Raw material made from trees used in producing paper products.

Pulse Width

(Ultrasonics) Duration time of a single transmitted pulse.

Ponding

Accumulation of liquid on an infiltrative surface.

Power Vent

A vent that includes a fan to speed up air flow. Often installed on roofs.

Preformed Insulation

Thermal insulating material fabricated in such a manner that at least one surface conforms to the shape of the surface to be covered and which, when handled, will maintain its shape without cracking, breaking, crumbling or permanent deformation.

Pump

The mechanical device which actually extracts the water from its source. It is described on the Licence as the maximum size/capacity for that Licensed Work but this description is not necessarily what is physically installed at the Work.

A mechanical device for causing flow, for raising or lifting water or other fluid, or for applying pressure to fluids.

Pump Basin

Shallow open container installed in a pump tank; the container houses the pump and effectively raises the pump intake level to the lip of the basin.

Pump Capacity

Flow (gpm) a pump can deliver at a certain operating pressure (head).

Pump Curve

Graphical method that describes the relationship between the total dynamic head (TDH) and the capacity of particular pumps using various size impellers; the curve also includes information about efficiency and horse power consumption. A curve or curves showing the interrelation of speed, dynamic head, capacity, brake horsepower, and efficiency of a pump.

Pump Delivery Rate

Flow delivered by a pump at a specified total dynamic head expressed as volume per unit time.

Pump Efficiency

The ratio of energy converted into useful work to the energy applied to the pump shaft, or the energy difference in the water at the discharge and suction nozzles divided by the power input at the pump shaft.

Pumping Head

The sum of the static head and friction head on a pump discharging a given quantity of water.

Pumping Station

(1) A facility housing relatively large pumps and their appurtenances. Pump house is the usual term for shelters for small water pumps. (2) A facility containing lift pumps to facilitate wastewater collection or reclaimed water distribution.

Pump Pit

A dry well or chamber, below ground level, in which a pump is located.

Pump Stage

The number of impellers in a centrifugal pump; for example, a single-stage pump has one impeller; a two-stage pump has two impellers.

Pump, Submersible

Pump with a hermetically sealed motor close-coupled to the pump housing, designed to be placed entirely below the surface of the liquid to be pumped.

Pump, Vacuum

Pump that removes air from a cargo tank to create a vacuum (or partial vacuum); may also be operated in reverse mode to produce pressure.

Pump Vault

Device installed in a septic or pump tank that houses a pump and screens effluent before it enters the pump.

Pumper

Service provider who removes septage from a wastewater treatment component and disposes of it according to specific regulatory parameters.

Pumping

(1) Act of removing septage from a wastewater treatment system component; (2) Conveying effluent under pressure.

Purification

The removal, by natural or other methods, of pollution from a given medium. The total or partial removal of unwanted constituents from a gaseous medium.

Putrefaction

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

PVC

Polyvinyl chloride plastic is used for flooring, vinyl wallpaper, electric cables and so on. PVC contains chlorine and, when it is burnt, hydrochloric acid and chlorinated hydrocarbons are produced. They help to increase chlorine-organic compounds, such as dioxins, in the soil and water.

Putrescibility

(1) The relative tendency of organic matter to undergo decomposition in the absence of oxygen. (2) The susceptibility of wastewaters, effluent, or sludge to putrefaction. (3) The stability of a polluted, raw, or partially treated wastewater.

Q

Quadrat

A plot of land selected at random for the observation or measurement of plants within it. It is used as a sampling technique for the study of the plant population of an area. Such a plot is usually selected by the random throwing of a rigid frame, which is usually square. Quadrats may also be points. Such POINT QUADRATS are observed at regular intervals along a line transect.

Qualified Person

One who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated his ability to solve or resolve problems relating to the subject matter, work, or project.

Quality Assurance/Quality Control (QA/QC)

A system of procedures, checks, audits, and corrective actions to ensure that all research design and performance, environmental monitoring and sampling, and other technical and reporting activities achieve the program's desired data quality objectives (DQOs).

Quench-Age Embrittlement

Embrittlement of low carbon steels resulting from precipitation of solute carbon of existing dislocations and from precipitation hardening of the steel caused by differences in the solid solubility of carbon in ferrite at different temperatures. Quench age embrittlement usually is caused by rapid cooling of the steel from temperature slightly below AC1 (the temperature at which austenite begins to form), and can be minimized by quenching from lower temperature.

Quench Aging

Aging induced by rapid cooling after solution heat treatment.

Quench Cracking

Fracture of a metal during quenching from elevated temperature. Most frequently observed in hardened carbon steel, alloy steel, or tool steel parts of high hardness and low toughness. Cracks often emanate from filets, holes, corners, or other stress raisers and result from high stresses due to the volume changes accompanying transformation to martensite.

Quench Hardening

(1) In ferrous alloys, hardening by austenitizing and then cooling at a rate such that a substantial amount of austenite transforms to martensite. (2) In copper and titanium alloys hardening by solution treating and quenching to develop a martensite like structure.

Quenching

Rapid cooling of metals (often steels) from a suitable elevated temperature. This generally is accomplished by immersion in water, oil, polymer solution, or salt, although forced air is sometimes used.

Quick-Disconnect

(1) Device that allows removal of another device without cutting the associated piping; (2) Mechanical device that allows interruption of electrical power.

Quicklime

A calcined material, the major part of which is calcium oxide, or calcium oxide in natural association with a lesser amount of magnesium oxide. It is capable of combining with water, that is, being slaked.

R

R (R-value)

A unit of measurement of resistance to heat flow in hr. ft² ° F/BTU.in. (imperial) R-Value is Measure of resistance to heat flow. Insulation materials have tiny pockets of trapped air. These pockets resist the transfer of heat through material. The ability of insulation to slow the transfer of heat is measured in R-values. The higher the R-value, the better the insulation material's ability to resist the flow of heat through it.

Raceway

Any channel for holding wires, cables, or bus bars that is designed expressly and solely for that purpose. Raceways may be of metal or insulating materials and the term includes rigid metal conduit, nonmetallic conduit, flexible metal conduit, and electrical metallic tubing. Raceways may be located beneath the floor or on or above the surface (refer to the National Electric Code for approved raceways).

Rack

A device fixed in place and used to remove suspended or floating solids from wastewater. It is composed of parallel bars that are evenly spaced. See also SCREEN.

Radial Flow

The direction of flow across a tank from center to periphery or vice versa.

Radiant Barrier Foil

Radiant barrier foil is a thin aluminum film that works to reflect heat gain. It is typically fastened to the underside of roofs or in attic spaces, where it prevents the heat absorbed by hot roofs from transferring to the home's interior.

Radiant Barrier Spray

Barrier spray is a coating applied to structures for insulation and related purposes. The most widely used barrier spray is spray polyurethane foam (SPF), which provides a sealed thermal barrier for residential and commercial applications. SPF products are engineered for a variety of uses including roofing and fire control. Radiant barrier spray is a product used to block radiant heat from the sun.

Radiation

Transfer of energy (heat/sound) from one object to another through an intermediate space. Only the object receiving the radiation, not the space

is heated. The heat is in the form of low frequency, infrared, invisible, light energy, transferring from a “warm” object to a “cold” object. It is known as the “black body effect”. Heat flow transfer by electromagnetic radiation (infra red waves).

The emission and propagation of energy through space or through a material medium; also the energy so propagated. The dispersion of energy by electromagnetic waves rather than by conduction and convection.

Radiation Damage

A general term for the alteration of properties of a material arising from exposure to ionizing radiation (penetrating radiation), such as X-rays, gamma rays, neutrons, heavy-particle radiation, or fission fragments in nuclear fuel material.

Radiative Forcing

A measure of the influence of a particular factor (e.g. greenhouse gas (GHG), aerosol, or land use change) on the net change in the Earth's energy balance.

Radioactive Waste

The by-product of nuclear reactions that gives off (usually harmful) radiation.

Radioactivity

The spontaneous emission of matter or energy from the nucleus of an unstable atom (the emitted matter or energy is usually in the form of alpha or beta particles, gamma rays, or neutrons).

Radiography (X-Ray)

Use of X-rays to measure thickness or imperfection within solid materials.

Radiused and Beveled Lags

Beveled lags with faces curved to fit the surface of the cylinder (sometimes known as curved and beveled lags).

Radon

A colorless, naturally occurring, radioactive, inert gaseous element formed by radioactive decay of radium atoms in soil or rocks.

Rainforest

A large, dense forest in a hot, humid region (tropical or subtropical). Rainforests have an abundance of diverse plant and animal life, much of which is still uncatalogued by the scientific community.

Rain Water

Water arising from atmospheric precipitation, which has not yet collected soluble matter from the earth.

Raindrop Splash

The result of the violent break up and dispersion of raindrops when they hit the ground surface. If the surface is not protected soil particles may be dislodged and spattered a considerable distance, due to the energy of the raindrops impact.

Rainfall Intensity

The rate of rainfall for any given time interval, usually expressed in millimeters per hour (mm/h).

Rainfall Simulator

A piece of equipment used in erosion studies for simulating rainfall. Such a unit usually has its own water supply and power source and is therefore portable. Provision is made for water to be sprayed onto a plot of soil through appropriate nozzles and at such a pressure that a range of rainfall intensities, terminal velocities and drop sizes can be simulated. In this way the relations between rainfall, infiltration, runoff, soil structure, soil loss, surface roughness or cover levels can be studied without the need for natural rainfall events. For small plots a single nozzle and a rotating disc with an adjustable orifice is typically used to obtain realistic rainfalls and the unit is called a rotating disc simulator. For long plots an oscillating spray line is typically used to obtain realistic rainfalls in a semi-permanent set-up and the unit is called a RAINULATOR.

Ramp

Inclined walking or working surface that is used to gain access to one point from another, and is constructed from earth or from structural materials such as steel or wood.

Range

A measure of the variability of a quantity; the difference between the largest and smallest values in the sequence of values of the quantity. Range is the portion of the earth in which a given species is found.

Range Pole

Long pole with painted red and white delineations of one foot each; used to mark points that are difficult to see from a distance.

Rank

A row of tines on a tillage implement. Generally the number of ranks is the same as the number of lateral bars in the implement frame.

Rank Spacing

The longitudinal distance between ranks on a tillage implement. It is generally the same as the spacing of the lateral bars in the implement frame.

Rate

- (1) The speed at which a chemical reaction occurs.
- (2) Flow volume per unit time. See also KINETICS.

Rate-of-Flow Controller

An automatic device that controls the rate of flow of a fluid.

Rate-of-Flow Recorder

A recorder for registering the rate of flow of water; generally, used with a rapid sand filter.

Rated Flow

The gas flow rate through a separator either as stated by the manufacturer for defined conditions of use or as agreed between the interested parties for a particular installation.

Rating Curve

A drawn curve showing the relation between gage height and discharge of a stream at a given gaging station. A graphic representation of the discharge of, or flow through, a structure or channel section as a function of water stage or depth of flow. A tabular presentation of the same data is known as a rating table.

Rare Earth Metal

One of the group of 15 chemically similar metals with atomic numbers 57 through 71, commonly referred to as the lanthanides.

Rational Formula

A formula for estimating peak discharge of runoff from the catchment above a specific point, viz:

$$Q = CIA/360$$

where Q is peak discharge (m^3/s).

C is runoff coefficient.

“I” is the rainfall intensity (mm/h) for the selected return period (yrs) with storm duration equal to the time of concentration for the catchment (mins).

A is the catchment area (ha).

The rational formula is based on the following assumptions:

The rainfall is of uniform intensity over the whole catchment for the duration of the design storm.

The rainfall duration is equal to the catchment's time of concentration. The return period of the peak discharge is equal to that of the rainfall intensity.

As presented the formula can be used for catchments up to 100 hectares. For catchments greater than 100 hectares and up to 1200 hectares a correction factor is applied, to account for the likely breakdown of the above assumptions in larger catchments which results in the overestimation of

peak discharge. For catchments larger than 1200 hectares the rational formula is not reliable and rainfall-runoff computer models may be required for design purposes.

Raw Sewage

Untreated sanitary wastewater.

Raw Sludge

Settled sludge promptly removed from sedimentation tanks before decomposition has much advanced.

Raw Wastewater

Wastewater before it receives any treatment. Plant influent or wastewater before any treatment.

Raw Water

Water taken from natural sources, i.e. water wells or surface water.

Reactive Metal

A metal that readily combines with oxygen at elevated temperatures to form very stable oxides, for example, titanium, zirconium, and beryllium. Reactive metals may also become embrittled by the interstitial absorption of oxygen, hydrogen, and nitrogen.

Reactor

Container or tank in which controlled chemical and biological reactions used for the treatment of wastewater are carried out.

Reactor, Batch

Reactor in which flow is neither entering nor leaving (Fig. 14).

Reactor, Continuous-Stirred Tank (CSTR)

Reactor in which complete mixing occurs; constituents entering the tank are immediately and evenly dispersed throughout the tank while chemical and biological reactions take place (Fig. 14).

Reactor, Plug Flow

Reactor in which fluid particles pass through the tank and are discharged in the same sequence in which they enter (Fig. 15).

Continous Stirred Tank Reactor (CSTR)

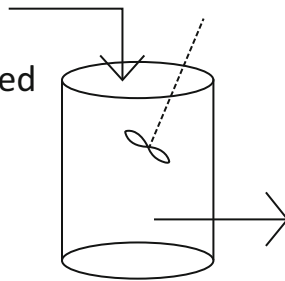


Fig. 14 CSTR

Reafforestation (for)

The re-establishment of a forest on land from which a previous forest has recently been cleared or destroyed.

Recharge Area (gen)

An area where water is absorbed to be added to a geologic zone of saturation or aquifer.

Recirculating

Design configuration wherein a portion of effluent is returned to a component for further treatment or to facilitate a treatment process.

Recirculation Ratio

Proportion of effluent returned to the treatment component compared to the amount of forward flow to the next component of the treatment train.

Recreational Capability

The ability of an area of land to sustain the most intensive recreational use without the occurrence of appreciable soil erosion and sedimentation.

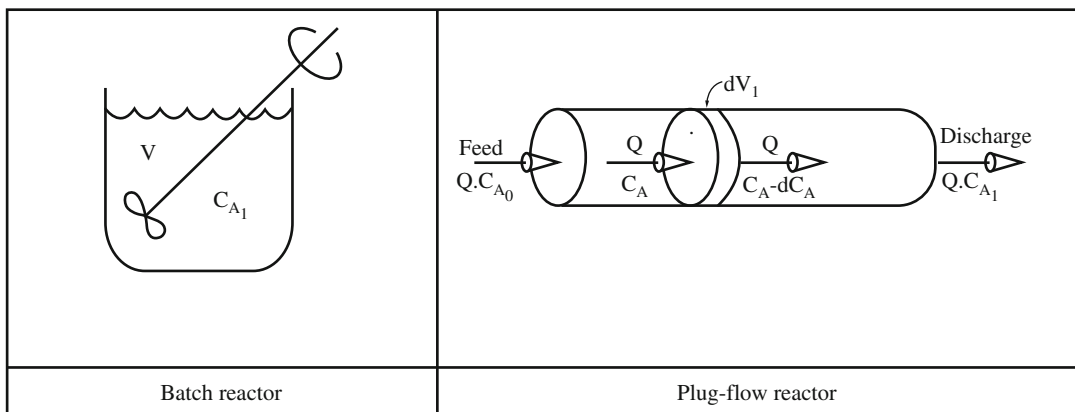


Fig. 15 Batch reactor and plug flow reactor

Over-use of an area may subsequently require extensive site modification and in extreme cases a complete loss of a recreational facility may occur.

Recreational Capability Classification

A method of land classification which ranks land according to various intensities of recreational use which are compatible with conservation of the soil resources of that land. It is designed to provide planners with information on the stability of a site! and to identify suitable alternative areas for development, when formulating management strategies.

A key factor in the classification is the assessment of visitor numbers to the recreational site. Such numbers fluctuate widely between and during seasons. Intensive use of an area at weekends or over a summer season can cause the gradual deterioration of vegetative cover, loss of topsoil, and the eventual death of established trees. The main factors considered in recreational capability classification are the stability of an area for active or passive recreation, and the intensity to which the proposed amenity is to be utilized. This intensity may range from uses with a heavy impact on the ground surface such as playing fields to passive uses such as viewing the landscape.

Five classes have been used by the Soil Conservation Services to classify recreational capability:

Class A

Land suitable for active recreation with high intensity use. This class represents the most suitable land for intensive recreational activities, including those with a heavy surface impact such as sporting fields, Specific soil erosion control measures for each site may be required to maintain stability.

Class B

Land suitable for active recreation with moderate intensity use. The erosion hazard is

moderate, limiting the land to intermittent heavy pressures from such activities as horse riding or picnicking, Specific soil erosion control measures for each site may be required to maintain stability.

Class C

Land suitable for passive recreation with low intensity use. Includes land with a high erosion hazard and is suitable for such activities as walking trails and orienteering. Activity areas should be adequately identified and signposted. Vehicular traffic should be controlled and restricted to well formed roads and surfaced parking bays.

Class D

Land suitable for passive recreation with undeveloped access. Minimum disturbance will provide the most effective erosion control and uses should be restricted to such activities as bushwalking and exploring. These activities have a low impact if defined trails are not provided. Vehicular access should be prohibited or restricted to well formed roads with adequate runoff and erosion control measures.

Class E

Land suitable for passive recreation with controlled access. Similar management to that of Class D but activities need to be strictly controlled to facilitate soil erosion control. Where considerable tourist potential exists, special provisions for erosion control may include 'lookout points' at safe or stable locations, and constructed walkways into critical areas. Erosion control measures will be costly but are essential to prevent the loss of the amenity.

Recrystallization

(1) Formation of a new, strain free grain structure from that existing in cold worked metal, usually accomplished by heating. (2) The change from one crystal structure to another, as occurs on heating or cooling through a critical temperature.

Redox Concentrations

Zones of apparent accumulation of Fe (iron) and/or Mn (manganese) oxides in soils.

Redox Depletions

Zones of low chroma where Fe (iron) and/or Mn (manganese) oxides and/or clay have been stripped out of the soil.

Redox Potential (Oxidation-Reduction Potential [ORP])

Electrical potential (measured in volts or millivolts) of a system due to the tendency of the substances in it to give up or acquire electrons.

The potential of a reversible oxidation-reduction electrode measured with respect to a reference electrode, corrected to the hydrogen electrode, in a given electrolyte.

Redoximorphic Feature

Soil property that results from the reduction and oxidation of iron and manganese compounds in the soil after saturation with water and subsequent desaturation.

Reduced Tillage

A general term describing a conservation tillage system in which the crop is grown with fewer tillage operations than would be the case for conventional tillage. Herbicides and/or grazing may be used for fallow weed control.

Reducing Agent

A compound that causes *reduction*, thereby itself becoming oxidized.

Reduction

Addition of electrons to a chemical entity decreasing its valence or oxidation number; for example under anaerobic conditions (no dissolved or molecular oxygen (O₂) present), sulfur compounds are reduced to produce hydrogen sulfide (H₂S) and other compounds. A reaction in which there is a decrease in valence resulting from a gain in electrons. Contrast with *oxidation*.

Redundant Off

(1) Optional operating parameter in a timed dosed configuration that acts as a fail-safe by preventing pump operation when effluent levels reach a specified level below the normal off level; (2) Sensor that controls the redundant off function in a timed dose system; typically, this sensor is directly wired into the pump circuit, thus bypassing the timer or control circuits.

Reference Electrode

A nonpolarizable *electrode* with a known and highly reproducible *potential* used for potentiometric and voltammetric analyses.

Reflective Insulation

Insulation depending for its performance upon reduction of radiant heat transfer across air spaces by use of one or more surfaces of high reflectance and low emittance.

Reflectivity

The ability of a surface material to reflect sunlight including the visible, infrared, and ultraviolet wavelengths.

Refractory Metal

A metal having an extremely high melting point, for example, tungsten, molybdenum, tantalum, niobium, chromium, vanadium, and rhenium. In the broad sense, this term refers to metals having melting points above the range for iron, cobalt, and nickel.

Regeneration (gen)

The re-establishment of depleted vegetation by natural self seeding and re-growth. It is commonly associated with stands of native timber that have been logged or partially cleared, burnt or depleted in some way, that are being encouraged to return to their natural condition. In a soil conservation context, it is associated with erosion control, especially in low rainfall pastoral areas where native pastures are encouraged to reestablish by such practices as excluding stock and vermin.

Regolith

The layer or mantle of loose, non-cohesive or cohesive rock material, of whatever origin, that nearly everywhere forms the surface of the land and rests on bedrock. It comprises rock waste of all sorts: volcanic ash: glacial drift: alluvium: wind-blown deposits: accumulations of vegetation, such as peat: and soil.

Regular Cultivation

The frequent growing of crops requiring tillage, on the same parcel of land. The proportion of time under tillage phases shall not be less than half the length of time under other phases.

Rehabilitation

The treatment of degraded or disturbed land to achieve an agreed level of capability and stability, preferably at least equal to that which existed prior to degradation or disturbance. Such rehabilitation may involve, the reshaping of the land surface, spreading available topsoil, construction of soil conservation works, revegetation, and the establishment of land use practices which will ensure continued stability and productivity.

Relative Humidity

The ratio, expressed as a percentage, of the amount of water vapor present in a given volume of air at a given temperature to the amount required to saturate the air at that temperature. Relative Humidity is the ratio of mol fraction of water vapor present in the air to the mol fraction of water vapour present in saturated air at the same temperature and barometric pressure. Approximately it equals the ratio of the partial pressure or density of the water vapor in the air to the saturation pressure or density, respectively, at the same temperature. The ratio expressed as a percentage of the amount of moisture air actually contains to the maximum amount it could contain at that temperature.

Remote Sensing

The collecting of information about an object or phenomenon by the use of sensing devices not in physical or intimate contact with the subject under investigation. The distance of separation might be as close as a few millimeters or as far as 800 kilometers or more, as in the case of satellites. The devices range from cameras to various scanners and radiometers.

The term is commonly used to refer to the collection of information about the earth by aerial photography, airborne radar and satellite.

Most remote sensing devices collect information from the electromagnetic spectrum, From longer to shorter wave lengths, it includes all those techniques That are normally used in remote sensing systems; gamma rays, X-rays, ultraviolet, visible light, infrared, microwaves and radio waves, The most common phenomenon observed with remote sensing is the reflection of electromagnetic energy as exemplified by normal aerial photography which utilizes the reflection of visible light from the terrain. The interpretation and evaluation of remote sensed images is based on spectral variation (comparing individual spectral signatures), spatial variation (comparing variations over a large area), and temporal variation (comparing variations over time).

Remote Sensing System

A technique, including methods and equipment, used for remote sensing. Two basic types of sensors are recognized:

Photographic Sensor

Involves the production of a permanent image when incoming radiation from the object being sensed is focused directly upon the recording medium. The most familiar and widely used sensor is the photographic camera and film, which is generally sensitive to wave lengths between 0.36 and 0.72 micromeres (effectively the visible spectrum).

Non-Photographic Sensor

Involves the production of a permanent image by focusing the incoming radiation upon a transducer which converts the radiation to a different type of signal, which is then recorded upon some medium, such as photographic film. Thus they require a transducer whereas photographic systems do not. Non-photographic sensor systems are often termed IMAGING SYSTEMS but this is not so in all cases since the information need not necessarily be stored as an image but can be kept,

for example on magnetic tape. Non-photographic sensors operate in different portions of the electromagnetic spectrum, from the ultraviolet (0.28 m) to the microwave (200 mm). They record either reflected or emitted radiation, Sensors which record reflected radiation can only operate during daylight conditions, whilst those which record emitted radiation can operate during the day or night.

Reno Mattress (Rock Mattress)

A mattress-shaped container made of wire mesh, fitted with rip-rap and used to protect earth surfaces from the erosive action of water. It is similar to a gabion but used where a gabion would be unnecessarily deep, such as in lining riverbanks.

Residential Development

A level of urban development which provides for the construction of roads, drainage and services to cater for subdivision allotments for housing, typically between 400 and 5000 square meters, In older subdivisions water and sewerage facilities may or may not be available, but in most new residential developments, catering for permanent residence in established urban centers, such facilities are normally provided.

Residual Site

An area where the in situ processes of weathering, leaching and new mineral formation are dominant, Lateral surface movement is minimal either because of level landform, such as a plateau, or where soil material is of such a nature as to resist lateral movement despite a considerable slope.

Residual Stress

Stresses that remain within a body as a result of *plastic deformation*.

Resilient Channels

Metal channels used to inhibit sound transmission from wood studs through drywall.

Resin

Component B in spray foam chemistry. This component is mixed with the A component on-site to make spray foam insulation.

Resistance

The opposition that a device or material offers to the flow of direct current, equal to the voltage drop across the element divided by the current through the element. Also called electrical resistance.

Resistance Welding

Welding in which force is applied to surfaces in contact and in which the heat for welding is produced by the passage of electric current through the electrical resistance at, and adjacent to, these surfaces.

Resistivity

Electrical resistivity.

Resolution

(Ultrasonics) The ability of a system to give simultaneous separate indications from discontinuities that are close together both in depth and lateral position.

Restoration

Rehabilitation of degraded or disturbed land so that, not only are the former capability and stability reestablished, but also the form and usage of the land are returned to a state closely resembling that before degradation or disturbance. This form of rehabilitation is typically very expensive, and may be virtually impossible where serious soil-removal has occurred, unless soil is imported from other sources.

Rest Potential

Corrosion potential and open-circuit potential.

Retaining Wall

A barrier, usually of uniform thickness and constructed of masonry materials, designed and installed to hold back unconsolidated rock and/or soil. Its aim is to counter the gravitational force of the material it is withholding and prevent mass movement. Small holes or gaps may be incorporated in the wall to cater for seepage.

Retarding Measure

Any measure designed to delay storm runoff and thereby reduce peak discharge. Such measures may include grassed drains, constricted pipe outlets and detention structures.

Retention Storage

The amount of water which can be permanently stored by a retention structure.

Retention Structure

A structure incorporating both temporary and permanent water storage components. Runoff in excess of the permanent storage is tempo-

rarily held and allowed to drain from the structure at a controlled rate during and after the runoff event, in order to reduce peak discharge downstream. The permanent storage may be used for such purposes as irrigation and/or recreation.

Return Period (Recurrence Interval) (Storm Frequency)

The average period in years between the occurrence of a storm of specified magnitude and an equal or greater storm.

It is an average figure, not an interval. For example, a storm with a return period of five (5) years does not occur regularly every five years but would probably occur ten (10) times in fifty (50) years. See also DESIGN RETURN PERIOD.

Return periods may also be calculated for floods, and in such cases the term FLOOD FREQUENCY can be used.

Revegetation

The re-establishment of plants on an area of ground that is depleted or devoid of vegetation, in order to provide protection against erosive agents. It is an integral part of erosion control and prevention on a wide variety of disturbed, eroded and/or degraded lands.

Revetment

A protective layer of rip-rap or other erosion-resistant material, either permanent or temporary, placed along the edge of a stream channel or shoreline, or against a batter, to stabilize the bank and protect it from the erosive action of water.

Rhizome

An underground stem, bearing buds and scale-like leaves, which serves for both vegetative propagation and survival in a perennial plant.

Paspalum is a common grass species having rhizomes.

Ridge

A hilt formation incorporating a narrow crest and adjoining slopes. The crest length is greater than the width of the adjoining slopes.

Rill

A small channel, cut by concentrated runoff, through which water flows during and immediately after rain. Rills typically form as a result of the action of heavy rainfall on exposed soil surfaces such as recently tilled land or constructed batters. They may be up to 30 cm in depth but would be largely obliterated by tillage operations. This distinguishes them from gullies.

Ringbarking

A method of killing trees by encircling each tree with a cut deep enough to ensure removal of the cambium layer beneath the bark. Ringbarking is often used as a low-cost long-term way of clearing timbered land for grazing purposes. Its aim is to allow the gradual spread of grasses into the ring barked area as the tree canopy disappears, in the hope that there is a consequent increase in stock carrying capacity.

Ringworm Corrosion

Localized corrosion frequently observed in oil well tubing in which a circumferential attack is observed near a region of metal "upset".

Riparian (gen)

Belonging to a river bank. Typically used to describe the rights of access to a river via its banks. Riparian vegetation is that which occurs

from normal river level to the edge of the floodplain.

Rip-Rap

Loose rock or stone used to protect earth surfaces against erosion by flowing water or wave action, as in a revetment.

Ripper

A heavy duty tillage implement consisting of one or more heavy duty tines which penetrate deeply. Loosening and shattering the soil without inversion. Depth of working normally exceeds 200 mm.

Ripping

The tillage of soil or other material by tined implement without inversion, for the purpose of loosening it and/or improving water movement and root penetration.

Ripping carried out to loosen the soil below normal tillage depth is known as DEEP RIPPING (SUBSOILING).

Ripple Drift

The wavy pattern left on sandy soils after saltation has taken place for some time.

Riser

(1) That section of pipeline extending from the ocean floor up the platform. Also, the vertical tube in a steam generator convection bank that circulates water and steam upward. (2) A reservoir of molten metal connected to a casting to provide additional metal to the casting, required as the result of shrinkage before and during solidification. (3) A vertical length of pipe used in a

hydraulic structure specifically to control the level of water in the structure. Typically used as the inlet of a pipe spillway.

Reaction Rate

The rate at which a chemical reaction progresses. See also KINETICS, RATE.

Reactive Organic Gases (ROG)

Classes of organic compounds, especially olefins, substituted aromatics and aldehydes, that react more rapidly in the atmosphere to form photochemical smog or ozone.

A photochemically reactive chemical gas, composed of non-methane hydrocarbons, that may contribute to the formation of smog. Also sometimes referred to as Non-Methane Organic Gases (NMOGs).

Reactivity (or Hydrocarbon Photochemical Reactivity)

A term used in the context of air quality management to describe a hydrocarbon's ability to react (participate in photochemical reactions) to form ozone in the atmosphere. Different hydrocarbons react at different rates. The more reactive a hydrocarbon, the greater potential it has to form ozone.

Reactor

The container, vessel, or tank in which a chemical or biological reaction is carried out.

Reagent

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

Reasonable Further Progress (RFP)

Specified rate of progress towards meeting an air quality standard, as set forth in law or in a plan.

Reasonably Available Control Measures (RACM)

A broadly defined term referring to technologies and other measures that can be used to control pollution. They include Reasonably Available Control Technology and other measures. In the case of PM10, RACM refers to approaches for controlling small or dispersed source categories such as road dust, woodstoves and open burning.

Reasonably Available Control Technology (RACT)

Air pollution abatement equipment that is both technologically feasible and cost effective.

Recalcination

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

Recalcining

Recovery of lime from water and wastewater treatment sludge.

Recarbonation

A process in which carbon dioxide is bubbled into the water being treated to lower the pH. Recarbonation is (1) The process of introducing carbon dioxide as a final stage in the lime-soda ash softening process to convert carbonates to

bicarbonates and thereby stabilize the solution against precipitation of carbonates. (2) The addition of carbon dioxide to the effluent of an advanced wastewater treatment ammonia air stripping process to lower the pH. (3) The diffusion of carbon dioxide gas through a liquid to replace the carbon dioxide removed by the addition of lime. (4) The diffusion of carbon dioxide gas through a liquid to render the liquid stable with respect to precipitation or dissolution of alkaline constituents.

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. It means rivers, lakes, or other water sources that receive treated or untreated waste-waters. A river, lake, ocean, or other watercourse into which wastewater or treated effluent is discharged.

Receptacle

A contact device installed at the outlet for connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles.

Recharge

Recharge is the process by which water is added to a reservoir or zone of saturation, often by runoff or percolation from the soil surface.

Reciprocating Internal Combustion Engine (RICE)

An engine in which air and fuel are introduced into cylinders, compressed by pistons, and ignited by a spark plug or by compression. Combustion in the cylinders pushes the pistons sequentially, transferring energy to the crankshaft, causing it to rotate.

Reciprocating Pump

A type of displacement pump consisting essentially of a closed cylinder containing a piston or plunger as the displacing mechanism. Liquid is drawn into the cylinder through an inlet valve and forced out through an outlet valve. When the piston acts on the liquid in one end of the cylinder, the pump is termed single-action; when it acts in both ends, it is termed double-action.

Recirculation

(1) In the wastewater field, the return of all or a portion of the effluent in a trickling filter to maintain a uniform high rate through the filter. Return of a portion of the effluent to maintain minimum flow is sometimes called recycling. (2) The return of effluent to the incoming flow. (3) The return of the effluent from a process, factory, or operation to the incoming flow to reduce the water intake. The incoming flow is called makeup water.

Reclaimed Wastewater

Wastewater used for some beneficial purpose usually after some degree of treatment.

Reclaimed Water

Reusable wastewater from wastewater treatment such as tertiary treatment of wastewater in biological and other systems.

Reconciled Orders

Water orders that have been accounted for based on a meter reading.

Recorder

(1) A device that makes a graph or other record of the stage, pressure, depth, velocity, or the movement or position of water-controlling devices, usually as a function of time. See also INDICATOR. (2) The person who records the observational data.

Recording Gauge

An automatic instrument for measuring and recording graphically and continuously. Also called a register.

Recreational Flow

A volume of water released from the Head work for recreational purposes, such as canoing. This is an important input to the River Operations Function.

Rectangular Weir

A weir having a notch that is rectangular in shape.

Recycle

(1) To return water after some type of treatment for further use; generally implies a closed system. (2) To recover useful values from segregated solid waste.

Recycled Water

Water that is used more than one time before it passes back into the natural hydrologic system.

Recycling

(1) An operation in which a substance is passed through the same series of processes, pipes, or vessels more than once. (2) The conversion of solid waste into usable materials or energy.

Reduce

The opposite of oxidize. The action of a substance to decrease the positive valence of an ion.

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 (H_2S) and other compounds. The addition of electrons to a chemical entity decreasing its valence. See also OXIDATION.

Reference Dose (RfD)

An estimate delivered by the U.S. EPA (with uncertainty spanning perhaps an order of magnitude) of the daily exposure to the human population (including sensitive subpopulations), that is likely to be without deleterious effects during a lifetime. The RfD is reported in units of mg of substance/kg body weight/day for oral exposures.

Reference Exposure Concentration (RfC)

An estimate, derived by the U.S. EPA with an uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human population, (including sensitive subgroups) that is likely to be without appreciable risk of deleterious effects during a lifetime of exposure. The RfC is derived from a no or lowest observed adverse effect level from human or animal exposures, to which uncertainty or "safety" factors are applied.

Reference Exposure Level (REL)

A term used in risk assessment. It is the concentration at or below which no adverse health effects are anticipated for a specified exposure period.

Refinery

A facility that produces liquid fuels by distilling petroleum.

Reflux Valve

A reflux valve is a type of valve that permits flow in only one direction. Reflux valves are also known as check valves.

Reforestation

Establishing native tree cover on lands that were previously forested, but that have had less than 10% tree canopy cover for a minimum time of 10 years.

Reformulated Gasoline

Specially refined gasoline with low levels of smog-forming volatile organic compounds (VOCs) and low levels of hazardous air pollutants.

Reformulated Gasoline Predictive Model

A set of mathematical equations that predict the emissions likely to occur from the combustion of a given formulation of gasoline

Refractory

Brick or similar material that lines a furnace or incinerator.

Refractory Index

A measure of the ability of a substance to be biodegraded by bacterial activity.

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.

Refrigerants

Cooling substances, many of which contain CFCs and are harmful to the earth's ozone layer.

Regeneration

(1) In ion exchange, the process of restoring an ion exchange material to the state used for adsorption. (2) The periodic restoration of exchange capacity of ion exchange media used in water treatment.

Regional Greenhouse Gas Initiative (RGGI)

A cooperative effort by Northeastern and Mid-Atlantic states to reduce carbon dioxide emissions. The RGGI states will develop a regional strategy by April 2005 for controlling emissions. This strategy will more effectively control interstate transport and international transport of greenhouse gases, and will require electric power generators in participating states to reduce carbon dioxide emissions.

Regional Haze

The haze produced by a multitude of sources and activities, which emit fine particles and their precursors across a broad geographic area. The U.S. regulations require states to develop plans to reduce the regional haze that impairs visibility in Class I areas.

Registered Professional Engineer

Person who is registered as a professional engineer in the state where the work is to be performed; a professional engineer, registered in any state is deemed to be a "registered professional engineer" within the meaning of this standard when approving designs for "manufactured protective systems" or "tabulated data" to be used in interstate commerce.

Regulated Stream

A River, Stream or other Water Course, the flow of which is regulated by artificial structures such as Dams, Weirs, Off-takes, Storages, etc.

Regulated Supplementary Licence

Holders of supplementary access licences are able to extract water during announced periods when flows exceed those required to meet other

licensed obligations and environmental needs. This is typically during periods when the dam is spilling or as a result of high tributary inflows downstream of the dam. Replaces access to 'off-allocation' water and access under Special Additional Licences and High Flow Authorities.

Regulated Water

A River, Stream or other watercourse, the flow of which is regulated by artificial structures such as Dams, Weirs, Off-takes, Storages, etc.

Reid Vapor Pressure (RVP)

Refers to the vapor pressure of the fuel expressed in the nearest hundredth of a pound per square inch (psi) with a higher number reflecting more gasoline evaporation.

Relative Humidity

(1) The amount of water vapor in the air; expressed as a percentage of the maximum amount that the air could hold at the given temperature. (2) The ratio of the actual water vapor pressure to the saturation vapor pressure.

Relative Sea Level Rise

The increase in ocean water levels at a specific location, taking into account both global sea level rise and local factors, such as local subsidence and uplift. Relative sea level rise is measured with respect to a specified vertical datum relative to the land, which may also be changing elevation over time.

Relay

An electrical device that is designed to interpret input conditions in a prescribed manner and, after specified conditions are met, to respond to cause electrical operation or similar abrupt change in

associated control circuits. The most common form of relay uses a coil and set of contacts. When current flows in the coil, contacts are opened or closed, depending on their arrangement. Relays are said to be normally open or normally closed.

Relief Valve

A valve that releases air from a pipeline automatically without loss of water, or introduces air into a line automatically if the internal pressure becomes less than that of the atmosphere.

Remediation

Act or process of correcting a fault or deficiency without changing system structure or form.

Remote Sensing

The collection and interpretation of information about an object without physical contact with the object; e.g., satellite imaging, aerial photography, and open path measurements.

Removal Efficiency

A measure of the effectiveness of a process in removing a constituent, such as BOD or TSS. Removal efficiency is calculated by subtracting the effluent value from the influent value and dividing it by the influent value. Multiply the answer by 100 to convert to a percentage.

Renewable Energy

Renewable energy is the energy resource that does not use exhaustible fuels. It is the energy from sources that cannot be used up: sunshine, water flow, wind and vegetation and geothermal energy, as well as some combustible materials, such as landfill gas, biomass, and municipal solid waste.

Repair

An element of maintenance, as distinguished from replacement or retirement.

Replacement

Installation of new or alternate equipment in place of existing equipment for a variety of reasons, such as obsolescence, total disrepair, improvement, or modification. Process of exchanging a component with an equivalent component.

Replacement Cost

- (1) The actual or estimated cost of duplication with a property of equal utility and desirability.
- (2) The cost of replacing property.

Replenishment Flows

A volume of water released from the Head work to replenish downstream Storages and Weirs, and to refill pools and water holes in effluent river systems downstream of the water source. Provides water for households, town use and stock. This is an important input to the River Operations Function.

Reporting

Act of submitting a detailed report of inspection, monitoring or operation and maintenance activities performed on a wastewater treatment system.

Reserve Area

Area of land with demonstrated capacity for use as a final treatment and dispersal component upon which no permanent structure should be constructed and which is intended for replacement of the original system if needed.

Reserve Capacity

Extra treatment capacity built into wastewater collection, treatment, and dispersal components or systems to accommodate projected increases in flow.

Residuals

Solids generated and retained in wastewater treatment components during the treatment of sewage, including sludge, scum, and pumpings from grease interceptors, septic tanks, aerobic treatment units, or other components.

Restrictive Layer

Horizon or condition in the soil profile or underlying strata that restricts movement of fluids; a restrictive layer may constitute a limiting soil/site condition; examples include fragipan, spodic horizons, massive structural grade, or certain bedrock, etc.

Reservoir

Reservoir is any natural or artificial holding area used to store, regulate, or control a substance.

Residence Time

The average time spent in a reservoir by an individual atom or molecule. With respect to greenhouse gases, residence time refers to how long on average a particular molecule remains in the atmosphere. For most gases other than methane and carbon dioxide, the residence time is approximately equal to the atmospheric lifetime.

Residue

- (1) The equilibrium quantity of a compound or element remaining in an organism after uptake and clearance.
- (2) The dry solid remaining after evaporation.

Resilience

A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to social well-being, the economy, and the environment.

Resistance

The property of an electrical circuit or device that opposes current flow, thereby causing conversion of electrical energy to heat or radiant energy.

Residual Chlorine

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

Residual Risk

The quantity of health risk remaining after application of emission control.

Residuals

The solids generated and/or retained during the treatment of wastewater. They include trash, rags, grit, sediment, sludge, biosolids, septage, scum, grease, as well as those portions of treatment systems that have served their useful life and require disposal such as the sand or peat from a filter. Because of their different characteristics, management requirements can differ as stipulated by the appropriate regulations.

Residual Saturation

The amount of water or oil remaining in the voids of a porous medium and held in an immobile state by capillary and dead-end pores.

Resources

Resources are the materials found in the environment that can be extracted from the environment in an economic process. There are abiotic resources (non-renewable) and biotic resources (renewable).

Respiration

The process in which an organism uses oxygen for its life processes and gives off carbon dioxide. Intake of oxygen and discharge of carbon dioxide as a result of biological oxidation. A series of charts, numbered 0 to 5, that simulate various smoke densities by presenting different percentages of black. A Ringelmann No. 1 is equivalent to 20% black; a Ringelmann No. 5 is 100% black. They are used for measuring the opacity or equivalent obscuration of smoke arising from stacks and other sources by matching the actual effluent with the various numbers, or densities, indicated by the charts.

Respirator

A device designed to protect the wearer from a hazardous atmosphere.

Retardation

Preferential retention of contaminant movement in the subsurface resulting from adsorption processes or solubility differences.

Retention Time

The time water, sludge or solids are retained or held in a clarifier or sedimentation tank. The theoretical time required to displace the contents of a tank or unit at a given rate of discharge (volume divided by the rate of discharge). Also called detention time.

Retrofit

The application of additional insulation over existing insulation, new insulation if old insulation has been removed, or new insulation over existing, previously uninsulated surfaces.

Return Activated Sludge (RAS)

The portion of the solid materials collected from secondary treatment (i.e., secondary clarifiers) returned to the aeration tanks to sustain biological activity there.

Return Air

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

Return Flow

(1) That part of a diverted flow that is not consumptively used and returned to its original source or another body of water. (2) (Irrigation) Drainage water from irrigated farmlands that re-enters the water system to be used further downstream.

Return Flow (Irrigation)

Irrigation water that is applied to an area and which is not consumed in evaporation or transpiration and returns to a surface stream or aquifer.

Return Flow

(1) Volume of effluent returned to a previous component of a treatment train configured with a recirculation mode; (2) volume of effluent used to backflush a component.

Return Line

(1) Portion of the distribution system through which effluent is routed back to a pretreatment component such as in a drip distribution system; (2) Portion of a treatment component that conveys effluent back to an upstream component such as an activated sludge return or a recirculating media filter.

Return Sludge

The recycled sludge in a (Publicly Owned Treatment Works) POTW that is pumped from a secondary clarifier sludge hopper to the aeration tank. Settled activated sludge returned to mix with incoming raw or primary settled wastewater. More commonly called return activated sludge.

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.

Reverse Osmosis

Reverse osmosis is a filtration method applied to the desalination of water. Osmosis is the passage of solutes through a semi-permeable membrane from a region of high solute concentration to a region of low solute concentration, until both regions have reached equal solute concentration. The energy that drives this process is called osmotic pressure. In reverse osmosis, this osmotic pressure has to be overcome to drive the solutes from a region of low to high concentration. An advanced method used in water and wastewater

treatment that relies on a semipermeable membrane to separate the water from its impurities. An external force is used to reverse the normal osmotic flow resulting in movement of the water from a solution of higher solute concentration to one of lower concentration. Also called hyperfiltration.

Revolving Screen

A screen or rack in the form of a cylinder or a continuous belt that is revolved mechanically. The screenings are removed by water jets, automatic scrapers, or manually.

Reynolds' Number

A dimensionless quantity used to characterize the type of flow in a hydraulic structure where resistance to motion depends on the viscosity of the liquid in conjunction with inertia. It is equal to the ratio of inertial forces to viscous forces. The number is chiefly applicable to closed systems of flow, such as pipes or conduits where there is no free water surface, or to bodies fully immersed in the fluid so the free surface need not be considered.

Ridge Vents

A vent mounted along the entire ridge line of the roof to allow the passage of air through the attic or cathedral ceiling.

Ringelmann Chart

Actually a series of charts, numbered 0 to 5, that simulate various smoke densities, by presenting different percentages of black. A

Ringelmann No. 1 is equivalent to 20% black; a Ringelmann No. 5 is 100% black. They are used for measuring the opacity or equivalent obscuration of smoke arising from stacks and other sources by matching the actual effluent with the various numbers, or densities, indicated by the charts.

Riparian

Of or pertaining to the banks of a body of water.

Riparian Water Rights

The rights of an owner whose land abuts water. They differ from state to state and often depend on whether the water is a river, lake, or ocean. The doctrine of riparian rights is an old one, having its origins in English common law. Specifically, persons who own land adjacent to a stream have the right to make reasonable use of the stream. Riparian users of a stream share the streamflow among themselves, and the concept of priority of use (Prior Appropriation Doctrine) is not applicable. Riparian rights cannot be sold or transferred for use on nonriparian land.

Riser

(1) Vertical piping that begins at the lateral and terminates in a spray distribution head in a spray dispersal system; (2) In reference to tanks.

Riser, Access

Conduit facilitating access to subsurface components of a wastewater treatment system.

Riser, Flexible

Polyethylene fitting for connection of spray distribution heads to laterals using flexible pipe as a riser; allows proper installation of the distribution head in a location that may be both vertically and horizontally remote from the lateral; helps protect and isolate the lateral from damage.

Riser, Swing Joint

Piping and connections used to adjust the elevation of and isolate spray distribution heads from the lateral in a spray dispersal system.

Riser, Universal

Piping for connection of spray distribution heads to laterals, allowing installation of the distribution head at the soil surface via multiple threaded sections that can be cut to the appropriate length.

Riser Pipe

Piping connected to the loading pipe valve and projecting into a cargo tank; facilitates distribution of material within the tank during loading.

Rising Main

Rising Main is a synonym for Pressure Main. Although water pressure mains are sometimes referred to as rising mains, the term is most commonly used when referring to a sewer pressure main.

Rip Rap

Protective covering, often stone or coarse gravel, for earthen slopes to prevent erosion, broken rock, cobbles or boulders placed on earth surfaces, such as the face of a dam or the bank of a stream for the protection against erosive forces,

such as flow velocity and waves. Broken stone or boulders placed compactly or irregularly on dams, levees, dikes, or similar embankments for protection of earth surfaces against the action of waves or currents.

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.

Rising Time

The time necessary for removal, by flotation, of suspended or aggregated colloidal substances.

Risk Assessment

An evaluation of risk that estimates the relationship between exposure to a harmful substance and the likelihood that harm will result from that exposure.

Risk Management

An evaluation of the need for and feasibility of reducing risk. It includes consideration of magnitude of risk, available control technologies and economic feasibility.

Respiratory Disease

A disease affecting the respiratory system.

Revocation (of Authority)

A Licence, Authority, Permit etc may be revoked under certain circumstances. A Revoked Licence will not be restored.

River

A natural stream of water of considerable volume, larger than a brook or creek.

River Operations

The procedures under which the volume of water in a stream and its rate of flow is regulated. Applies to both regulated and unregulated streams although the operational procedures are quite different.

River Section

A portion of a (usually) Regulated Stream which is controlled by artificial means, such as between two Weirs for instance. It often—but not necessarily—correlates to a Metering Section. It is a fundamental entity within River Operations. Also referred to as Stream Section.

Roadside Batter

A batter on the side of a road formed by excavation or deposition of material during road construction.

Roadside Erosion

Soil erosion associated with the presence of a road across a landscape. Such erosion may be directly caused by the road, or may be existing erosion aggravated by the location, nature or construction of the road. Roadside erosion is usually a result of one or more of the following factors:

Lack of provision for safe disposal of water from the road surface.

Lack of adequate drainage under the road, particularly where the road crosses a drainage line.

Concentration of runoff water along the sides of the road, from the road itself and/or from the adjacent catchment.

Lack of stabilization of the road shoulders, table drains, mitre drains, batters or other adjacent areas.

Rock

Naturally occurring inorganic material with a defined structure and mineralogical composition.

Materials that might otherwise impair absorption area performance; placed on the infiltrative surface.

Rock Fragments

Unattached pieces of rock 2 mm in diameter or larger.

Rock Platform

A level area of rock forming part of the seashore that is exposed at low tide. It results principally from the action of waves undercutting precipitous shore lines, thus producing the typical coastal rock platform/cliff association. The wave action is enhanced by the continuous wetting and drying with the tides which aids the weathering process.

Rock, Washed

Clean graded media of specified size range, offering a minimum specified void space, having a hardness value of three or greater on the Moh's Scale of Hardness (can scratch a copper penny), prepared to be relatively free of fine.

Rock Wool

Mineral wool produced from naturally occurring igneous rock. Thermal insulation material composed of threads or filaments of slag, produced by reprocessing the residual materials from met-

als smelting. A synthetic vitreous fiber insulation made by melting predominantly igneous rock and other inorganic materials, and then physically forming them melt into fibers.

Rod, Level

Pole marked with a gradation facilitating the determination of a relative elevation for a point, typically constructed of wood and graduated in feet and tenths and hundredths of a foot.

Rod Reading

Reading taken on a leveling rod when sighting through the telescope of an optical leveling instrument.

Rod Weeder

A light secondary tillage implement used for weed control whose main component is a horizontally mounted rod which rotates slowly under the soil surface in an opposite direction to the direction of travel. The rod is typically of a square or round cross-section 25 mm in diameter. It may be driven by a ground wheel, by tractor power take-off or hydraulic motor, and rod surface speed should be about 10% greater than the machine's forward speed. A DEAD ROD is a self rotating rod mounted behind other tillage implements.

Roof Vents

A louver or small dome mounted near the ridge of the roof to allow the passage of air beneath the roof sheathing or through the attic.

Rootstock

An underground plant stem used for vegetative propagation.

Rotameter

An instrument used for measuring the length of an irregular line, such as a road or watercourse, on a map. It consists of a small wheel at the foot of the instrument which is guided along the line, and a dial with a rotating hand that indicates the distance travelled on a graduated scale. The measured distance can then be converted to the corresponding distance on the ground by reference to the map scale. Complete revolutions of the rotating hand are registered on a small integrated recessed dial.

Rotary Distributor

A movable distributor made up of horizontal arms that extend to the edge of the circular trickling filter bed, revolve about a central post, and distribute liquid over the bed through orifices in the arms. The jet action of the discharging liquid normally supplies the motive power. See also DISTRIBUTOR.

Rotary Dryer

A long, slowly revolving, steel cylinder with its long axis slightly inclined, through which passes the material to be dried in hot air. The material passes through from inlet to outlet, tumbling about.

Rotary Pump

A type of displacement pump consisting essentially of elements rotating in a pump case that is 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.

Rotary Sieve

An apparatus used for separating dry soil into its various constituent fractions. It consists of a rotating nest of concentric cylindrical sieves of various diameters. Rotations are generally slow, typically 7 RPM.

Rotary Valve

A valve consisting of a casing more or less spherical in shape and a gate that turns on trunnions through 90° when opening or closing and having a cylindrical opening of the same diameter as that of the pipe it serves.

Rotating Biological Contactor (RBC)

A device for wastewater treatment composed of large, closely spaced plastic discs that are rotated about a horizontal shaft. The discs alternately move through the wastewater and the air and develop a biological growth on their surfaces. Type of attached growth pretreatment component consisting of disks mounted on a drive shaft which rotates; microorganisms attached to the discs are alternately exposed to free oxygen in the atmosphere and the wastewater.

Rotating Distributor

A distributor consisting of rotating or reciprocating perforated pipes or troughs from which liquid is discharged in the form of a spray or in a thin sheet at uniform rates over the surface area to be wetted.

Rotational Grazing

The successive grazing of pastures on a sequential basis as a means of optimizing management of both stock and pasture. Such a system often involves short periods of heavy grazing followed

by periods of rest for herbage recovery in the same season. This allows for control of weeds, stock parasites, pasture cover, sward height, stage of growth and composition. It also provides opportunities for pasture fertilization and renovation as necessary, and general pasture management in rotation to stock numbers, teed availability and rainfall occurrence.

Rotifer

Minute, multicellular aquatic animals with rotating cilia on the head and forked tails. Rotifers help stimulate microfloral activity and decomposition, enhance oxygen penetration, and recycle mineral nutrients.

Roughing Filter

A trickling filter used to remove an initial portion of the soluble BOD, usually about 50%, but not to provide complete removal.

Roughness Coefficient

A factor in many engineering equations for computing the average velocity of flow of water in a conduit or channel. It represents the effect of the roughness of the confining material on the energy losses in the flowing water.

Roughness Coefficient (Retardance Factor)

A measure of the retardance to flow in a channel. The more retardance the higher the roughness coefficient. It is computed to assist in the prediction of flow velocities for design purposes using Manning's Formula and has the symbol 'n'.

Factors which affect retardance include:

Physical roughness of the material forming the channel, e.g. presence of surface irregularities in min9 materials increases n. vegetation, e.g. height, density, type.

Cross section, e.g. abrupt changes in section along the channel increase n , as does an increase in depth of flow. Channel alignment, e.g. severe meandering with curves having relatively small radii increase n . erosion and sedimentation, e.g. active erosion increases n . obstructions. e.g. number, type, size.

The value of 'n' in a natural or constructed vegetated channel varies with the season and from year to year and hence is not a fixed value. Thus, all the above factors should be evaluated with respect to the kind of channel, the degree of maintenance, the seasonal requirements and the season of the year when the design storm normally occurs, as a basis for selecting the value of the roughness coefficient.

Roughness Element

An object which interrupts wind flow over a surface.

RSI

A unit of measurement of resistance to heat flow in $m^2 \text{ } ^\circ C/W$ per 25 mm (metric) $R=0.176$ RSI.

Run

The metal method or deposited during one passage of an electrode, torch or blow-pipe.

Running Losses

Evaporation of motor vehicle fuel from the fuel tank while the vehicle is in use.

Run-Off

Run-off is that part of rainfall which flows off the surface to reach a sewer or river.

Runoff Coefficient

The C factor in the rational formula, which equals the ratio of the rate of runoff to the rate of rainfall, t indicates the proportion of the rainfall rate that is actually contributing to the runoff rate and as such the coefficient is always less than 1.0.

The runoff coefficient depends on rainfall intensity, topography, depression storage, infiltration, interception loss and interception storage. For its estimation, numerical values are allocated to various runoff producing characteristics related to these factors. The sum of which gives the runoff coefficient. This assessment is subjective and represents one of the main problems in the application of the rational formula for calculating runoff rates.

N.B. A stricter definition of the runoff coefficient is that, for a specific runoff event, it is the ratio of the peak rate of runoff to the mean rainfall intensity of the storm causing the runoff, when both rainfall and runoff are expressed in the same units. For practical soil conservation purposes, the two definitions are taken as being the same.

Runoff Harvesting Dam

A farm dam on a hillside or 1st or 2nd order stream which collects and stores rainfall runoff. 1st and 2nd order streams are as defined by the order made under section 5 of the Water Act 1912 in relation to the definition of a river gazetted 23rd March 2001. See also FARM DAM and IN-RIVER DAM. Note: This order refers to watercourses shown as blue lines on topographic maps. The lines which are uppermost in a catchment are 1st order streams, when two 1st order streams are joined they make a 2nd order stream, etc.

Runoff Plots

Small uniform parcels of land from which runoff and soil loss can be measured under natural or artificial rainfall. Typically a series of plots is established,

with suitable replication, and each plot is treated so that runoff and soil loss can be measured under different land management practices.

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.

Runoff Volume

Amount of precipitation (and/or irrigation) minus surface storage, infiltration, evapotranspiration, and interception, that exits a defined area.

Runon

Surface water flowing onto an area as a result of runoff occurring higher up the slope. Often used in an urban context as a contributing factor to increased erosion hazard. Also used in semi-arid areas to refer to surface water which is diverted from sloping country onto flatter land to achieve increased production from such land.

Run-On

Any rain water, leachate, or other liquid that drain on to any waste treatment area.

Rural Capability

The ability of an area of land to sustain permanent agricultural or pastoral production, at its most intensive level, consistent with protection from soil erosion and without permanent damage. Land which is used beyond its rural capability will deteriorate rapidly, resulting in loss of production and a permanent loss of soil resources.

Rural Capability Classification

A method of land classification which ranks land according to various intensities of rural use which are compatible with conservation of the soil resources of that land.

The classification does not necessarily reflect the existing land uses, rather it indicates the potential of the land for such uses as crop production, pasture improvement and grazing. In assessing this potential. The classification takes into account climate, physical characteristics of the soil and landform to determine the most intensive rural use which is compatible with conservation management and sustained production.

The dominant emphasis in rural capability classification is placed on soil breakdown which is essentially related to the potential use of the land in terms of tillage practices. The classification system used by the Soil Conservation Service of New South Wales is based on four categories related to tillage practices. (N.B. Other States systems may vary somewhat.)

The first represents land suitable for regular cultivation. The land must be capable of sustaining at least two successive seasonal or annual tillage phases for crop production in which the tilled layer is inverted or shattered without producing either a significant increase in soil erosion susceptibility or a significant deterioration in soil structure. The proportion of time under tillage phases shall not be less than half the length of time under other land uses. It includes land where the soils are: sufficiently deep with a structure and texture which will not readily break down under tillage: free of excessive salts: relatively free of large stones so as not to restrict the use of farm machinery: and which have efficient drainage but sufficient moisture holding capacity to suit the requirements of the crop to be grown.

The second category includes land suitable for occasional cultivation, which is capable of the infrequent growing of crops utilizing tillage practices involving a series of soil workings. It is land suitable for grazing that can be occasionally tilled for pasture establishment or renewal, but because of site factors such as soil type, slope, topographic

location or drainage is not suited to regular cultivation.

The third category represents grazing land unsuited to tillage operations and includes excessively steep or stony land, areas with high erosion potential and/or soils which limit productivity due to their depth or physical fertility.

The final category includes land unsuitable for the cropping or grazing enterprises mentioned above because of the land's physical limitations to conventional rural production, which result in an extreme erosion hazard if general land clearing occurs.

These four categories, defining potential intensity of rural use, are further subdivided depending on the soil conservation measures required to sustain permanent production. The following eight classes are defined:

Land suitable for regular cultivation.

Class I

No special soil conservation measures required.

Class II

Simple soil conservation measures required such as adequate crop rotation. May include strategic earthworks.

Class III

Intensive soil conservation measures required, such as graded or diversion banks and waterways, together with management practices as in Class II. Land suitable for grazing and occasional cultivation.

Class IV

Simple soil conservation measures required such as stock control and application of fertilizer. May include strategic earthworks.

Class V

Intensive soil conservation measures required, such as level or diversion banks and contour ripping, together with management practices as in Class IV.

Land suitable for grazing only.

Class VI

Judicious soil conservation management measures required to ensure an adequate ground cover is maintained. Such measures may include limitation of stock, broadcast seeding and fertilizer application, prevention of fire

and destruction of vermin. May include strategic earthworks.

Land unsuitable for general rural production.

Class VII

Land best protected by green timber because of erosion hazard, steepness, shallowness or infertility. General clearing of timber is not recommended but strategic logging or very limited grazing may be practiced under strict control for management purposes such as fire control.

Class VIII

Land unsuitable for agricultural or pastoral uses. Should not be cleared, grazed or logged but utilized for activities compatible with the preservation of the natural vegetation such as wildlife deluges and scenic areas.

Rural Residential Development

A level of urban development which provides for the construction of roads, drainage and services to cater for subdivision allotments typically between 2 and 10 hectares. Water and sewerage supply may or may not be provided. Such development generally caters for permanent residence in rural areas close to urban centers, including hobby farms or rural/retreats.

Rural Retreat

A type of land development involving the retention or establishment of as much native vegetation as possible and the exclusion of agricultural practices including tillage and/or grazing. Controlled clearing may be necessary on each lot to provide a house site, a reasonable view and for fire control.

Rurban (Perl-Urban)

A general term used to describe land on the periphery of established urban centers. The land is characterized by an assortment of land use

activities, including market gardening and hobby Farms, which are typically influenced by the adjacent settled areas. Rurban land is often considered in the context of having potential for future urban expansion.

0.1 and 0.5 mm are commonly moved in this way and usually bounce no higher than 50 cm. When they return to the surface the moving particles impinge on other material, which may detach more particles thereby perpetuating the process.

Rust

A visible corrosion product consisting of hydrated oxides of iron. Applied only to ferrous alloys. See also WHITE RUST.

Rusting

Corrosion of iron or an iron-base alloy to form a reddish-brown product which is primarily hydrated ferric oxide.

S

Sacrificial Anode

The use of an alloy electrode less noble than the structure to which it is connected, to induce galvanic corrosion on the electrode (anode) in preference to that of the structure.

Sacrificial Protection/Sacrificial Anodes/Sacrificial Pieces

Pieces of metal which, being anodic to the equipment into which they are introduced, will galvanically corrode and so protect the equipment. Cathodic protection, based on wasting of anodic metal to prevent corrosion of cathodic metal—zinc, aluminum, magnesium, carbon steel, etc.—so protecting steel and other more noble metals.

Safety Valve

A valve that automatically opens when prescribed conditions, usually pressure, are exceeded in a pipeline or other closed receptacle containing liquids or gases. It prevents such conditions from being exceeded and causing damage.

Saline Water

Water that contains significant amounts of dissolved solids.

Salinity

Quality of water based on its salt content; seawater contains approximately 18,000 parts per million of salt.

Salmonella

A genus of aerobic, rod-shaped, usually motile bacteria that are pathogenic for man and other warm-blooded animals.

Salt Fog Test

An accelerated corrosion test in which specimens are exposed to a fine mist of a solution usually containing sodium chloride, but sometimes modified with other chemicals.

Salt Water Intrusion

Displacement of fresh or ground water by the advance of salt water due to its greater density, usually in coastal and estuarine areas.

Saltwater Classifications (See Also CLASSIFICATIONS)

Class SA: suitable for commercial shellfishing and all other tidal saltwater uses.

Class SB: saltwater protected for primary recreation, which includes swimming on a frequent or organized basis, and all Class SC uses.

Class SC: saltwater protected for secondary recreation, fishing, and propagation and survival of aquatic life; all saltwaters are classified to protect these uses at a minimum.

Salting (Salinisation)

The accumulation of free salts in part of a landscape to an extent which causes degradation of vegetation and/or soils. Typically caused by hydrological changes as a result of human use of land, particularly in areas of marine geology. Two broad types of salting are recognized:

Drying and Salting

Salting associated with non-irrigated land. It is commonly caused by the clearing of hill slopes which allows an increase in rainfall intake and a rise in water table level. Subsequently, seepage is increased enabling dissolved salts to flow laterally underground and surface as salty water lower down the slope. The salt becomes concentrated in out-flow patches typically resulting in death of normal vegetation and the creation of bare areas which become an erosion hazard. Salt crystals can often be observed on these patches.

Reclamation measures may include diversion of extraneous runoff, sowing of appropriate salt tolerant species with minimum soil disturbance, mulching with straw or hay, heavy fertilization

and exclusion of stock. In some situations deep ripping, incorporation of gypsum, catchment tree planting and/or artificial drainage may also be appropriate.

In level semi-arid areas or dune fields, saline seepage at the toe of dunes may occur after clearing, along with salting of the lower swales. Naturally saline areas also occur in certain undulating arid areas, and occasional very large rains flush salt from these, adversely affecting vegetation down slope.

Irrigation Salting

Salting associated with irrigated land. It is caused by the irrigation of crops using river water and/or groundwater which may be already mildly saline.

A cycle can build up, under continued irrigation, whereby the salinity of both soils and water sources increases. This is due to a complex interaction of irrigation practice, crop needs, leaching requirements and the nature of soils, landform, geology and climate of the area.

Salting of irrigated land can follow the raising of saline water tables to within capillary reach of plant roots, due to movement of excess water to the water table.

Control measures include careful regulation of irrigation in relation to crop needs, crop selection, drainage and soil amelioration as well as improved catchment management to reduce base levels of river salinity.

Sample, Composite

Commingled individual samples collected from the same point at different times; samples may be of equal volume or may be proportional to the flow at time of sampling.

Sample, Grab

Discrete sample collected at a particular time and location.

Sample, Integrated

Combination of grab samples collected at a similar time but at different locations.

Sampler

A device used with or without flow measurement to obtain a portion of liquid for analytical purposes. May be designed for taking single samples (grab), composite samples, continuous samples, or periodic samples.

Sampling Line

The line across the sampling plane on which the sampling points are located.

Sampling Plane

The cross section of the duct in which all sampling is carried out.

Sampling Point

A specific location on a sampling line at which an individual sample is extracted. A specific location on a sampling line at which an individual sample is extracted.

Sampling Port

Part or device at a particular location in a component that allows a sample to be collected for analysis.

Sampling Position

A place in a duct where sampling is carried out.

Sand

Soil particle between 0.05 and 2.0 millimetres in diameter. A fairly uniform deposit of granular breakdown material largely derived from siliceous rocks and composed mainly of quartz grains. In some soils calcareous fragments of sand size are included.

Sand

A soil separate consisting of particles between 0.02 and 2.0 mm in equivalent diameter. Fine sand is defined as particles between 0.02 and 0.2 mm, and coarse sand as those between 0.2 and 2.0 mm.

Sand Blast

The damage to plants caused by abrasion from particles moved by wind action.

Sand Drift

Sand moved by wind action, either by surface creep or saltation and subsequently deposited.

Sand Filter

A sand filter is a device designed to purify water by making it to pass through a layer of sand. Sand filter is a bed of sand through which water is passed to remove fine suspended particles. Commonly used in tertiary wastewater treatment plants and sludge drying beds.

Sand Plain

An extensive, sandy, level to gently undulating landform with little topographic relief and without stream channels. Sand plains were possibly formed by sheet or stream flow, but are now relict

and modified by wind action, They are usually found in arid or semi-arid regions, exhibit low inherent fertility and carry scrub or heath type native vegetation, They may also occur behind coastal sand dunes.

Sanitary Collection System

The pipe system for collecting and carrying liquid and liquid-carried wastes from domestic sources to a wastewater treatment plant.

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. Sanitary sewer is a sewer that carries liquid and waterborne wastes from residences, commercial buildings, industrial plants, and institutions together with minor quantities of ground, storm, and surface water that are not admitted intentionally. See also WASTEWATER. Sewer pipe that conveys sewage to a sewage treatment plant. Part of the sewage collection system.

Sanitary Tee

Pipe fitting in the shape of a “T” with a long-sweep radius; commonly used as a part of an inlet or outlet baffle in a septic tank.

Sanitary Wastewater (Domestic)

Wastewater, including toilet, sink, shower and kitchen flows, originating from human domestic activities.

Sarcadina

Species of amoeba found in wastewater. Does not play a significant role in the activated-sludge process other than as an indication of start up or the passing of a toxic influence.

Saturated

Condition wherein all available soil pore space is occupied by water.

Saturated Air

Air containing all the water vapor that it is capable of holding at a given temperature and pressure.

Saturated Calomel Electrode

A reference electrode composed of mercury, mercurous chloride (calomel), and a saturated aqueous chloride solution.

Saturated Hydrocarbon

An organic compound consisting of only carbon and hydrogen atoms with no double or triple bonds. Examples are ethane, methane and propane. They are relatively unreactive, (i.e., do not form photochemical smog as rapidly as other organics).

Saturated Liquid

Liquid that contains at a given temperature as much of a solute as it can retain in the presence of an excess of that solute.

Saturated Soil

Soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

Saturated Zone

The zone of the soil in which all space between the soil particles is occupied by water, including the capillary zone.

Saturation Extract

A solution derived by saturating a soil sample with water under standard conditions for a period long enough to dissolve the soluble constituents present. The solution is subsequently extracted by filtration or centrifuged, and used in chemical analysis or measurement related to the soluble constituents and/or other ions present.

SBA

Small Business Administration.

SBEAP

Small Business Environmental Assistance Program.

SBDC

Small Business Development Center.

Scald

A bare area produced by the removal of the surface soil by wind and/or water erosion. The result is exposure of the more clayey subsoil which is, or becomes, relatively impermeable to water. A typical erosion form on duplex soils in arid or

semi-arid regions. Scalds vary in size from a few square meters to hundreds of hectares, and are very difficult to revegetate due to the lack of topsoil, low permeability, and often saline surface. The term is also used for a bare surface area caused by salting.

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.

Scaling

(1) The formation at high temperatures of thick corrosion product layers on a metal surface. (2) The deposition of water-insoluble constituents on a metal surface.

Salt Water Intrusion

Displacement of fresh or ground water by the advance of salt water due to its greater density, usually in coastal and estuarine areas.

Scale

(1) Proportion between two sets of dimensions, as between those of a drawing and its original; for example, the scale of a drawing may be expressed as 1/4 inch = one foot; (2) Measuring tool used by architects and engineers in preparing drawings to a proportionate scale; (3) To measure a drawing with a scale. (4) Either pan or tray of a balance; (5) To climb, as a ladder; (6) Series of graduated marked spaces for measuring something, as on a thermometer; (7) Rust occurring in thin layers; (8) Hard deposit of minerals on heater coils and pool surfaces.

Scarifier

A tillage implement used for both primary and secondary tillage at depths up to 150 mm. Medium duty tines are fitted at an overall tine spacing ranging from 150 to 250 mm. The usual tine cross-section is such that the longitudinal dimension is greater than the lateral dimension. Breakout force is usually in the range of 0.6–1.4 kN.

Scarify

Process of abrading or scratching the infiltrative surface prior to installation of a final treatment and dispersal component. To abrade, scratch, or modify the surface, such as to scratch the impervious seed coal of hard seed or to break the surface of the soil with a scarifier.

In a broad sense, the term encompasses various precipitous faces, including those of cliffs and escarpments, but it is usually applied to descriptions of landslides. The MAN SCARP is the exposed surface of separation remaining on the undisturbed ground at the periphery of the landslide. Main scarps may also occur on some flow-related mass movements. MINOR SCARPS are produced by displacements within the landslide's moving mass and this distinguishes them from flow-related movements.

Scouring

A term commonly used to mean localized erosion of a bank or channel which typically occurs due to excessive slope, turbulence or flow velocity. Can also be applied to focalized deflation due to wind erosion.

Scraper

(1) Device used to remove solids from a clarifier to a sump. (2) Mechanism to remove dewatered solids from a belt filter press or conveyor.

Screen

(1) Porous material or mesh configured as a plate or cylinder that allows the passage of particles smaller than particular size, (e.g., an effluent screen) according to a specific flow/pressure relationship; a screen has area but no depth with respect to flow; (2) Use of a porous material or mesh in order to separate particles by size; screen is a device with openings, generally of uniform size, used to retain or remove suspended or floating solids in flow stream preventing them from passing a given point in a conduit. The screening element may consist of parallel bars, rods, wires, grating, wire mesh, or perforated plate.

Screening

A preliminary treatment process that removes large suspended or floating solids from raw wastewater to prevent subsequent plugging of pipes or damage to pumps.

Screenings

(1) Material removed from liquids by screens. (2) Broken rock, including the dust, of a size that will pass through a given screen depending on the character of the stone.

Screenings Grinder

A device for grinding, shredding, or macerating material removed from wastewater by screens.

Screw-Feed Pump

A pump with either a horizontal or vertical cylindrical casing in which operates a runner with radial blades like those of a ship's propeller. See also VERTICAL SCREW PUMP.

Scrubber

An air pollution control device that uses a high energy liquid spray to remove aerosol and gaseous pollutants from an air stream. The gases are removed either by absorption or chemical reaction. Scrubber is a device that uses a high energy liquid spray to remove aerosol and gaseous pollutants from an air stream. The gases are removed either by absorption or chemical reaction.

Scrubbing

Removal of suspended solids and undesirable gases from gaseous emissions.

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. Usually fatty material in wastewater that floats. Scum is (1) The extraneous or foreign matter that rises to the surface of a liquid and forms a layer or film there. (2) A residue deposited on a container or channel at the water surface. (3) A mass of solid matter that floats on the surface.

Scum Baffle

A vertical baffle dipping below the surface of wastewater in a tank to prevent the passage of floating matter.

Scum Breaker

A device installed in a sludge digestion tank to break up scum.

Scum Chamber

A space provided in a sludge digestion tank for accumulated scum rising from the digestion unit.

Scum Collector

A mechanical device for skimming and removing scum from the surface of settling tanks.

Scum Removal

Separation of floating grease and oil from wastewater usually during preliminary or primary treatment.

Scum Trough

A trough placed in a primary sedimentation tank to intercept scum and convey it out of the tank.

Sea Surface Temperature

The temperature in the top several feet of the ocean, measured by ships, buoys and drifters.

Season Cracking

An obsolete historical term usually applied to stress-corrosion crackling of brass.

A term usually applied to stress corrosion cracking of brass.

Seasonal Cracking

A phenomenon in expansive soils which, during a dry period, develop cracks as wide or wider than 6 mm and which penetrate at least 0.3 m into the soil material.

Seals (Hydraulic Seals)

Seals (Hydraulic Seals) are used to isolate various parts of a sewer system, preventing vapor travel and spread of fire or explosion.

Secchi Disk

Tool to measure the clarity of the water.

Second-Growth Forests

Forests that have grown back after being logged.

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 Cover

Long term or permanent cover used in vegetative stabilization. It can be established at the same time as or after a primary cover.

Secondary Effluent

(1) The liquid portion of wastewater leaving secondary treatment. (2) An effluent that, with some exceptions, contains not more than 30 mg/L each (on a 30-day average basis) of BOD₅ and suspended solids.

Secondary Ore (Secondary Minerals)

Ore or minerals resulting from the chemical alteration of primary ore. For example, weathering and oxidation changes original sulphides to sulphates, carbonates and oxides.

Secondary Particle

Particles that are formed in the atmosphere. Secondary particles are products of the chemical reactions between gases, such as nitrates, sulfur oxides, ammonia and organic products.

Secondary Particulate

Particles that usually form over several hours or days and attain aerodynamic diameters between 0.1 and 1 μm . Several of these particles, particularly those containing ammonium nitrate, are volatile and transfer mass between the gas and particle phase to maintain a chemical equilibrium.

Secondary Sedimentation Tank

A settling tank following secondary treatment designed to remove by gravity part of the suspended matter. Also called a secondary clarifier.

Secondary Settlement Tank

A tank in which settleable solids or humus is separated from the effluent flowing through it from biological filters or an activated sludge plant.

Secondary Shut-Off

Second of two automatic shut-off valves that prevent a cargo tank from being overfilled and possibly causing ejection of material from the tank through the pump.

Secondary Treatment

Biological sewage treatment process that occurs in two steps. First, micro-organisms are used to break down contaminants dissolved in sewage that are organic in origin. This occurs in a series of aerated tanks. Second, micro-organisms and other solid materials are then settled out of the sewage in secondary clarifiers.

Second-Stage BOD

That part of the oxygen demand associated with the biochemical oxidation of nitrogenous material. As the term implies, the oxidation of the nitrogenous materials usually does not start until a portion of the carbonaceous material has been oxidized during the first stage.

Secondary Standard

A pollution limit based on environmental effects such as damage to property, plants, visibility, etc. Secondary standards are set for criteria air pollutants.

Secondary Treatment

(1) Generally, a level of treatment that produces secondary effluent. (2) Sometimes used interchangeably with the concept of biological wastewater treatment, particularly the activated-sludge process. Commonly applied to treatment that consists chiefly of clarification followed by a biological process with separate sludge collection and handling.

Secondary Voltage

The output or load-supplied voltage of a transformer or substation (see PRIMARY VOLTAGE).

Secondary Standard

A pollution limit based on environmental effects such as damage to property, plants, or visibility. Secondary standards are set for criteria air pollutants.

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.

Secondary Waste Treatment

Processing by various types of systems that employ aeration and biological oxidation stages to decompose dissolved and colloidal organic contaminants (inorganic plant nutrients may also be partially removed).

Secondary Wastewater Treatment

Biological removal of organics and solids from wastewater. Secondary wastewater effluent limits are generally 30 mg/L BOD₅ and 30 mg/L of TSS.

Securing Bands

Bands of metal (suitably treated as may be necessary to minimize corrosion), or of plastics material, used for securing insulation to pipes or other structures.

Sediment

Soil that has washed or eroded from a land surface. Particles of mud, sand, clay, silt, and organic matter transported and deposited by water.

Material of varying size, both mineral and organic, that is being, or has been, moved from its site of origin by the action of wind, water, gravity, or ice, and comes to rest on the earth's surface either above or below sea level.

Sediment Basin

The pondage of a large sediment trap, formed by the construction of a barrier or dam, built at a suitable location on a flowline to entrap gravel,

sand, silt or other sedimentary material carried by runoff.

Sediment Concentration

The instantaneous measurement of the quantity of sediment carried in a unit volume of water. If bed load is not sampled then the suspended sediment concentration can be determined. The preferred symbol is C_s , with units of kg/m^3 .

Sediment Discharge

The quantity of sediment, measured in dry weight per unit time, transported through a channel cross-section. It is obtained by multiplying the sediment concentration by the stream discharge.

Sediment Load (gen)

The sediment carried in flowing water, including sediment in suspension and bed load.

Sediment Trap (Silt Trap)

A structure, usually relatively small, designed specifically to collect sedimentary material in a drainage line. Such a structure may be built in a gully above another larger structure to prevent it becoming fitted with sediment, and has the additional advantages of reducing flow velocity and minimizing channel scouring.

It may also be fabricated as a box-like device in association with a culvert or other similar structure. Sediment traps should be regularly cleaned out to maintain their efficiency.

Sediment Yield

The total amount of sediment produced by a catchment and delivered by flowing water to a point under evaluation, usually the catchment outlet. It may be expressed in terms of a single

rainfall event or in terms of a specified period of time.

Sedimentary Rock

Rock formed of sediment, and specifically: (1) sandstone and shale, formed of fragments of other rock transported from their sources and deposited in water; and (2) rocks formed by or from secretions of organisms, such as most limestone. Many sedimentary rocks show distinct layering, which is the result of different types of sediment being deposited in succession.

Sedimentation

Settling of solid material out of a liquid, typically accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material; may be enhanced by coagulation and flocculation. Separation under the action of gravity of particles from the fluid in which they are suspended. The process of settling and deposition, under the influence of gravity, of suspended matter carried by water or wastewater. Sedimentation is (1) The process of subsidence and decomposition of suspended matter or other liquids by gravity. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material. Also called settling. It may be enhanced by coagulation and flocculation. (2) Solid-liquid separation resulting from the application of an external force, usually settling in a clarifier under the force of gravity. It can be variously classed as discrete, flocculent, hindered, and zone sedimentation.

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 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.

Sedimentation Tank

A basin or tank in which wastewater containing settleable solids is retained for removal of the suspended matter by gravity. Also called a sedimentation basin, settling basin, settling tank, or clarifier.

Sedimentation Tanks

Provide a period of quiescence during which suspended waste material settles to the bottom of the tank and is scraped into a hopper and pumped out for disposal. During this period, floatable solids (fats, oils) rise to the surface of the tank and are skimmed off into scum pipes for disposal.

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. Seed sludge. In biological treatment, is the inoculation of the unit process with biologically active sludge resulting in acceleration of the initial stage of the process.

Seedbed

The layer of soil which, when suitably prepared, receives sown seeds and provides for their subsequent germination and growth.

Seeding

Any process whereby seeds are transmitted to a suitable growth medium which will provide for their germination and subsequent growth. It may occur naturally or be carried out as in sowing.

Seepage

(1) The slow movement of water through small cracks, pores, Interstices, etc., of a material into or out of a body of surface or subsurface water. (2) The loss of water by infiltration into the soil from a canal, ditches, laterals, watercourse, reservoir, storage facilities, or other body of water, or from a field. (3) The process by which water percolates downwards and/or laterally through the soil, often emerging at ground level lower down a slope. The term is frequently used in relation to the percolation of water through a constructed earth wall.

Seepage Pit

Excavation (deeper than it is wide) which receives septic tank effluent and from which the effluent seeps into the surrounding soil through the bottom and openings in the side of the pit; emphasis is on disposal rather than treatment.

Selective Catalytic Reduction (SCR) System

An emission control system that reduces NO_x emissions through the catalytic reduction of NO_x in diesel exhaust to N₂ and H₂O by injecting nitrogen-containing compounds into the exhaust stream, such as ammonia or urea.

Selective Corrosion

The selective corrosion of certain alloying constituents from an alloy (as dezincification), or in an alloy (as internal oxidation).

Selective Leaching

Selective leaching describes a corrosion process also called “parting” or de-alloying. More specifically, it can be called de-zincification in the case of brasses, de-nickelification in cupronickels, etc. Selective leaching may occur in a plug form or in a more evenly distributed layer type. Stagnant conditions and regions under deposits are conducive to selective leaching. In brasses it can occur at pH extremes in water; high dissolved solids and high temperature also promote selective leaching. The overall dimensions of a part do not change drastically, but appreciable weakening can occur.

Self-Cleansing Velocity

The minimum velocity necessary to keep solids in suspension in sewers, thus preventing their deposition and subsequent nuisance from stoppages and odors of decomposition.

Self-Mulching

The condition of a well-aggregated soil in which the surface layer forms a shallow mulch of soil aggregates when dry. Aggregation is maintained largely as a response of the clay minerals present to the natural processes of wetting and drying. Such soils typically have moderate to high clay contents and marked shrink-swell potential. Any tendency to crust and seal under the impact of rain is counteracted by shrinkage and cracking, thus producing a mulch effect as the soil dries out. Tillage when wet may appear to destroy the surface mulch which, however, will reform upon drying.

Self-Purification

The natural processes of purification in a polluted body of water.

Self-Setting Cement

Finishing material, based on Portland cement, that is supplied as a dry powder and, when mixed with water in suitable proportions, will set without the application of heat.

Self-Supplied Water

Water withdrawn from a surface- or ground-water source by a user rather than being obtained from a public supply. An example would be homeowners getting their water from their own well.

Semi-Arid

Refers to climates or regions which lack sufficient rainfall for regular crop production. Usually defined as a climate with annual average rainfall greater than 250 mm (10 inches) but less than 375 mm (15 inches). In northern Australia regular crop production may become unreliable where annual average rainfall is less than 700 mm (28 inches), mainly due to high evaporation rates.

Semi-Automatic Welding

Welding in which some of the variables are automatically controlled, but manual guidance is necessary.

Sensitive Groups

Identifiable subsets of the general population that are at greater risk than the general population to the toxic effects of a specific air pollutant (e.g., infants, asthmatics, elderly).

Sensitivity

The degree to which a system is affected, either adversely or beneficially, by climate variability or change. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range or variability of temperature) or indirect (e.g., damages caused by an increase in the frequency of coastal flooding due to sea level rise).

Sensitization

In Austenitic stainless steels the precipitation of chromium carbide usually at grain boundaries, on exposure to temperatures of about 550 to 850 °C.

Sensitization Heat Treatment

A heat treatment, whether accidental, intentional, or incidental (as during welding) that causes precipitation of constituents at grain boundaries, often causing the alloy to become susceptible to intergranular corrosion, cracking or S.C.C. (Stress Corrosion Cracking).

Sensor

Part or device that detects a chemical, physical, or mechanical signal and converts it into an electronic one. Any device which gathers energy, typically electromagnetic radiation, and presents it in a form suitable for obtaining information about the environment. Passive sensors such as thermal infrared and microwave, utilize electromagnetic radiation produced by the surface or

object being sensed. Active sensors such as radar supply their own energy source.

Separate Sewer System

A sewer system carrying sanitary wastewater and other water-carried wastes from residences, commercial buildings, industrial plants, and institutions, as well as minor quantities of ground, storm, and surface water that are not intentionally admitted. See also COMBINED SEWER, WASTEWATER.

Separation Distance

Minimum vertical or horizontal space required between specified components, between components and physical features, or between components and legally-defined boundaries.

Separator

An apparatus for separating, from a gaseous stream in which they are suspended or mixed, solid particles (filter and dust separator), liquid particles (filter and droplet separator) or gases (gas-purifier). An underground sewage disposal tank, generally installed to treat the wastewaters from an individual home, in which a continuous flow of waste material is decomposed by anaerobic (in the absence of oxygen) bacteria.

Septage

Material accumulated in a pre-treatment system or privy—the mat of grease and scum on the surface of septic tanks, the accumulated sludge at the bottom of tanks and the sewage present at the time of pumping.

The sludge produced in individual on-site wastewater disposal systems such as septic tanks and cesspools.

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 is (1) Anaerobic. (2) Putrid, rotten, foul smelling; anaerobic.

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” (Fig. 16).

Septic Tank Effluent

Partially treated sewage that is discharged from a septic tank.

Septic Tank Effluent Gravity (STEG)

Collection system that uses septic tanks to separate solids and allow gravity flow of effluent to a subsequent component.

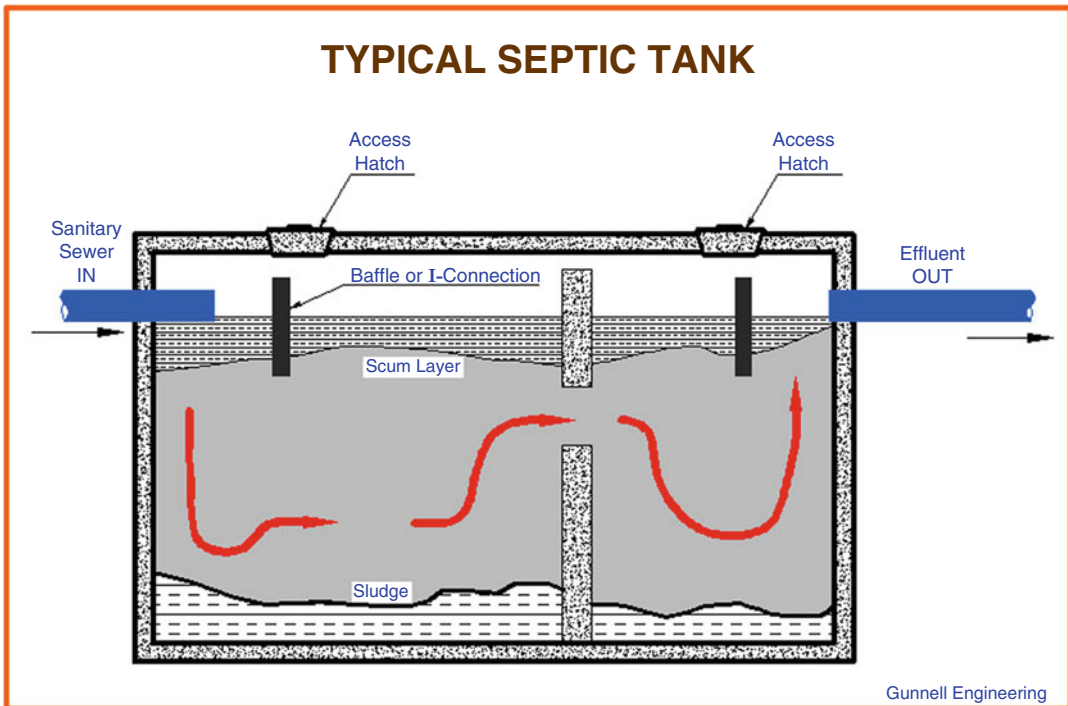


Fig. 16 Septic tank

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.

Septic Wastewater

Wastewater undergoing anaerobic decomposition.

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. septicity is a condition produced by growth of anaerobic organisms.

Sequencing Batch Reactor (SBR)

Component in which batch type suspended growth (activated sludge) processes are carried out in the same tank in stepwise order (e.g. fill, treat, settle, decant, and draw).

Series Operation

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

Service

Conductors and equipment for delivering energy from the electrical supply system to the wiring system of the premises served Act of performing various activities related to wastewater treatment

systems, including installation, inspection, operation, maintenance, assessment, and mitigation.

Service Charge

The rate charged by the utility for rendering service, usually used as a ready-to-serve charge.

Service Conductors

Supply conductors that extend from the street main or from transformers to the service equipment of the premises served.

Service Equipment

Necessary equipment usually consisting of a circuit breaker or switch and fuses and their accessories that is located near the point of entrance of the supply conductors to a building or other structure and intended to constitute the main control and means of cut-off of the electrical supply.

Service Pipe

A Service Pipe is a water pipe that supplies water from the reticulation main to the consumer. The portion of the service pipe under the control of a Water Agency generally terminates at the water meter, or in the case of fire services, the isolating valve of the fire protection system.

Service Provider

Any person who performs work in relation to wastewater treatment systems; may include site evaluators, designers, inspectors, installers, O&M service providers, and pumpers.

Service Provider, O&M

Professional who performs operation and maintenance on a wastewater treatment system.

Setback

Minimum horizontal separation distance between system components and site/facility features; typically defined by code or regulation. A nominal boundary designed to delineate a coastal buffer zone.

Settleability

The tendency of suspended solids to settle.

Settleability Test

A determination of the settleability of solids in a suspension by measuring the volume of solids settled out of a measured volume of sample in a specified interval of time, usually reported in milliliters per liter (mL/L). Also called the Imhoff cone test.

Settleable Solids

(1) That matter in wastewater that will not stay in suspension during a preselected settling period, such as 1 hour, but settles to the bottom. (2) In the Imhoff cone test, the volume of matter that settles to the bottom of the cone in 1 hour. (3) Suspended solids that can be removed by conventional sedimentation.

Settlement

The loss in height and volume of a newly formed earth structure through the process of consolidation. The amount of settlement depends on how

well the structure is compacted during construction, and on soil type.

Settling

Process of subsidence and deposition of suspended matter carried by a liquid; typically accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material.

Settling Pond (Water Quality)

An open lagoon into which wastewater contaminated with solid pollutants is placed and allowed to stand. The solid pollutants suspended in the water sink to the bottom of the lagoon and the liquid is allowed to overflow out of the enclosure.

Settling Time

Time during which suspended, aggregated, precipitated, or colloidal substances settle by gravity.

Settleometer

A 2-L or larger beaker used to conduct the settleability test.

Settling

The process of subsidence and deposition of suspended matter carried by a liquid. It is usually accomplished by reducing the velocity of the liquid below the point at which it can transport the suspended material. Also called sedimentation.

Settling Tank

A tank or basin in which water, wastewater, or other liquid containing settleable solids is retained for a sufficient time, and in which the velocity of flow is sufficiently low to remove by gravity a part of the suspended matter. See also SEDIMENTATION TANK.

Settling Time

Time necessary for the removal of suspended or colloidal substances by gravitational settling, aggregation, or precipitation.

Settling Velocity

Velocity at which subsidence and deposition of settleable suspended solids in wastewater will occur.

Sewage

Sewage is the fluid discharged from medical, domestic, and industrial sanitary appliances. The water-borne wastes of a community. The used water and added waste of a community which is carried away by drains and sewers. The used household water and water-carried solids that flow in sewers to a wastewater treatment plant. The preferred term is "wastewater."

Sewage Collection System

System of piping, lift stations, and other appurtenances that receives and conveys wastewater either by gravity or pressure.

Sewage Effluent

Treated sewage discharged from a sewage treatment works.

Sewage Pump Station

A Sewage Pump Station (SPS) is a pump station designed to pump sewage either directly or via an intermediate pump station to a Wastewater Treatment Plant.

Sewage System

Sewage system is any of several drainage systems for carrying surface water and sewage for disposal.

Sewage Treatment Plant

A facility designed to receive the wastewater from domestic sources and to remove materials that damage water quality and threaten public health and safety when discharged into receiving streams or bodies of water. The substances removed are classified into four basic areas:

1. greases and fats;
2. solids from human waste and other sources;
3. dissolved pollutants from human waste and decomposition products; and
4. dangerous microorganisms.

Most facilities employ a combination of mechanical removal steps and bacterial decomposition to achieve the desired results. Chlorine is often added to discharges from the plants to reduce the danger of spreading disease by the release of pathogenic bacteria.

Sewer

Sewer is an underground pipe or open channel in a sewage system for carrying water or sewage to a disposal area. A pipe or conduit that carries wastewater or drainage water. The term “collection line” is often used also.

Sewer Access Point

A Sewer Access Point is a pit or a shaft designed to allow access to a sewer for maintenance.

Sewer Flow Monitor

Sewer flow monitors are devices used to assist with determining the inflow and infiltration into the sewer system. Monitors are installed at key points of the system to continuously record flow depth and flow velocity. In conjunction with rainfall data, the sewer flow rate can be correlated with rainfall events. A hydrograph displays the variation of sewer flow over time.

Sewer Lamphole

A sewer lamphole is a reticulation sewer end of line access point to allow limited access to facilitate inspection or clearing of obstructions.

Sewer Maintenance Hole

A Sewer Maintenance Hole is a Sewer Access Point with a removable cover which allows human and machine access to a (typically buried) Sewer.

Sewer Maintenance Shaft

A Sewer Maintenance Shaft is a Sewer Access Point on a sewer between Sewer Maintenance Holes, larger than inspection openings, which

provides equipment access but not person access to the sewer and which allows limited change of grade and/or direction; used where appropriate as an alternative to Sewer Maintenance Holes.

Sewer Manhole

Sewer manhole is a deprecated term for Sewer Maintenance Hole.

Sewer Relining

Sewer Relining is a Renewal Activity, where a PVC pipe is inserted or extruded into a clay or concrete Gravity Sewer, nearing the end of its life.

Sewer Surcharge

Sewer surcharge refers to the overloading of the sewer beyond its design capacity due to inflow and infiltration of water. A surcharging sewer often results in sewer overflow at manholes and customers' over flow relief gully, ORG.

Sewer System

A Sewer System is a network of pipelines and ancillary works that conveys sewage to a treatment works or other place of disposal.

Sewer Terminal Maintenance Hole

A sewer terminal maintenance hole is an end of line sewer access point with a removable cover which allows human and machine access to a sewer. A sewer terminal maintenance hole provides access to the sewer system for customer sanitary drains via property connection sewers.

Sewer Terminal Maintenance Shaft

A Sewer Terminal Maintenance Shaft is a Sewer Access Point to allow insertion into the sewer of equipment for CCTV inspection and maintenance.

Sewerage

Sewerage is a system of sewers and ancillary works to convey sewage from its point of origin to a treatment works or other place of disposal.

Sewerage Treatment System

A sewerage treatment system (or sewerage network) is the infrastructure used to receive, transport and treat sewage or effluent, including sewers, access chambers, machinery, outfalls, pumps, structures and vents.

SF6 (Sulfur Hexafluoride)

SF6 is a colorless, non-toxic and non-flammable gas under standard conditions. It is used in many applications including as a gaseous dielectric medium in the electrical industry, an inert gas for the casting of magnesium, a tracer gas and an etchant in the semiconductor industry. SF6 is the most potent greenhouse gas with a global warming potential of 23,900 times that of carbon dioxide when compared over a 100-year period.

Shadow

The reflected image of a ground object imprinted on an aerial photograph. Shape and shadow are closely associated in terms of aiding identification, i.e. shape of the shadow, such as in the identification of coniferous species.

Shallow Narrow Pressurized Trench

Final treatment and dispersal component in which highly-treated effluent is distributed into trenches installed in the upper portion (8–12 inches) of the soil profile and dosed via low-pressure distribution laterals.

Shaping

Physical reorientation of land surface materials by mechanical means to produce a pre-conceived landform.

Share Component

The Share Component of the access licence is the volume share of water made available in a water source. It is similar to the entitlement volume on previous water licences. The amount of water a licence holder is allocated in any year as a result of an available water determination is based on their share component. Other rules, such as Carryover, are also based on the share component.

Shear

That type of force that causes or tends to cause two contiguous parts of the same body to slide relative to each other in a direction parallel to their plane of contact.

Shear Failure

A breakdown of the ability of soil material to maintain its aggregated structure such that one body of soil material is caused to move past, or in relation to, the adjacent materials. It is a principal factor in the initiation of landslides and landslips. Shear failure is triggered by:

*Factors that contribute to increased shear stress including: removal of lateral support (e.g. erosion by water and ice, previous mass movement, human activity by cut and till operations); surcharge (e.g. weight of precipitation, seepage pressures, construction of till, weight of buildings); transitory stresses (e.g. earthquakes, vibrations from blasting) removal of underlying support (e.g. undercutting by flowing water or waves, weathering, tunnel erosion) and lateral pressure (e.g. freezing water in cracks).

Factors that contribute to low or reduced shear strength including: initial state of the material giving it inherent low strength through its composition (e.g. sedimentary clays and shales), texture (e.g. unconsolidated material) and gross structure and slope geometry (e.g. faults, bedding planes, inclined strata): changes due to weathering (e.g. physical disintegration of granular rocks, removal of matrix material): and changes in inter-granular forces due to water content and pressure in pores and fractures.

Factors that contribute to both increased shear strength and reduced shear strength such as the addition of water.

Shear Strength

The stress required to produce fracture in the plane of cross section, the conditions of loading being such that the directions of force and of resistance are parallel and opposite although their paths are offset a specified minimum amount. The maximum load divided by the original cross-sectional area of a section separated by shear.

Shear Strength

The internal resistance of a soil to shear along a plane. The resistance is caused by inter-granular friction and cohesion.

Shear Stress (Soil)

The force per unit area acting along a given plane and tending to cause shear (allure within a soil mass. All landslides involve shear failure of land surface materials under shear stress.

Sheet Flow

Flow in a relatively thin sheet of generally uniform thickness.

Sheet Flow (Overland Flow)

Water flowing in a thin layer over the land surface. In a soil conservation context it is usually storm runoff and may lead to sheet erosion.

Sheeting

Members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

Shelterbelt

An area of living trees and/or shrubs established and maintained for the protection of grazing animals from adverse climatic conditions. Shelterbelts may also serve as windbreaks.

Sherodising

The coating of iron or steel with zinc by heating the product to be coated in zinc powder at a temperature below the melting point of zinc.

Shield (Shield System)

Structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure; can be perma-

ment structures or can be designed to be portable and moved along as work progresses; additionally, shields can be either pre-manufactured or job-built in accordance with OSHA 1926.652(c) (3) or (c)(4). Shields used in trenches are usually referred to as “trench boxes” or “trench shields”.

Shore Power

“Shore power”, also known as Cold Ironing, refers to providing electrical power to a vessel that is docked. The purpose of shore power is to allow the vessel operator to turn off the vessel’s auxiliary engines, which would normally be providing the necessary electricity. Although there are emissions associated with the generation of electricity used for shore power, those emissions are much less than those from the auxiliary engines, which burn diesel fuel.

Shoring (Shoring System)

Structure such as a metal hydraulic, mechanical or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

Shoring, Aluminum Hydraulic

Pre-engineered shoring system comprised of aluminum hydraulic cylinders (cross braces) used in conjunction with vertical rails (uprights) or horizontal rails (wales); designed specifically to support the sidewalls of an excavation and prevent cave-ins.

Short-Circuiting

A hydraulic condition occurring in parts of a tank where the time of travel is less than the flow-through time.

Short Ton

Common measurement for a ton in the United States. A short ton is equal to 2,000 lbs or 0.907 metric tons.

Shrink-Swell Potential

The capacity of soil material to change volume with changes in moisture content, frequently measured by a laboratory assessment of the soil’s linear shrinkage.

Relates to the soil’s content of montmorillonite type clays. High shrink- swell potential in soils, such as cracking clays, can give rise to problems in earth foundations and soil conservation structures.

In an urban context shrink-swell potential is particularly relevant in consideration of building and road foundations. It is non-critical when linear shrinkage values are low, marginal when medium, critical when high, and very critical when very high. Where marginal or higher values are recognized, structural engineering expertise is required to ensure the construction of stable foundations.

Shrub

A perennial plant having one or more woody main stems, frequently branching near ground level.

Sick Building Syndrome

A human health condition where infections linger, caused by exposure to contaminants within a building as a result of poor ventilation.

Sideslope

That section of a hill slope which comprises the middle and upper slopes where soil processes are usually transportational. A side slope generally

lies between a hillcrest and a loot slope, supplying depositional material for the latter.

Side-Water Depth

The depth of water measured along a vertical exterior wall.

Sigma Phase

A hard, brittle, nonmagnetic intermediate phase with a tetragonal crystal structure, containing 30 atoms per unit cell, space group $P4_2mm$, occurring in many binary and ternary alloys of the transition elements. The composition of this phase in the various systems is not the same and the phase usually exhibits a wide range in homogeneity. Alloying with a third transition element usually enlarges the field of homogeneity and extends it deep into the ternary section.

Sigma-Phase Embrittlement

Embrittlement of iron-chromium alloys (most notably austenitic stainless steels) caused by precipitation at grain boundaries of the hard, brittle intermetallic sigma phase during long periods of exposure to temperatures between approximately 560 and 980 °C (1050 and 1800 °F). Sigma-phase embrittlement results in severe loss in toughness and ductility, and can make the embrittled material susceptible to intergranular corrosion. See also SENSITIZATION.

Significant Meter

Where a Primary Meter or an Alternate Meter is a three phase Electricity Meter (thereby actually consisting of three Meters—one for each phase), one of the three Meters is selected and consistently used as the Significant Meter and the other

two are used as Backup Meters (Alternate Meters) in the event of failure of the Significant Meter.

Sill

A horizontal section at the outlet of a soil conservation or hydrologic structure which spreads water flowing from the structure, hence preventing it from concentrating and forming gullies. When not associated with a specific structure. They are often called CONTOUR SILLS, having a similar function to a contour ditch.

When constructing earthen sills adjacent down slope vegetation should be retained for erosion protection. It is desirable to prevent stock trampling these areas, as the maintenance of the horizontal edge of the sill is vital to its proper function.

Silos

Fixed vertical underground structures made of steel and concrete that house an ICBM and its launch support equipment.

Silt

A soil separate consisting of particles between 0.002 and 0.02 mm in equivalent diameter.

Single-Action Pump

A reciprocating pump in which the suction inlet admits water to only one side of the plunger or piston and the discharge is intermittent.

Single-Stage Digestion

Digestion limited to a single tank for the entire digestion period.

Single-Suction Impeller

An impeller with one suction inlet.

Sink

Any process, activity or mechanism which removes a greenhouse gas, an aerosol or a precursor of a greenhouse gas or aerosol from the atmosphere.

Sinkhole

A depression in the Earth's surface caused by dissolving of underlying limestone, salt, or gypsum. Drainage is provided through underground channels that may be enlarged by the collapse of a cavern roof.

Site

Works or plant where sampling is to be carried out.

Site Drainage

The natural interception and removal of excess surface water from land.

Skimming

(1) The process of diverting water from the surface of a stream or conduit by means of a shallow overflow. (2) The process of diverting water from any elevation in a reservoir by means of an outlet at a different elevation or by any other skimming device in order to obtain the most palatable drinking water. (3) The process of removing grease or scum from the surface of wastewater in a tank.

Skimmings

Grease, solids, liquids, and scum skimmed from wastewater settling tanks.

Slag Wool

Mineral fiber produced from steel mill slag.

Slag Wool Insulation

Man-made material made primarily from iron ore blast furnace slag which is spun into a fibrous form.

Slake

To become mixed with water so that a true chemical combination takes place, as in the slaking of lime.

Slaking

The partial breakdown of soil aggregates in water due to the swelling of clay and the expulsion of air from pore spaces. It does not include the effects of soil dispersion. It is a component, along with soil dispersion and soil detachment, of the process whereby soil structure is broken down in the field. This breakdown results from the action of raindrop impact, raindrop splash, runoff and seepage, and contributes to soil erosion and the failure of earth structures.

Slasher

A machine used to reduce the size of standing plant material. Such material may comprise trash from a prior crop or fallow, or a stand of vegetation which needs cutting down for a specific

management purpose. The blades of the machine rotate in a horizontal plane and are driven by the tractor power take-off. Wide machines may have several rotors, and double sets of blades are sometimes used to achieve finer cutting. The blades of a FLAIL SLASHER rotate in a vertical plane. It has a more aggressive cutting action and higher power requirement than a slasher.

Slimes

Finely crushed tailings, pumped in suspension from a refining or concentrating plant and usually deposited in settling ponds or dumped into abandoned open-cut mines. The term refers specifically to tailings from metalliferous mines. Slimes usually contain chemicals added during the concentrating process, and hence the dumps or settling ponds are difficult to revegetate as part of an eventual rehabilitation program.

Slip Circle

A slip face having a characteristic uphill curvature, principally associated with rotational slips.

Slip Face

A surface of separation associated with a landslip. Slip faces commonly consist of planes where abrupt changes occur in texture, structure or hardness within the soil material. Such slip faces are typically parallel to the ground surface. Slip faces may also occur in relatively homogeneous material when the loading of a unit of soil exceeds the shear strength of the in-place material giving rise to a rotational slip. These slip faces are typically concave

Sideslope

Physical landscape feature.

Sieve Analysis

Use of specific size sieves to determine the gradation (the distribution of aggregate particles, by size, within a given sample) in order to determine compliance with design, production control requirements, and verification specifications.

Silt

Mineral particles that range in diameter from 0.02–0.002 mm in the International System or 0.05–0.002 mm in the USDA-NRCS system.

Simplex System

Control that operates a single device (e.g., a simplex pump system).

Single Pass

Flow configuration wherein effluent moves through a treatment component only once.

Siphon

Device used for demand dosing effluent from a tank at a given elevation to a component at a lower elevation, accomplished by means of suction created by the weight of the liquid in the conveying pipe.

Site Evaluation

Comprehensive analysis of soil and site conditions for a given land use.

Site Evaluator

Service provider who conducts preconstruction site evaluations, including visiting a site and performing soil analysis, a site survey, or other activ-

ities necessary to determine the suitability of a site for an onsite wastewater treatment system.

Site Plan

Plan-view drawing that provides a graphical representation of existing and proposed natural and manmade physical features on a site.

Site Restoration

Reconstitution of the surface of a site to approach as nearly as possible the original grade and vegetative cover.

Slag

Bottom ash (a by-product of coal-fired power plants); coarse fraction may be used as distribution media.

Slickensides

Stress surfaces in soil that are polished and striated and are produced by one mass sliding past another.

Slimes

(1) Substances of a viscous organic nature, usually formed from microbiological growth, that attach themselves to other objects forming a coating. (2) The coating of biomass (humus, schmutzdecke, sluff) that accumulates in trickling filters or sand filters and periodically sloughs away to be collected in clarifiers. See also BIOFILM.

Slip

Plastic deformation by the irreversible shear displacement (translation) of one part of a crystal relative to another in a definite crystallographic direction and usually on a specific crystallographic plane. Sometimes called glide.

Slip-Prone

Susceptible to landslip. Slip-prone areas are often recognizable by features of prior landslips, such as slip scars or the lateral displacement of fence posts. Where these features are difficult to recognize, data on soil mineralogy, site drainage and slope- soil morphology can assist in identifying slip prone areas. Such data is used to determine the presence of potential slip faces, soil strength and other factors influencing the potential for landslip.

Slope

(1) The inclination of gradient from the horizontal of a line or surface. The degree of inclination is usually expressed as a ratio such as 1:25, indicating unit rise in 25 units of horizontal distance; or in a decimal fraction (0.04); degrees (2° 18 min); or percent (4%). (2) Inclination of the invert of a conduit expressed as a decimal or as feet (meters) per stated length measured horizontally in feet. (3) In plumbing, the inclination of a conduit, usually expressed in inches per foot (meter) length of pipe.

Slope Break

Configuration for piping installed on steep slopes to slow the flow coming from the structure to the first tank; typically includes the installation of cleanouts to prevent obstruction.

Slope, Concave

Landscape form or feature that is curved or rounded inward such as a segment of the interior of a hollow sphere; slope becomes progressively flatter as one moves downslope.

Slope, Convex

Landscape form or feature that has a surface that is curved or rounded outward; slope becomes progressively steeper as one moves downslope.

Slope Failure

A general term referring to the occurrence of mass movement on hillslopes.

Slope, Linear

Landscape form or feature that is narrow and elongated; the slope is uniform as one moves downslope.

Sloping (Sloping System)

Method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

Sloughing

The disattachment of slime and solids accumulated on the media of trickling filters and RBCs in contact areas. Sloughed material usually is removed subsequently in clarifiers. See also SLIMES.

Slow Sand Filter

A filter for the purification of water in which water without previous treatment is passed downward through a filtering medium consisting of a layer of sand from 24- to 40-in. (0.6- to 1-m) thick. The filtrate is removed by an underdrainage system and the filter is cleaned by scraping off the clogged sand and eventually replacing it. It is characterized by a slow rate of filtration, commonly 3–6 mgd/ac (28–56 ML/ha-d) of filter area. Its effectiveness depends on the biological mat (or *schmutzdecke*) that forms in the top few millimeters.

Slow Strain Rate Technique

An experimental technique for evaluating susceptibility to stress-corrosion cracking. It involves pulling the specimen to failure in uniaxial tension at a controlled slow strain rate while the specimen is in the test environment and examining the specimen for evidence of stress-corrosion cracking.

Sludge

The accumulated suspended solids of sewage deposited in tanks or basins. A mixture of solids and water produced during the treatment of wastewater. Biosolids remaining after secondary or tertiary treatment. Sludge may be applied to agricultural fields as a soil amendment, composted or palletized. Or 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 is (1) The accumulated solids separated from liquids during the treatment process that have not undergone a stabilization process. (2) The removed material resulting from chemical treatment, coagulation, flocculation, sedimentation, flotation, or biological oxidation of water or wastewater. (3) Any solid material containing large

amounts of entrained water collected during water or wastewater treatment. See also ACTIVATED SLUDGE, SETTLEABLE SOLIDS.

Sludge Age

Average residence time of suspended solids in a biological treatment system equal to the total weight of suspended solids in the system divided by the total weight of suspended solids leaving the systems.

Sludge Blanket

Accumulation of sludge hydrodynamically suspended within an enclosed body of water or wastewater.

Sludge Boil

An upwelling of water and sludge deposits caused by release of decomposition gases in the sludge deposits.

Sludge Circulation

The overturning of sludge in sludge digestion tanks by mechanical or hydraulic means or by the use of gas recirculation to disperse scum layers and promote digestion.

Sludge Collector

A mechanical device for scraping the sludge on the bottom of a settling tank to a sump from which it can be drawn.

Sludge Concentration

Any process of reducing the water content of sludge leaving the sludge in a fluid condition.

Sludge Density Index (SDI)

A measure of the degree of compaction of a sludge after settling in a graduated container, expressed as mL/g. The sludge volume index (SVI) is the reciprocal of the sludge density index.

Sludge Dewatering

Removing the remaining water from sludge for reuse and to lighten the sludge for reuse or disposal.

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 Dryer

A device for removing a large percentage of moisture from sludge or screenings by heat.

Sludge Drying

The process of removing a large percentage of moisture from sludge by drainage or evaporation by any method.

Sludge Drying Bed

A sludge drying bed is an open area at water treatment plant or a wastewater treatment plant where moist sludge is left to dry.

Sludge Return

Process that sends the material (sludge) settled in a clarifier back to a septic or processing tank for further treatment or to maintain adequate microbial populations for treatment.

Sludge-Gas Holder

A tank used to store gas collected from sludge digestion tanks for the purpose of stabilizing the flow of gas to the burners, maintaining a nearly constant pressure, and supplying gas during periods when the digestion tanks are temporarily out-of-service or when gas production is low.

Sludge-Gas Utilization

Using the gas produced by the anaerobic digestion of sludge for beneficial purposes such as heating sludge, mixing sludge, drying sludge, heating buildings, incineration, or fueling engines.

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 Pressing

The process of dewatering sludge by subjecting it to pressure, usually within a cloth fabric through which the water passes and in which the solids are retained.

Sludge Reaeration

The continuous aeration of sludge after its initial aeration for the purpose of improving or maintaining its condition.

Sludge Reduction

The reduction in quantity and change in character of sludge as the result of digestion.

Sludge Return

Process that sends the material (sludge) settled in a clarifier back to a septic or processing tank for further treatment or to maintain adequate microbial populations for treatment.

Sludge Solids

Dissolved and suspended solids in sludge.

Sludge Thickener

A tank or other equipment designed to concentrate wastewater sludges.

Sludge Thickening

The increase in solids concentration of sludge in a sedimentation tank, DAF, gravity thickener, centrifuge or gravity belt thickener.

Sludge Utilization

The use of sludges resulting from industrial wastewater treatment as soil builders and fertilizer admixtures.

Sludge Volume Index (SVI)

The ratio of the volume (in milliliters) of sludge settled from a 1000-mL sample in 30 minutes to the concentration of mixed liquor (in milligrams per liter [mg/L]) multiplied by 1000. 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 determine 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.

Slurry

A thick, watery mud or any substance resembling it, such as lime slurry. Fine sized (<2 mm) rock, clay and carbonaceous materials discarded after the final washing and screening of coal. It is usually pumped in suspension to settling ponds or dumped into abandoned open-cut mines, to be eventually revegetated as part of a mine rehabilitation program. The term may also refer to fine

reject from other washing operations such as in opal mining or sand and gravel extraction.

Slushing Compound

An obsolete term describing oil or grease coatings used to provide temporary protection against atmospheric corrosion.

Smart Growth

An initiative or plan that intends to improve ways in which human settlement occurs for the purpose of reducing impacts on the environment, as well as to improve quality of life. Smart Growth initiatives are attempting to address urban sprawl; motor vehicle use; environmental integrity and food-system security; and affordable housing, among many other topics.

Smear

Degradation of the infiltrative surface through the sealing of soil pores.

Smelt

Molten slag; in the pulp and paper industry, the cooking chemicals tappered from the recovery boiler as molten material and dissolved in the smelt tank as green liquor.

Smoke

A visible aerosol resulting from combustion.

Note: In some literature, smoke is referred to quantitatively in terms of a Ringelmann Number, a smoke shade, a darkness of stain or a mass of deposit collected (see FUME, FUMES, and ESPECIALLY SMOKE, for approximate terms).

The whole of the combustion gases and the particles entrained by them. (By extension, also the gases charged by particles resulting from a

chemical process or from a metallurgical operation.)

Smoke Control Forecast

Designed to predict the capability of the atmosphere to effectively disperse pollutants such as small particulate matter (smoke).

Smoke Dispersion Factors

Two factors control the spread or dispersion of small particles or gases. These factors are the wind speed (controls horizontal spread) and the height of the “mixed layer”. The mixed layer is the portion of the atmosphere from the ground up to the level at which gases and small particles freely mix. For example, smoke from a smoke-stack will tend to rise to the top of the mixed layer and then level off.

Smog

A mixture of pollutants, principally ground-level ozone, produced by chemical reactions in the air involving smog-forming chemicals. A major portion of smog-formers comes from burning of petroleum-based fuels such as gasoline. Other smog-formers, volatile organic compounds, are found in products such as paints and solvents. Smog can harm health, damage the environment and cause poor visibility. Major smog occurrences are often linked to heavy motor vehicle traffic, sunshine, high temperatures and calm winds or temperature inversion (weather condition in which warm air is trapped close to the ground instead of rising). Smog is often worse away from the source of the smog-forming chemicals, since the chemical reactions that result in smog occur in the sky while the reacting chemicals are being blown away from their sources by winds.

Smoldering Combustion

A test to assess the fire resistance within the insulation layer.

Snowpack

A seasonal accumulation of slow-melting snow.

S-N Diagram

A plot showing the relationship of stress, S, and the number of cycles, N, before fracture in fatigue testing.

SOAK (gen)

A site where sub surface seepage water emerges at ground level.

Soaking Heat

A test condition in which the specimen is completely immersed in an atmosphere maintained at a controlled temperature.

Soda Ash

A common name for commercial sodium carbonate (Na_2CO_3).

Sodic Soil

A soil containing sufficient exchangeable sodium to adversely affect soil stability, plant growth and/or land use. Such soils would typically contain a horizon in which the ESP or amount of exchangeable sodium expressed as a percentage of cation exchange capacity would be 6 or more.

The soils would be dispersible and may be improved by the addition of gypsum. Strongly sodic soils are considered to be those with an ESP of 15% or more.

Sodium Bisulfite (NaHSO_3)

A salt used for reducing chlorine residuals; a strong reducing agent; typically found in white powder or granular form in strengths up to 44%. At a strength of 38%, 1.46 parts will consume 1 part of chlorine residual.

Sodium Carbonate (Na_2CO_3)

A salt used in water treatment to increase the alkalinity or pH of water or to neutralize acidity. Also called soda ash.

Sodium Hydroxide (NaOH)

A strong caustic chemical used in treatment processes to neutralize acidity, increase alkalinity, or raise the pH value. Also known as caustic soda, sodium hydrate, lye, and white caustic.

Sodium Hypochlorite (NaOCl)

A water solution of sodium hydroxide and chlorine in which sodium hypochlorite is the essential ingredient.

Sodium Metabisulfite ($\text{Na}_2\text{S}_2\text{O}_5$)

A cream-colored powder used to conserve chlorine residual; 1.34 parts of $\text{Na}_2\text{S}_2\text{O}_5$ will consume 1 part of chlorine residual.

Sodium Tripolyphosphate (STPP)

A manufactured chemical of the general formula $\text{Na}_5\text{P}_3\text{O}_{10}$, used for the dispersion of aggregated soils. This may be in the laboratory for par-

ticle size analysis, or for sealing leaking water holding structures built in or from aggregated soils.

Soffits

Soffit (from French *soffite*, formed as a ceiling; to fix underneath), in architecture, describes the underside of any construction element. Examples of soffits include: The underside of a flight of stairs.

Softening

The removal of most of the calcium and magnesium ions from water.

Soft Liquid

A liquid with a vapor pressure above the prevailing atmospheric pressure, e.g. ethylene, NGL, LPG, etc.

Soft Water

Water that is free of magnesium or calcium salts.

Soil

(1) Unconsolidated mineral and/or organic material on the immediate surface of the earth that serves as a medium for the growth of plants; (2) Unconsolidated mineral or organic matter on the surface of the earth that has been subjected to and shows effects of pedogenic and environmental factors of climate (including water and temperature effects), and macro- and microorganisms, conditioned by relief, acting on parent material over a period of time. (3) The natural dynamic system of unconsolidated mineral and organic material at the earth's surface. It has been developed by physical, chemical and biological processes including the weathering of rock and the decay of vegetation. Soil materials include

organic matter, clay, silt, sand and gravel mixed in such a way as to provide the natural medium for the growth of land plants. Soil comprises organized profiles of layers more or less parallel to the earth's surface and formed by the interaction of parent material, climate, organisms and topography over generally long periods of time. It differs markedly from its parent material in morphology, properties and characteristics.

Soil Abrasion

The process by which moving soil particles erode the soil surface thus providing more particles which may subsequently move.

Soil Absorption Capacity

In subsurface effluent disposal, the ability of the soil to absorb water. See SOIL ABSORPTION TEST.

Soil Absorption Test

A test for determining the suitability of an area for subsoil effluent disposal by measuring the rate at which the undisturbed soil will absorb water per unit of surface.

Soil Aeration

The process by which air in the soil is replenished by air from the atmosphere. In a well-aerated soil the soil air is similar in composition to the atmosphere above the soil. Poorly aerated soils usually contain a much higher percentage of carbon dioxide and a correspondingly lower percentage of oxygen. The rate of aeration depends largely on the volume and continuity of pores in the soil.

Soil Aggregate

A unit of soil structure consisting of primary soil particles held together by cohesive forces or by secondary soil materials such as iron oxides, sil-

ica or organic matter. Aggregates may be natural, such as peds, or formed by tillage, such as crumbs and clods,

Soil Ameliorant (Soil Conditioner)

A substance used to improve the chemical or physical qualities of the soil. For example, the addition of lime to the soil to increase pH to the desired level for optimum plant growth, or the addition of gypsum to improve soil structure.

Soil Amendment

The alteration of the properties of a soil by the addition of substances such as lime, gypsum and sawdust, for the purpose of making the soil more suitable for plant growth.

Soil Association

A soil mapping unit in which two or more soil taxonomies units occur together in a characteristic pattern, such as a toposequence. The units are combined because the scale of the map, or the purpose for which it is being made, does not require delineation of individual soils.

The soil association may be named according to the units present, the dominant unit, or be given a geographic name based on a locality where the soil association is well developed.

Soil Carbon

A major component of the terrestrial biosphere pool in the carbon cycle. The amount of carbon in the soil is a function of the historical vegetative cover and productivity, which in turn is dependent in part upon climatic variables.

Soil Class

The common taxonomies unit for a group of soils that are characterized by a particular set of morphological features or surface features that are

related to soil management. It is commonly used in the mapping of soils for specific purposes and represents a group of soils that respond similarly to a set of management practices. While no specific taxonomic units can be attributed to a soil class, as their definition depends on the purpose of the soil mapping, soil class often coincides with soil series, soil phase or an extended principal profile form.

Soil Classification

The systematic arrangement of soils into groups or categories on the basis of similarities and differences in their characteristics. Soils can be grouped according to their genesis (taxonomic classification), their morphology (morphological classification), their suitability for different uses (interpretative classification) or according to specific properties.

The purposes of soil classification are as follows:

*Generally, as a means of grouping soils into useful categories so that statements about one particular soil are likely to apply to other soils in the same group.

With experience, the identification and categorizing involved may lead to the inference of other soil properties (apart from those used in the classification).

*A formal system of classification encourages the scientific and logical study of soils.

*The standardisation and objectivity involved are desirable for communication purposes.

Soil Classification System

Method of categorizing soil and rock deposits in a hierarchy of stable rock, Type A, Type B, and Type C, in decreasing order of stability; categories are determined based on an analysis of the properties and performance characteristics of the

deposits and the environmental conditions of exposure.

Soil Coherence

The degree to which soil material is held together at different moisture levels. If two-thirds or more of the soil material, whether composed of pedes or not, remain united at the given moisture level then the soil is described as coherent.

Soil Colour

The color of soil material as determined by comparison with a standard Munsell soil color chart (Munsell Color Company, 1975) or its equivalent. The colour designation thus determined specifies the relative degrees of the three variables of colour HUE, VALUE and CHROMA. Hue represents the spectral colour, for soils normally in terms of red and yellow. Value represents the lightness or darkness of coloration, and chroma its intensity. For example, 5YR 4/6 has a hue of 5YR, a value of 4 and a chroma of 6. Equivalent descriptive colour names can be used if desired, using those listed in the Munsell chart.

During soil survey, soil colour is determined on a freshly broken aggregate of both dry and moist soil material, to ensure complete documentation of colour. Since a soil's colour may vary, depending on soil moisture content, the moist soil colour provides a base for comparison with other soil samples.

A whole-coloured soil is one in which less than 10% of the soil mass is affected by mottling. Its colour would be specified as a single colour, whereas mottled soils would be described in terms of the dominant matrix colour and the subdominant colour of the mottles. Soil colour is particularly important in the identification of bleaching and gleying in a soil profile.

Soil Complex

A soil mapping unit in which two or more soil taxonomic units occur together in an undefined or complex pattern. The soils are intimately mixed and it is undesirable or impractical to delineate them at the scale of the map. The soil complex may be named according to the units present, the dominant unit or be given a geographic name based on a locality where the soil complex is well developed.

Soil Compressibility

The capacity of a soil to decrease in volume on application of loading. Such decrease is equal to the decrease in the volume of the soils pores. Changes in volume of the particles themselves are considered to be negligible.

Soil compressibility is commonly measured by an oedometer, in which the soil sample is laterally confined in a rigid metal ring but is compressed vertically by mechanical or hydraulic means. The changes in thickness with increasing and decreasing incremental loading over various time periods are plotted and thence used to compute a stiffness modulus (E) which is the expression of the soils compressibility (mega newtons per square metre or MN/m²).

Soil Conservation

The prevention, mitigation or control of soil erosion and degradation through the application to land of cultural, vegetative, structural and land management measures, either singly or in combination, which enable stability and productivity to be maintained for future generations.

Soil Conservation Farm Plan

Plan of a rural property showing the land's rural capability and proposed soil conservation structures and land management measures. The plan also incorporates a report describing in more detail measures required on each class of land.

Soil conservation structures proposed might include areas of banks, gully control structures and waterways. Land management measures might include recommendations on pasture improvement, rabbit control, fencing and access track layout.

The main purpose of the plan is to classify each area of the farm to show the most productive type of use to which it is suited, the type and degree of soil erosion hazard and the type of management and protection needed for continued production and prevention or control of soil erosion. Its implementation should bring the rural property up to its productive potential based on existing technology.

Soil Consistence

Attribute of soil expressed in degree of cohesion and adhesion, or in resistance to deformation or rupture; consistence includes: the resistance of soil material to rupture, resistance to penetration, the plasticity, toughness, or stickiness of puddled soil material, and the manner in which the soil material behaves when subjected to compression; general classifications of soil consistence include loose, friable, very friable, firm, very firm, and extremely firm.

The resistance of soil material to deformation or rupture. Terms used for describing consistence of soil materials at various soil moisture contents and degrees of cementation are: wet—nonsticky, slightly sticky, sticky, very sticky, non-plastic, loose, very friable, friable, firm, very firm, and extremely firm. Dry—loose, soft, slightly hard, hard, very hard, and extremely hard. Cementation - weakly cemented, strongly cemented and indurated.

Soil Degradation

Decline in soil quality commonly caused through its improper use by humans. Soil degradation includes physical, chemical and/or biological deterioration. Examples are loss of organic matter, decline in soil fertility, decline in structural condition, erosion, adverse changes in salinity,

acidity or alkalinity, and the effects of toxic chemicals, pollutants or excessive flooding.

Soil Detachability

The susceptibility of a soil to the removal of transportable fragments by an erosive agent, such as rainfall, running water or wind. Depends largely on soil texture and structure, and is an important component of soil erodibility.

Soil Dispersibility

The characteristic of soils relating to their structural breakdown in water, into individual particles. Usually associated with high levels of exchangeable sodium on the clay traction, and two levels of soluble salts in the soil. These factors cause clay particles to separate in water. As clay is one of the chief agents holding soil materials together. This leads to collapse of the soil structure and consequent instability. Qualitative categories of soil dispersibility are high, moderate and low which generally relate to classes 1, 2 and 3–8 respectively of Emerson's Aggregate Test.

Soil Dispersion

The process whereby soil aggregates break down and separate into their constituent particles (clay, silt, sand) in water, due to deflocculation. The process is different from but often associated with, slaking.

Soil Erodibility

The susceptibility of a soil to the detachment and transportation of soil particles by erosive agents. It is a composite expression of those soil properties that affect the behaviour of a soil and is a function of the mechanical, chemical and physical characteristics of the soil. It is independent of the other factors influencing soil erosion such as topography, land use, rainfall intensity

and plant cover, but may be changed by management.

The qualitative categories of soil erodibility used are low, moderate, high, very high and extreme. The most highly erodable soils are those that are most easily detached and transported by erosive forces, High soil dispersibility is a good indicator of high soil erodibility.

In the Universal Soil Loss Equation soil erodibility is represented by the "K" factor which is defined as the rate of soil loss per erosion index unit as measured on a unit plot. Such a plot is 72.6 ft. long with a uniform lengthwise slope of 9%, in continuous fallow, tilled up and down the slope. The "k" value can also be estimated from a knowledge of soil properties, through the use of a nomograph.

Soil Fabric

Describes the appearance of the soil material using a $\times 10$ hand lens. Differences in fabric are associated with the presence or absence of peds and the lustre! or lack thereof, of the ped surfaces, and the presence, size and arrangement of pores (voids) in the soil mass. Descriptive terms used are Earthy, Sandy, Rough-ped and Smooth-ped.

Soil Family

A unit of soil classification and soil mapping intermediate between soil series and Great Soil Group, consisting of or describing groups of similar soil series, Soil properties used to define a soil family include depth of sodium, differences in structure, occurrence of mottling or sodium contents.

Soil Fertility

The capacity of the soil to provide adequate supplies of nutrients in proper balance for the growth of specified plants, when other growth factors, such as light, moisture and temperature are

favourable. The more general concept of soil fertility can be divided into three components:

*CHEMICAL FERTILITY refers specifically to the supply of plant nutrients in the soil.

*PHYSICAL FERTILITY refers specifically to soil structure conditions which provide for aeration, water supply and root penetration.

BIOLOGICAL FERTILITY refers specifically to the population of micro-organisms in the soil, and its activity in recycling organic matter.

Soil Horizon

A layer or section of the soil profile, more or less well defined, occupying a position approximately parallel to the soil surface, and having characteristics that have been produced through the operation of soil-building processes. Layer of soil or soil material approximately parallel to the land surface and differing from adjacent related layers in physical, chemical, and biological properties or characteristics such as color, structure, texture, consistence, kinds and number of organisms present, degree of acidity or alkalinity, etc.

A layer of soil material within the soil profile with distinct characteristics and properties which are produced by soil-forming processes, and which are different from those of the layers below and/or above. Generally, horizons are more or less parallel to the land surface, except that tongues of material from one horizon may penetrate neighbouring horizons. The boundary between soil horizons defines the nature of the change from one horizon to another. It is specified by the width of the transition zone and the shape as expressed in vertical section. Width of boundary may be expressed as:

Sharp=boundary is less than 2 cm wide.

*Clear=boundary is 2–5 cm wide.

Gradual=boundary is 5–10 cm wide.

*Diffuse=boundary is more than 10 cm wide

Shape of boundary may be expressed as:

Even=boundary is almost a plane surface.

*Wavy=boundary waves up and down and the pockets so formed are relatively wider than their depths.

*Irregular=boundary waves up and down and the pockets so formed are relatively deeper than their widths.

*Broken=boundary is discontinuous,

Soil Infiltration Rate

The maximum rate at which a soil, in a given condition at a given time, can absorb water.

Soil Landscape

An area of land that has recognisable and specifiable topography and soils, that is capable of being presented on maps and of being described by concise statements. Thus a soil landscape has a characteristic landform with one or more soil taxonomic units occurring in a defined way. It is often associated with the physiographic features of the landscape and is similar to a soil association but in a soil landscape the landform pattern is specifically described. The soil landscape may be named according to the soil taxonomic units present, the dominant unit, or be given a geographic name based on a locality where it is well developed.

Soil Loss

The amount of soil material removed from a given area due to an erosion event, including mineral particles, organic matter and nutrients. Expressed in units of weight per unit area, the term typically applies to losses sustained by paddock-sized areas (<100 ha) and is measured as the amount of sediment leaving such an area as a result of the event. This approach however, does not account for soil which moves only within the area, or that which moves on to the area from outside it. For practical purposes these two discrepancies work in opposition and, depending on local circumstances, their net effect on the actual soil loss may be small. The difficulty of measurement of all soil movement to, from and within an area normally precludes more accurate and/or meaningful assessment of soil losses. In practice, the smaller the area under

consideration, the closer measured soil loss comes to the actual soil erosion occurring.

Soil Loss Equation

A mathematical relationship between soil loss and the various factors affecting it, used for soil loss prediction. The most widely used soil loss equation is the UNIVERSAL SOIL LOSS EQUATION (USLE) which is an erosion model developed in the United States and designed to predict the long term average soil losses in runoff from specific field areas under specified cropping and management systems.

The USLE is:

$A = R \times K \times L \times S \times C \times P$

where:

A is the computed soil loss per unit area per year.

R is the rainfall/runoff factor K is the soil erodibility factor.

L is the slope length factor.

S is the slope steepness factor.

C is the cover/management factor.

P is the conservation practice factor.

Numerical values for each of the six factors have been derived from research data and analyses for most conditions in the United States. These are available in a series of charts and tables. The major purpose of the USLE is to supply specific and reliable guides for selecting adequate erosion control practices. The procedure is also useful for computing the upland erosion phase of sediment yield as a step in predicting rates of sedimentation of reservoirs or streams, but the USLE factors are more difficult to evaluate for large mixed catchments. The equation is not recommended for prediction of specific soil loss events. An equation of similar form has also been developed to predict soil losses due to wind erosion, on cropland.

This equation is:

$E = f(I, K, C, L, V)$ where:

E is the erosion per unit area.

I is the soil erodibility factor.

K is the soil roughness (Factor C is the climatic factor (including wind and soil moisture)).

L is the length along the field.

V is the vegetative cover factor.

Soil Loss Prediction

The estimation of future soil losses for a given set of soil, climate, topography and land use conditions. The technique is usually used to predict long term average soil losses for specified conditions.

Soil Loss Tolerance

The maximum rate of annual soil erosion that may occur and still permit a high level of crop productivity to be obtained economically and indefinitely. Such a rate is arbitrarily determined taking into account soil depth, physical properties and other characteristics affecting root development, gully prevention, on-site sediment problems, seeding losses, and soil organic matter reduction and plant nutrient losses. When soil loss prediction procedures give a predicted level of soil loss, any cropping and management combination for which the level is less than the tolerance rate may be expected to provide satisfactory erosion control. From the alternatives indicated by these procedures, the one best suited to a particular Farm may then be selected.

It should be noted that in many parts of soil formation rates are generally considered to be close to zero, and therefore the soil loss tolerance is correspondingly low.

Soil Moisture Characteristic

The graphical relationship between soil water content and soil wafer potential for a given soil. It may vary widely, depending on the texture, structure and pore size distribution of the soil. The relationship is used to indicate the ease or diffi-

culty of removing water from the soil at different soil water contents and can therefore be important in relation to soil structure and plant growth studies.

Soil Morphology

(1) Physical constitution of a soil profile as exhibited by the kinds, thickness, and arrangement of the horizons in the profile; and by the texture, structure, consistence, and porosity of each horizon; (2) visible characteristics of the soil or any of its parts.

Soil Opener

A tillage assembly used to slice through soil and create an opening for the placement of seed and/or fertilizer during the operation of sowing. A number of such assemblies form the essential functional components of a drill. Three types are in common use:

Disc Opener

A soil opener consisting of one, two or three discs arranged so that a small furrow is opened up for placement of seed and/or fertilizer. The boot is usually an integral part of such an opener.

Runner Opener

A soil opener consisting of a tillage tool of narrow cross-section which forms a narrow groove in the soil. Normally used for shallow seed placement into a prepared seedbed.

Tine Opener

A soil opener consisting of a tine, a boot and a tillage tool.

Soil Organic Matter

That fraction of the soil including plant and animal residues at various stages of decomposition, cells and tissues of soil organisms, and substances synthesised by them. It is of vital importance as it contributes to the cation exchange and field capacities of the soil and provides a major source

of plant nutrients and substances which assist in soil structure maintenance.

Soil Packer

An implement used to form a seedbed by crushing soil clods. It may also assist erosion control by anchoring plant residue. Packers usually consist of one or two gangs of heavy rollers made up of many individual segments or a spiral.

Soil Permeability

The characteristic of a soil, soil horizon or soil material which governs the rate at which water moves through it. It is a composite expression of soil properties and depends largely on soil texture, soil structure, the presence of compacted or dense soil horizons, and the size and distribution of pores in the soil. The rate varies widely in the field, from more than 3000 mm/day in poorly graded sands and gravels, to less than 0.01 mm/day for some heavy plastic clays. The qualitative categories of permeability for general use are:

Slowly permeable less than 10 mm per day.

Moderately permeable—10–1000 mm per day.

Highly permeable more than 1000 mm per day.

When applied to a soil profile, the rate of water transmission is controlled by the least permeable layer in the soil.

Soil Profile

Vertical section of the soil through all its horizons and extending into the parent material.

Soil Phase

A subdivision of a soil taxonomic unit based on characteristics that affect the use and management of the soil, but do not change the classification of the soil. Such characteristics include

slope, erosion, depth, stoniness and rockiness, drainage, depositional layers, gilgai or scalding.

Soil Plasticity

The degree to which a soil is plastic. A highly plastic soil has plastic properties over a wide range of moisture contents. A sub plastic soil has properties suggesting that less clay is present than is actually the case. Such soil materials may be identified by determining two soil textures. The initial texture obtained by a 1–2 minute working of the soil sample will appear to be of a less clayey grade than the texture obtained after a 10 minute working. A non-plastic soil has properties which do not allow plastic behaviour, whatever the moisture content.

Soil Porosity

The degree to which the soil mass is permeated with pores or cavities Porosity can be generally expressed as a percentage of the whole volume of a soil horizon that is unoccupied by solid particles. In addition, the number, sizes, shapes, and distribution of the voids are important. Generally, the pore space of surface soil is less than one-half of the soil mass by volume, but in some soils it is more than half. The part of the pore space that consists of small pores that hold water by capillary action is called CAPILLARY POROSITY, The part that consists of larger pores that do not hold water by capillary action is called NON-CAPILLARY POROSITY.

The percentage of the soil (or rock) volume that is not occupied by solid particles, including all pore space filled with air and water. The total porosity may be calculated from the following formula: percent pore space $(1 - \text{volume weight/specific gravity}) \times 100$.

Soil Profile

A vertical cross-sectional exposure of a soil, extending downwards from the soil surface to the parent material or, for practical purposes, to a depth of one metre where the parent material cannot be differentiated. It is generally composed of three major layers designated A, B and C horizons. The A and B horizons are layers that have been modified by weathering and soil development and comprise the so/um. The C horizon is weathering parent material which has not, as yet, been significantly altered by biological soil forming processes. A surface organic (O) horizon and/or a sub-solum (D) horizon may also occur.

The boundaries between successive soil horizons are specified by their width and shape.

O Horizon:

A surface layer of plant materials in varying stages of decomposition not significantly mixed with the mineral soil. Often not present or only poorly developed in Australian soils except in some forests. When highly developed it can be divided into two parts:

O1 HORIZON is the surface layer of undecomposed plant materials.

O2 HORIZON is the layer beneath the O, which is partly decomposed.

A HORIZON:

This is the original top layer of mineral soil. It can be divided into two parts:

A1 HORIZON is the surface soil and generally referred to as topsoil. Relative to other horizons it has a high content of organic matter, a dark colour and maximum biological activity. This is the most useful part of the soil for revegetation and plant growth. It is typically from 5 to 30 cm thick.

A2 HORIZON is a layer of soil of similar texture to the A horizon, but is paler in colour, poorer in structure, and less fertile. A white or grey colouration, known as bleaching, is often caused

by impeded soil drainage and/or eluviation. The A2 horizon is typically from 5 to 70 cm thick, but does not always occur.

B HORIZON: The layer of soil below the A horizon. It is usually finer in texture (i.e. more clayey), denser, and stronger in colour. In most cases it is a poor medium for plant growth. Thickness ranges from 10 cm to over 2 metres. It can be divided into two parts:

B HORIZON is a transitional horizon dominated by properties characteristic of the underlying B2 horizon.

B2 HORIZON is a horizon of maximum development due to concentration of silicate clay and/or iron, and/or aluminium and/or translocated organic material. Structure and/or consistency is unlike that of the A and C horizons and colour is typically stronger.

C HORIZON: Layers below the B horizon which may be weathered, consolidated or unconsolidated parent material little affected by biological soil forming processes. The C horizon is recognised by its lack of pedological development, and by the presence of remnants of geologic organisation. Its thickness is very variable.

D HORIZON: Layers below the solum which are not C horizon, and are not related to the solum in character or pedologic organisation.

R HORIZON: Hard rock that is continuous.

Soil Reaction Trend

The change in pH with depth in a soil profile, from surface soil to deep subsoil. Four such trends have been defined: strongly acid, acid, neutral and alkaline.

Soil Resistivity

The electrical resistivity of the soil. This is important in cathodic protection systems as it affects current distribution through the soil and potentials on the protected structure.

Soil Resource

The total extent of soil within a given area available as a natural medium for plant growth. It is limited and exhaustible, and thus, its management must aim to avoid degradation to ensure its potential productive capability is maintained or improved.

Soil Salinity

The characteristic of soils relating to their content of water-soluble salts. Such salts predominantly involve sodium chloride, but sulphates, carbonates and magnesium salts occur in some soils. High salinity adversely affects the growth of plants, and therefore increases erosion hazard. Soil salinity is normally characterised by measuring the electrical conductivity of a soil/water saturation extract and is expressed in millisiemens per centimetre at 25 °C (mS/cm).

Soil Separate

Mineral particle that is sand-, silt-, or clay-sized.

Soil Series (sol, lev)

A unit of soil classification and soil mapping comprising or describing soils which are alike in all major profile characteristics. Each soil series is developed from a particular parent material, or group of parent materials, under similar environmental conditions, it approximates to the extended principal profile form. The name given to a soil series is geographic in nature, and indicates a locality where the soil series is well developed.

Soil Solution

The water in a soil containing ions dissociated from the surfaces of soil particles, and other soluble substances.

Soil Stabiliser

A substance or material used to improve soil stability, strength or bearing capacity. In a soil conservation context the primary purpose of a soil stabiliser is to reduce erosion potential. For example the addition of proprietary chemicals to achieve soil flocculation, or the incorporation of organic materials such as hay or straw into newly topsoiled areas.

Soil Structure

Combination or arrangement of primary soil particles into secondary units or peds; secondary units are characterized on the basis of shape, size class, and grade (degree of distinctness).

Soil Substitution

Trench or bed installed after native soil is excavated and replaced with approved soil material; configurations and terminology vary among jurisdictions; may be referred to locally as sand-lined trenches, liner systems, etc.

Soil Structure

The combination or spatial arrangement of primary soil particles (clay, silt, sand, gravel) into aggregates such as peds or clods and their stability to deformation. Structure may be described in terms of the grade class and form of the soil aggregates, as follows:

Grade' expresses the degree and strength of soil aggregation determined on moist soil. The grades range from structure less, if there is no observable aggregation, to strong, where more than two thirds of the soil is aggregated.

Class—expresses the main size range of the aggregates.

Form—expresses the shape of the individual aggregates as crumb, granular, sub-angular blocky, angular blocky, prismatic, columnar or platy.

Soil structure is an important property with respect to the stability, porosity and infiltration characteristics of the soil. Well-structured soils tend to be more resistant to erosion due to their ability to absorb rainfall more freely and over longer periods, and because of the resistance of their aggregates to detachment and transport by raindrop splash and/or overland flow. They also have good soil/water/air relationships for the growth of plants. Poorly-structured soils have unstable aggregates and low infiltration rates. They tend to break down quickly under heavy rainfall which leads to soil detachment and erosion. Under certain conditions surface sealing occurs and this gives rise to rapid and excessive runoff.

Soil Survey

The systematic examination, description, classification and mapping of soils, with the aim of categorising soil distribution within a defined area. In practice, most soil surveys also include statements on the geology, topography, climate and vegetation of the area concerned. They may be carried out for general use, in which case a wide range of soil properties is examined, or for a particular purpose such as crop irrigation or urban planning, in which case only a limited number of soil properties may be relevant. Soil survey involves the following steps; (1) deciding which properties of the soil are important for the particular purpose; (2) selecting categories for each property relevant to the particular purpose; (3) classifying soils into map units so that soil variation within units is less than that between units; (4) locating and plotting the boundaries of these units on maps; and 5. preparing maps and reports for publication.

Soil Taxonomic Unit

A general term for a grouping of soils based on similarities of the soils within the group, and differences compared with other groups. Note that the general taxonomic units such as great soil

group and principal profile form need to be distinguished from the soil survey taxonomic units such as soil series and soil association.

Soil Test

Chemical analysis of soil to determine the need for fertilizers or amendments for species of plant being grown.

Soil Textural Class

Percentage by weight of sand, silt, and clay such that each class possesses unique physical characteristics and management relative to the other textural classes; textural class names are modified by the addition of suitable adjectives when rock fragments are present in substantial amounts (for example, 'stony silt loam').

Soil Texture

Relative proportions by weight of the various inorganic primary particles in a soil as described by the classes of soil texture.

The coarseness or fineness of soil material as it affects the behaviour of a moist ball of soil when pressed between the thumb and forefinger. It is generally related to the proportion of soil particles of differing sizes (sand, silt, clay and gravel) in a soil, but is also influenced by organic matter content, clay type, and degree of structural development of the soil.

For field identification of these main groups, take a small handful of soil and knead with water until a homogeneous soil ball or bolus is obtained. Large pieces of grit and organic material should be discarded. Small clay peds should be crushed and worked in with the rest of the soil. The feel, behaviour and resistance of the soil to manipulation during this process is important. The bolus should be kept moist so that it just fails to stick to

the fingers. The six main texture groups should be apparent as follows:

1. Sands have very little or no coherence and cannot be rolled into a stable ball. Individual sand grains adhere to the fingers.
2. Sandy Loams have some coherence and can be rolled into a stable ball, but not a thread. Sand grains can be felt during manipulation.
3. Loams can be rolled into a thick thread, but this will break up before it is 3–4 mm thick. The soil ball is easy to manipulate and has a smooth spongy feel with no obvious sandiness.
4. Clay Loams can be easily rolled to a thread 3–4 mm thick, but it will have a number of fractures along its length. Soil becoming plastic, capable of being moulded into a stable shape.
5. Light Clays can be rolled to a thread 3–4 mm thick without fracture. Plastic behaviour evident, smooth feel with some resistance to rolling out,
6. Heavy Clays can be rolled to a thread 3–4 mm thick and formed into a ring in the palm of the hand without fracture. Smooth and very plastic, with moderate-strong resistance to rolling out.

In a soil conservation context, soil texture is very important as it not only has a major influence on the erodibility of soils but also on their performance when used in water storage structures. In particular it largely determines soil permeability.

Soil Texture Grade

A minor category of soil texture as set out in the table under soil texture group.

Soil Treatment Area

Physical location where final treatment and dispersal of effluent occurs; includes drainfields, drip fields and spray fields.

Soil Type

A general term used to describe a group of soils that can be managed similarly and which exhibit similar morphological features. It is largely a lay-man's term and now has no formal soil taxonomic meaning.

Soil Variant

A soil having a morphology which is distinct from the surrounding soils but comprises such a limited geographic area that the delineation of a new map unit or the naming of a new soil taxonomic unit, is not justified.

Soil Water

Water contained in, or in transit by drainage through the soil.

Soil Water Potential

In general terms, the amount of work (or suction) which must be applied to remove water from soil. The water content at a suction of -15 bars is taken to approximate the permanent wilting point, and the water content at a suction of -0.1 bar is taken to approximate field capacity.

Solar Energy

Energy derived from sunlight.

Solar Radiation

Radiation emitted by the Sun. It is also referred to as short-wave radiation. Solar radiation has a distinctive range of wavelengths (spectrum) determined by the temperature of the Sun.

Solder Embrittlement

Reduction in mechanical properties of a metal as a result of local penetration of solder along grain boundaries.

Solenoid

Electro-magnetically operated mechanical device (electric coil).

Solid-Metal Embrittlement

The occurrence of embrittlement in a material below the melting point of the embrittling species. See also LIQUID-METAL EMBRITTLEMENT.

Solid Solution

A single, solid, homogeneous crystalline phase containing two or more chemical species.

Solids Disposal

Any process for the ultimate disposal of solid wastes or sludges by incineration, landfilling, soil conditioning, or other means.

Solids, Dissolved

That portion of total solids that passes through a filter of $2.0 \mu\text{m}$ (or smaller) nominal pore sized under specified conditions.

Solids, Fixed

Residue of total, suspended, or dissolved solids (mineral fraction) after heating to dryness for a specified time at a specified temperature.

Solids Inventory

Amount of sludge in the treatment system typically expressed as kilogram (tons). Inventory of plant solids should be tracked through the use of a mass balance set of calculations.

Solids Loading

Amount of solids applied to a treatment process per unit time per unit volume.

Solids Retention Time (SRT)

The average time of retention of suspended solids in a biological waste treatment system, equal to the total weight of suspended solids leaving the system, per unit time.

Solids, Settleable

Suspended solids that will settle out of suspension within a specified period of time, expressed in milliliters per liter (mL/L).

Solids, Suspended

That portion of total solids that is retained on a filter of 2.0 μm (or smaller) nominal pore sized under specified conditions.

Solids, Total (TS)

Material residue left in a vessel after evaporation of a sample subsequent to drying to a constant weight in an oven at 217–221 °F (103–105 °C); includes total suspended solids (TSS) and total dissolved solids (TDS); typically expressed in mg/L.

Solids, Total Dissolved (TDS)

Material that passes through a filter of 2.0 μm (or smaller) nominal pore size, evaporated to dryness in a weighed dish and subsequently dried to con-

stant weight at 180 °C; typically expressed in mg/L.

Solids, Total Suspended (TSS)

Measure of all suspended solids in a liquid, typically expressed in mg/L; to measure, a well-mixed sample is filtered through a standard glass fiber filter and the residue retained on the filter is dried to a constant weight at 217–221 °F (103–105 °C); the increase in the weight of the filter represents the amount of total suspended solids.

Solids, Volatile

Weight loss on ignition of total solids, not distinguishing between inorganic and organic matter, and including loss due to decomposition or volatilization of some mineral salts at 1,022 °F (550 °C).

Solid Waste

Solid waste is any garbage, refuse, or sludge from a waste treatment plant, water supply treatment plant, or air pollution control facility, or other discarded material, including solids, liquids, semisolids, or contained gaseous material resulting from industrial, commercial, mining, and agricultural operations and from community activities. In addition, solid waste does not include radioact source, special nuclear, and/or their by-product material.

Solubility

Amount of a substance that will dissolve in a given amount of another substance, typically water.

Solum

The upper part of a soil profile above the parent material, in which current processes of soil formation are active. The solum consists of either the A and B horizons or the A horizon alone

when no B horizon is present. The living roots and other plant and animal life characteristic of the soil are largely confined to the solum.

Solute

A substance that is dissolved in another substance, thus forming a solution. The component of either a liquid or solid solution that is present to a lesser or minor extent: the component that is dissolved in the solution.

Solution

A mixture of a solvent and a solute. In some solutions, such as sugar water, the substances mix so thoroughly that the solute cannot be seen. But in other solutions, such as water mixed with dye, the solution is visibly changed. In chemistry, a homogeneous dispersion of two or more kinds of molecular or ionic species. Solution may be composed of any combination of liquids, solids, or gases, but they always consist of a single phase. That part of natural weathering processes whereby substances in rocks and soil are dissolved in groundwater. Such water usually contains some carbon dioxide and organic compounds from plant breakdown which make it mildly acid, thereby enhancing its ability to dissolve rock materials.

Solution Heat Treatment

Heating an alloy to a suitable temperature, holding at that temperature long enough to cause one or more constituents to enter into solid solution, and then cooling rapidly enough to hold these constituents in solution.

Solution Potential

Electrode potential where half-cell reaction involves only the metal electrode and its ion.

Solvent

A substance that dissolves other substances, thus forming a solution. Water dissolves more substances than any other, and is known as the “universal solvent”. The component of either a liquid or solid solution that is present to a greater or major extent; the component that dissolves the solute.

Solvent Base

Hydrocarbon-containing compounds such as paint thinner used for the purpose of thinning various types of coatings such as paint.

Soot

Agglomerates of carbonaceous particles formed by incomplete combustion and deposited before emission.

Sorption

Removal of an ion or molecule from solution by adsorption and/or absorption; term often used when the exact nature of the mechanism of removal is not known.

Sorting

Separation of particle sizes by an erosive fluid, according to their equivalent spherical diameters, as a result of changes in flow velocity.

Sound

Sound is a form of energy emitted by a vibrating body and on reaching the ear it causes the sensation of hearing through nerves.

Sour Gas

A gaseous environment containing hydrogen sulfide and carbon dioxide in hydrocarbon reservoirs. Prolonged exposure to sour gas can lead to hydrogen damage, sulfide-stress cracking, and/or stress-corrosion cracking in ferrous alloys.

Sour Water

Waste waters containing fetid materials, usually sulfur compounds.

Source

Any place or object from which pollutants are released. A source can be a power plant, factory, dry cleaning business, gas station, or a farm. Cars, trucks, and other motor vehicles are sources. Consumer products and machines used in industry can also be sources. Location at which wastewater is generated.

Spalling

Condition in which the surface of a concrete component is physically degraded (flaking), exposing aggregate and/or structural reinforcement materials.

The spontaneous chipping, fragmentation, or separation of a surface or surface coating.

Sparger

An air diffuser designed to give large bubbles, used singly or in combination with mechanical aeration devices.

Spatter

Globules of metal expelled during welding onto the surface of parent metal or of a weld.

Spelter

A brazing alloy consisting nominally of 50% Cu and 50% Zn.

Special Order by Consent (SOC)

An administrative order entered by the Environmental Management Commission and an NPDES discharger which in some way modifies limitations of an NPDES permit by consent of both parties and provides interim limitations and conditions.

Speciation

Speciation is the analytical activity of identifying and/or measuring the quantities of one or more individual chemical species in a sample.

Species

A subdivision of a genus having members differing from other members of the same genus in minor details.

Specific Conductance

A measure of the ability of water to conduct an electrical current as measured using a 1-cm cell and expressed in units of electrical conductance, i.e., Siemens per centimeter at 25 °C. Specific conductance can be used for approximating the total dissolved solids content of water by testing its capacity to carry an electrical current. In water quality, specific conductance is used in ground water monitoring as an indication of the presence of ions of chemical substances that may have been released by a leaking landfill or other waste storage or disposal facility. A higher specific conductance in water drawn from downgradient wells when compared to upgradient wells indicates possible contamination from the facility.

Specific Gravity

The ratio of the mass of a body to the mass of an equal volume of water at a specific temperature, typically 20 °C (68 °F).

Specific Oxygen Uptake Rate

Measures the microbial activity in a biological system expressed in mg O₂/g-h of VSS. Also called respiration rate.

Specific Resistance

The relative resistance a sludge offers to the draining of its liquid component.

Specific Speed

A speed or velocity of revolution, expressed in revolutions per minute (rpm), at which the runner of a given type or turbine would operate if it were so reduced in size and proportion that it would develop 1 hp under a 1-ft head. The quantity is used in determining the proper type and character of turbine to install at a hydroelectric power plant under given conditions.

Spheroidite

An aggregate of iron or alloy carbides of essentially spherical shape dispersed throughout a matrix of ferrite.

Spiral-Air Flow Diffusion

A method of diffusing air in the grit chamber or aeration tank of the activated-sludge process where, by means of properly designed baffles and

the proper location of diffusers, a spiral helical movement is given to the air and the tank liquor.

Spiral Cracking

Spiral cracking is a pipe failure mode. As the name suggests it presents as a crack that spirals around the circumference of a pipe.

Splitter Box

(1) A division box that splits the incoming flow into two or more streams. (2) A device for splitting and directing discharge from the head box to two separate points of application.

Spodic Horizon

Diagnostic subsurface horizon characterized by the illuvial accumulation of amorphous materials composed of aluminum and organic carbon with or without iron.

Spoil

Soil removed from its original location, typically stacked in a pile and may be reused.

Spray Aerator

An aerator consisting of a pressure nozzle through which water is propelled into the air in a fine spray.

Spray-Applied Cellulose

An installation method in which water is added to cellulose insulation to make it stick when blown into wall cavities. Also known as Type 2 cellulose Insulation.

Spray Booth

A power ventilated structure enclosing a coating operation, to confine and limit the escape of spray, vapor and residue and to safely conduct or direct them to an exhaust system. The spray booth contains and captures particulate emissions and vents them to a control device.

Spray Field

Above-grade soil treatment area where final treatment and dispersal occurs via application of effluent to the infiltrative surface via pressurized distribution heads utilizing nozzles.

Spray Dispersal

Application of effluent over a soil treatment area via spray heads and associated devices and parts (including pump, filters, controls, and piping).

Spray Foam

Spray Foam is made chemical that is composed of both organic and nonorganic materials. When these materials are combined at a specific temperature, form a polyurethane material that expands several times its original size. This is where the compound is named.

Spray Foam Insulation

The insulation of spray foam on cracks and crevices to creating an airtight and watertight seal, one of the advantages of spray foam is its ability to expand and reach elusive. This is what makes spray foam insulation as effective.

Spray Irrigation

A method of land treatment for disposing of some organic wastewaters by spraying them, usually from pipes equipped with fixed or moving spray nozzles. See also LAND APPLICATION.

Sprayed-On Insulation

Insulation of the fibrous or foam type that is applied to a surface by means of power spray devices.

Sprayed Insulation

An adherent coating of insulating material.

Spring

A water body formed when the side of a hill, a valley bottom or other excavation intersects a flowing body of groundwater at or below the local water table, below which the subsurface material is saturated with water. Groundwater seeping out of the earth where the water table intersects the ground surface.

Spring Line

Horizontal axis defined by the greatest width dimension of piping, conduit, tank, or other structure.

Springing

Springing is separation of acid oils, either phenolic or naphthenic, by neutralization of spent caustic solutions. The acid oils are known as “sprung acids”.

Sputtering

A coating process whereby thermally emitted electrons collide with inert gas atoms, which accelerate toward and impact a negatively charged electrode that is a target of the coating material. The impacting ions dislodge atoms of the target material, which are in turn projected to and deposited on the substrate to form the coating.

Squirt Height

Height achieved by the liquid in a pressurized lateral when an orifice is positioned such that the discharge is vertical into the atmosphere, typically expressed in feet of height.

Stabilization Pond

A type of oxidation pond in which biological oxidation of organic matter is effected by natural or artificially accelerated transfer of oxygen to the water from air.

Stabilized

Stabilized cellulose is used most often in attic/roof insulation. It is applied with a very small amount of water to activate an adhesive.

Stable Rock

Natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed; unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

Stabilisation

The provision of adequate measures, vegetative, structural and/or mechanical, to prevent or control erosion,

Stabilising Species (csd)

Plant species used for the stabilisation of drifting coastal sand dunes, all capable of withstanding shoreline exposure. Three broad types are recognised:

Primary Species

Plant species which will colonise bare sand without protection from other vegetation. These plants rely on sand drift for nutrient replenishment. Examples are Sand Spinifex and Marram grass.

Secondary Species

Plant species which will establish following the cessation of sand drift brought about by primary stabilising species. An example is Coastal Wattle.

Tertiary Species

Plant species which can only establish following the cessation of sand drift and under protection of established vegetation. Examples are Banksia, Bottlebrush and Paperbark.

Stabilizing Treatment

(1) Before finishing to final dimensions, repeatedly heating a ferrous or nonferrous part to or slightly above its normal operating, temperature and then cooling to room temperature to ensure dimensional stability in service. (2) Transforming retained austenite in quenched hardenable steels, usually by cold treatment. (3) Heating a solution-treated stabilized grade of austenitic stainless steel to 870–900 °C (1600–1650 °F) to precipitate all carbon, as TiC, NbC, or TaC so that sensitization is avoided on subsequent exposure to elevated temperature.

Stack

A chimney, smokestack, or vertical pipe that discharges used air.

Stage

The elevation of the free surface of stored or flowing water relative to a fixed datum.

Stage Recorder

An instrument used for measuring and recording the height of water in a channel. It incorporates a float, rising and falling with the changes in water stage in a stilling well, that is connected to a recording mechanism. By relating water heights to rates of flow, using a rating curve, a complete hydro graph is recorded. This can be used in conjunction with rainfall data to study the relation between rainfall and runoff from a catchment, and the way it is affected by landform, land management, land use and soil conservation practices. The recorder should only be used in conjunction with a calibrated flume or weir.

Stake

Stout stick or post sharpened at one end and driven into the earth as a support or boundary marker.

Stake, Grade

Stake indicating the amount of cut or fill required to bring the ground to a specified level.

Stake, Guard

Stake, strip, or lath placed beside a hub stake to identify it.

Stake, Hub

Short stake placed at a station and driven almost flush with the ground; hub stakes are used to obtain station elevations in drainage and other kinds of elevation work; also called a hub.

Stake, Slope

In earthwork, a stake marking the line where a cut or fill meets the original grade.

Stage I Controls

Systems placed on fuel storage tanks to control and capture gasoline vapors during loading of the tanks by delivery trucks.

Stage II Controls

Systems placed on service station gasoline pumps to control and capture gasoline vapors during refueling, including vapor recovery nozzles.

Staged Digestion

The progressive digestion of waste in two or more tanks arranged in series, usually divided into primary digestion with mixed contents and secondary digestion where quiescent conditions prevail and supernatant liquor is collected.

Staged Treatment

(1) Any treatment in which similar processes are used in series or stages. (2) In the activated-sludge process, two or more stages consisting of a clarifying stage and a biological stage, or two biological stages. (3) In anaerobic digestion, an operation in which sludge is completely mixed in the first tank and pumped to a second tank for separation of the supernatant liquor from the solids.

Staged Trickling Filter

A series of trickling filters through which wastewater passes successively with or without intermediate sedimentation.

Stakeholders

Residents, environmentalists, businesses and government representatives that have a stake or concern about how air quality is managed.

Stale Wastewater

Wastewater containing little or no oxygen, but as yet free from putrefaction. See also SEPTIC WASTEWATER.

Stalked Ciliates

Small, one-celled organisms possessing cilia (hair-like projections used for feeding) that are not motile. They develop at lower prey densities, long SRTs, and low F:M ratios.

Standard Electrode Potential

The reversible potential for an electrode process when all products and reactions are at unit activity on a scale in which the potential for the standard hydrogen half-cell is zero.

Standard Methods

(1) An assembly of analytical techniques and descriptions commonly accepted in water and wastewater treatment (Standard Methods for the Examination of Water and Wastewater) published jointly by the American Public Health Association, the American Water Works Association, and the Water Environment Federation. (2) Validated methods published by

professional organizations and agencies covering specific fields or procedures. These include, among others, the American Public Health Association, American Public Works Association, American Society of Civil Engineers, American Society of Mechanical Engineers, American Society for Testing and Materials, American Water Works Association, U.S. Bureau of Standards, U.S. Standards Institute (formerly American Standards Association), U.S. Public Health Service, Water Environment Federation, and U.S. Environmental Protection Agency.

Standard Pressure

Atmospheric pressure at sea level under standard conditions.

Standard Testing

Laboratory test methodology for determining relative properties of materials at specific conditions.

Startup

Setting of operational controls, verification of component function, documentation of initial operating conditions of a system, and establishment of microbial populations for biological treatment.

State Implementation Plan (SIP)

A detailed description of the programs a state will use to carry out its responsibilities under the Clean Air Act. State implementation plans are collections of the regulations used by a state to reduce air pollution in nonattainment areas. The Clean Air Act requires that EPA approve each state implementation plan. Members of the public are given opportunities to participate in review and approval of state implementation plans.

Static Head

Vertical distance between the free level of the source of supply and the point of free discharge or the level of the free surface. The hydraulic head due to the height of the static pool of water held in a weir or similar hydrologic structure, with respect to a fixed datum. It equals the depth of water plus the height of the channel floor above datum.

Static Level

(1) The elevation of the water table or pressure surface when it is not influenced by pumping or other forms of extraction from the groundwater. (2) The level of elevation to which the top of a column of water would rise, if afforded the opportunity to do so, from an artesian aquifer, basin, or conduit under pressure. Also called hydrostatic level.

Static Suction Head

The vertical distance from the source of supply, when its level is above the pump, to the center line of the pump.

Static Suction Lift

The vertical distance between the center of the suction end of a pump and the free surface of the liquid being pumped. Static lift does not include friction losses in the suction pipes. Static suction head includes lift and friction losses.

Station

Point where a rod reading is taken; points along the line of a survey; stations are usually marked with a peg or wood stake, or in grade settling, marked with a grade stake.

Stationary Source

A place or object from which pollutants are released which stays in place. Stationary sources include power plants, gas stations, incinerators, and houses. Stationary Source is a fixed, non-mobile producer of pollution, usually at industrial or commercial facilities.

STC (Sound Transmission Class)

STC is an integer rating of how well a building partition attenuates airborne sound. It is widely used to rate interior partitions, ceilings/floors, doors, windows and exterior wall configurations.

Steady Flow

(1) A flow in which the rate, or quantity of water passing a given point per unit of time, remains constant. (2) Flow in which the velocity vector does not change in either magnitude or direction with respect to time at any point or section.

Steady Nonuniform Flow

A flow in which the quantity of water flowing per unit of time remains constant at every point along the conduit, but the velocity varies along the con-

duit because of a change in the hydraulic characteristics.

Steel

- **Ferrite**
- Ferrite is the name given to the body centered cubic allotropes of iron, α and α' iron, and to body centered cubic solid solutions
- **Austenite**
- Austenite is the name given to the face centered cubic, or γ , variety of iron, and to the face centered cubic solid solutions.
- **Cementite**
- Is the name given to the carbide of iron, Fe_3C . This is an extremely hard and brittle constituents.
- **Pearlite**
- Pearlite is the eutectoid mixture of ferrite and cementite, and is formed when Austenite decomposes during cooling. It consists of alternate thin layers, or lamellae, of ferrite and cementite.
- **Martensite**
- This is the name given to the very hard and brittle constituent that is formed when a steel is very rapidly cooled from the Austenitic state. It is a ferrite, highly super saturated with dissolved carbon.
- **Sorbite and troostite**
- These are names given to the structures produced when martensite or bainite is tempered, that is, heated to same temperature not exceeding $700^\circ C$ for the purpose of reducing brittleness and hardness.
- **Bainite**
- This is the term that is given to the decomposition product that is formed when austenite decomposes by either isotherm transformation, or at a cooling rate intermediate between the very rapid cooling necessary for martensite and the slower rate of cooling at which pearlite is formed.
- **Plain carbon steel**
- This is a steel containing up to 1.5 percent of carbon together with not more than 0.5 percent of silicon and not more than 1.5 percent of manganese, and only traces of other elements.
- **Alloy steel**

- It is one that contains either silicon or manganese in amounts in excess of those quoted above, or that contains any other element, or elements, as the result of deliberately made alloying additions.

Step Aeration

A procedure for adding increments of settled wastewater along the line of flow in the aeration tanks of an activated-sludge plant. Also called step feed.

Stepdown

Device used to connect a trench at a certain elevation to the next trench at a lower elevation; can be used as a relief line in sequential or serial distribution.

Sterilization

A process which inactivates or removes all living organisms (including vegetative and spore forms) as well as viruses.

Stilling Basin

The pondage located at the foot of an over fall, pipe, flume, spillway or similar structure to reduce the energy of the descending stream of water and associated turbulence, subsequently reducing outlet velocities to a non-erosive level. The basin's dimensions are calculated according to the size of the hydraulic pump occurring at the design peak discharge.

Stilling Well

A vertical chamber, having closed sides and bottom except for a small inlet or inlets connected to a main body of water, for the attenuation of waves or surges whilst permitting the water level within the chamber to rise and fall with the major fluctuations of the main water body. Used with water

measuring devices and stage recorders to improve the accuracy of measurement.

Stock Watering

The watering of stock being raised on the land. Does not include the use of water in connection with intensive animal husbandry.

Stoichiometric

Pertaining to or involving substances that are in the exact proportions required for a given reaction.

Stone Wool

Stone wool is an effective insulation, manufactured from intertwined fibres of molten volcanic rock.

Stop Valve

A stop valve or isolating valve is a valve type that is used to permanently or temporarily stop flow in a pipe. Ball valves, gate valves, globe valves and check valves are the most common subcategory of stop valves.

Storage Tank

Any stationary container, reservoir, or tank used for the storage of liquids. District regulations usually only apply to the storage of organic liquids.

Storm Drain

A pipeline or channel system that carries surface water and/or runoff to public waters, but does not feed into sewer system.

Storm Duration

The timespan from the commencement to the cessation of a storm.

Storm Sewage

A mixture of sewage and the surface water arising from heavy rainfall or melting snow (ice).

Storm Sewer

A sewer that carries only surface runoff, street wash, and snow melt from the land. In a separate sewer system, storm sewers are completely separate from those that carry domestic and commercial wastewater (sanitary sewers).

Storm Surge

An abnormal rise in sea level accompanying a hurricane or other intense storm, whose height is the difference between the observed level of the sea surface and the level that would have occurred in the absence of the cyclone.

Storm Water

Storm water is rain water discharged from a catchment area as a result of a storm.

Stormwater Management Facility

A device that controls stormwater runoff and changes the characteristics of that runoff including, but not limited to, the quantity and quality, the period of release or the velocity of flow.

Stormwater Management Plan

A document describing how existing runoff characteristics will be affected by a land development project and methods for complying with the requirements of the local program.

Storm Water Run-Off (SRO)

The pulse of surface water following a rainstorm. The water carries sediment, gas, oil, animal feces, glass and other waste from the watershed to receiving waters creating a difficult urban/suburban wastewater problem.

Straddling Stocks

Fish populations that straddle a boundary between domestic and international waters.

Straggler Floc

Large (6-mm or larger) floc particles that have poor settling characteristics.

Straight Pipe

Conduit used to convey wastewater either directly from the source or following septic tank pretreatment to the land surface or a water body; term that often indicates an illegal discharge without treatment.

Strain

The unit of change in the size or shape of a body due to force. Also known as nominal strain.

Strain-Age Embrittlement

A loss in ductility accompanied by an increase in hardness and strength that occurs when low-carbon steel (especially rimmed or capped steel) is aged following plastic deformation. The degree of embrittlement is a function of aging time and temperature, occurring in a matter of minutes at about 200 °C (400 °F), but requiring a few hours to a year at room temperature.

Strain Aging

Aging induced by cold working.

Strain Hardening

An increase in hardness and strength caused by plastic deformation at temperatures below the recrystallization range.

Strain Rate

The time rate of straining for the usual tensile test. Strain as measured directly on the specimen gage length is used for determining strain rate. Because strain is dimensionless, the units of strain rate are reciprocal time.

Stratification

The existence or formation of distinct layers in a body of water identified by thermal or salinity characteristics or by differences in oxygen or nutrient content.

Stratigraphy

The study of original succession and age of sub-surface layers; dealing with their form, distribution, com position, and physical and chemical properties.

Stratosphere

The portion of the atmosphere that is 10–25 miles above the earth's surface.

Stray Current

Current flowing through paths other than the intended circuit.

Stray-Current Corrosion

Stray-current corrosion differs from other forms in that the source of the current causing the corrosion is external to the affected equipment. This cause of metal deterioration is frequently misdiagnosed. Stray-current corrosion can cause local metal loss in buried or submerged metal structures, but it occurs much less frequently in underwater transporting equipment than in underground structures. Stray-current corrosion is almost always associated with direct current. At the anodic areas, metal goes into solution and the electrolyte tends to become acidic. It is most commonly encountered in soils containing water.

Stream

Also variously referred to as River; or Water Course. It is the path of the main flow of surface water along its extent. Stream is a general term for a body of flowing water; natural water course containing water at least part of the year. In hydrology, it is generally applied to the water

flowing in a natural channel as distinct from a canal.

Stream Flow

The water discharge that occurs in a natural channel. A more general term than runoff, stream flow may be applied to discharge whether or not it is affected by diversion or regulation.

Stream Lag

The number of days between water release from a weir and its availability in a given water section. In the WOU software Stream Lag is a number in the range 0–30 inclusive.

Stream Order

The physical sequence of Licensed Works along a Stream. Stream Orders are unique for a licence and catchment code and are in increasing order from the most upstream. This is an important piece of information for authorised officers of State Water to enable them to plan their activities.

Stream Section (River Section)

A portion of a (usually) Regulated Stream which is controlled by artificial means, such as between two Weirs for instance. It often—but not necessarily—correlates to a Metering Section. It is a fundamental entity within River Operations. Also referred to as River Section.

Stream Buffers (Riparian Buffers)

The zones of variable width which are located along both sides of a stream and are designed to provide a protective natural area along a stream corridor.

Stress

The intensity of the internally distributed forces or components of forces that resist a change in the volume or shape of a material that is or has been subjected to external forces. Stress is expressed in force per unit area and is calculated on the basis of the original dimensions of the cross section of the specimen. Stress can be either direct (tension or compression) or shear. See also RESIDUAL STRESS.

Stress Concentration Factor (K_t)

A multiplying factor for applied stress that allows for the presence of a structural discontinuity such as a notch or hole; K_t equals the ratio of the greatest stress in the region of the discontinuity to the nominal stress for the entire section. Also called theoretical stress concentration factor.

Stress Corrosion or Stress-Accelerated Corrosion

Corrosion which is accelerated by stress.

Stress Corrosion Cracking

Stress corrosion cracking is the result of the combined action of static stresses and corrosion. The static stresses may be residual or applied service stresses. The environment plays an important role in this type of cracking. The resulting cracks are branched, and can propagate either transgranularly or intergranularly, and sometimes both ways. Caustic cracking of steel is a case of stress corrosion cracking that is sometimes called caustic embrittlement. Generally speaking, it is not necessarily the concentration of the corrodent in the bulk environment that causes the cracking, but the increased concentration occurring in crevices or in alternately wetted and dried regions.

Stress-Intensity Factor

A scaling factor, usually denoted by the symbol K , used in linear-elastic fracture mechanics to describe the intensification of applied stress at the tip of a crack of known size and shape. At the onset of rapid crack propagation in any structure containing a crack, the factor is called the critical stress-intensity factor, or the fracture toughness. Various subscripts are used to denote different loading conditions or fracture toughnesses:

K_{Ic} . Plane-stress fracture toughness. The value of stress intensity at which crack propagation becomes rapid in sections thinner than those in which plane-strain conditions prevail.

K_{I} . Stress-intensity factor for a loading condition that displaced the crack faces in a direction normal to the crack plane (also known as the opening mode of deformation).

K_{Ic} . Plane-strain fracture toughness. The minimum value of K_{Ic} for any given material and condition, which is attained when rapid crack propagation in the opening mode is governed by plane-strain conditions.

K_{Id} . Dynamic fracture toughness. The fracture toughness determined under dynamic loading conditions; it is used as an approximation of K_{Ic} for very tough materials.

K_{ISCC} . Threshold stress-intensity factor for stress-corrosion cracking. The critical plane-strain stress intensity at the onset of stress-corrosion cracking under specified conditions.

K_Q . Provisional value for plane-strain fracture toughness.

K_{th} . Threshold stress intensity for stress-corrosion cracking. The critical stress intensity at the onset of stress-corrosion cracking under specified conditions.

DK . The range of the stress-intensity factor during a fatigue cycle.

Stress-Intensity Factor Range, DK

In fatigue, the variation in the stress-intensity factor in cycle, that is, $K_{max}-K_{min}$.

Stress Raisers

Changes in contour or discontinuities in structure that cause local increases in stress.

Stress Ratio, A or R

The algebraic ratio of two specified stress values in a stress cycle. Two commonly used stress ratios are: (1) the ratio of the alternating stress amplitude to the mean stress. $A = S_a / S_m$ and (2) the ratio of the minimum stress to the maximum stress. $R = S_{min} / S_{max}$.

Stress-Relief Cracking

Also called postweld heat treatment cracking, stress-relief cracking occurs when susceptible alloys are subjected to thermal stress relief after welding to reduce residual stresses and improve toughness. Stress-relief cracking occurs only in metals that can precipitation-harden during such elevated-temperature exposure; it usually occurs at stress raisers, is intergranular in nature, and is generally observed in the coarse-grained region of the weld heat-affected zone. See also COLD CRACKING, HOT CRACKING, and LAMELLAR TEARING.

Striation

A fatigue fracture feature, often observed in electron micrographs, that indicates the position of the crack front after each succeeding cycle of stress. The distance between striations indicates the advance of the crack front across that crystal during one stress cycle, and a line normal to the striation indicates the direction of local crack propagation. See also BEACH MARKS.

Strip Mining

Mining technique in which the land and vegetation covering the mineral being sought are stripped away by huge machines, usually damag-

ing the land severely and limiting subsequent uses.

Structural Degradation Hazard

The susceptibility of a soils structure to breakdown as a result of cultivation. Three categories are recognised:

High applies to a soil with a structure that readily degrades to a massive condition following cultivation.

Moderate applies to a soil with a structure that degrades to a massive condition after some years of continuous cultivation.

Low applies to a soil with a structure that resists degradation to a massive condition except after many years of continuous cultivation,

Structural Stability

The ability of a soil to maintain its structure under the influence of tillage, rainfall, trampling or other adverse forces, which tend to disintegrate such structure. Sometimes characterised in the laboratory by various wet and/or dry sieving techniques.

Structural Ramp

Ramp built of steel or wood, usually used for vehicle access; ramps made of soil or rock are not considered structural ramps.

Structureless

Group of soil structures recognized in the *Field Book for Describing and Sampling Soils* includes three subcategories that essentially have no structural units: single grain (entirely non-coherent; e.g. loose sand), massive (material is a coherent mass {not necessarily cemented}, no secondary pores), and massive - rock controlled fabric (coherent mass with the original rock fabric still identifiable).

Stud

Upright post in the framework of a wall to support an approved interior material such as gypsum wallboard.

Sublaterals

Sublaterals are sewer branches [min. 150 mm (6 inch) Diameter Nominal size] collecting effluents from catch basins and convey it to the laterals.

Submerged-Arc Welding

Metal-arc welding in which a bare wire electrode is used; the arc is enveloped in flux; some of which fuses to form a removable covering of slag on the weld.

Submerged Soil

Soil which is underwater or is freely seeping.

Submerged Weir

A weir that, when in use, has a water level on the downstream side at an elevation equal to, or higher than, the weir crest. The rate of discharge is affected by the tailwater. Also called a drowned weir.

Submergence

(1) The condition of a weir when the elevation of the water surface on the downstream side is equal to or higher than that of the weir crest. (2) The ratio, expressed as a percentage, of the height of the water surface downstream from a weir above the weir crest to the height of the water surface upstream above the weir crest. The distances

upstream or downstream from the crest at which such elevations are measured are important, but have not been standardized. (3) In water power engineering, the ratio of tailwater elevation to the headwater elevation when both are higher than the crest. The overflow crest of the structure is the datum of reference. The distances upstream or downstream from the crest at which headwater and tailwater elevations are measured are important, but have not been standardized. (4) The depth of flooding over a pump suction inlet.

Subsidence

A dropping of the land surface as a result of ground water being pumped. Cracks and fissures can appear in the land. Subsidence is virtually an irreversible process.

Subsiding/Subsidence

The downward settling of the Earth's crust relative to its surroundings.

Substation

An assembly of equipment for switching and/or changing or regulating the voltage electrical supply.

Substrate

The basic metal or non-metal whose surface is being protected.

Subsurface Corrosion

Formation of isolated particles of corrosion products beneath a metal surface. This results from the preferential reactions of certain alloy constituents to inward diffusion of oxygen, nitrogen, or sulfur.

Subsurface Drain

Underground conduit used to collect and convey surface or groundwater.

Subsurface Flow Wetland (SF)

A type of constructed wetland in which primarily treated waste flows through deep gravel or other porous substrate planted with wetland vegetation. The water is not exposed to the air, avoiding problems with odor and direct contact.

Subsurface Soil Absorption

A process that utilizes the soil to treat and dispose of effluent from a treatment works.

Substrate

(1) Substances used by organisms in liquid suspension. (2) The liquor in which activated sludge or other matter is kept in suspension.

Suction Head

(1) The head at the inlet to a pump. (2) The head below atmospheric pressure in a piping system.

Suction Lift

The vertical distance from the liquid surface in an open tank or reservoir to the center line of a pump drawing from the tank or reservoir and set higher than the liquid surface.

Suctoreans

Ciliates that are stalked in the adult stage and have rigid tentacles to catch prey.

Suggested Control Measure (SCM)

A model rule developed by air quality managers for local air districts to use to control the emissions from certain stationary sources of air pollution.

Sulfate Aerosols

Particulate matter that consists of compounds of sulfur formed by the interaction of sulfur dioxide and sulfur trioxide with other compounds in the atmosphere. Sulfate aerosols are injected into the atmosphere from the combustion of fossil fuels and the eruption of volcanoes like Mt. Pinatubo. Sulfate aerosols can lower the Earth's temperature by reflecting away solar radiation (negative radiative forcing). General Circulation Models which incorporate the effects of sulfate aerosols more accurately predict global temperature variations

Sulfate-Reducing Bacteria

Bacteria capable of assimilating oxygen from sulfate compounds, reducing them to sulfides. See also SULFUR BACTERIA.

Sulfidation

The reaction of a metal or alloy with a sulfur-containing species to produce a sulfur compound that forms on or beneath the surface on the metal or alloy.

Sulfide Stress Cracking

Brittle failure by cracking under the combined action of tensile stress and corrosion in the presence of water and hydrogen sulfide. See also ENVIRONMENTAL CRACKING.

Sulphur (S)

When fuel containing sulphur, such as coal and oil, is burnt, sulphur dioxide is formed. In the air, it is transformed into sulphuric acid. This is the most important cause of acidification in the soil and water. At the same time, sulphur is a vital substance, in small quantities, for living organisms.

Sulfur Bacteria

Bacteria capable of using dissolved sulfur compounds in their growth; bacteria deriving energy from sulfur or sulfur compounds.

Sulfur Cycle

A graphical presentation of the conservation of matter in nature showing the chemical transformation of sulfur through various stages of decomposition and assimilation. The various chemical forms of sulfur as it moves among living and nonliving matter is used to illustrate general biological principles that are applicable to wastewater and sludge treatment.

Sulfur Dioxide

A criteria air pollutant. Sulfur dioxide is a gas produced by burning coal, most notably in power plants. Some industrial processes, such as production of paper and smelting of metals, produce sulfur dioxide. Sulfur dioxide is closely related to sulfuric acid, a strong acid. Sulfur dioxide plays an important role in the production of acid rain.

Sulfur Hexafluoride (SF₆)

A colorless gas soluble in alcohol and ether, slightly soluble in water. A very powerful greenhouse gas used primarily in electrical transmission and distribution systems and as a dielectric in electronics. The global warming potential of SF₆ is 22,800.

Sulfur Oxides (SO_x)

Pungent, colorless gases formed primarily by the combustion of sulfur-containing fossil fuels, especially coal and oil. Considered major air pollutants, sulfur oxides may impact human health and damage vegetation.

Sump

A tank or pit that receives drainage and stores it temporarily, and from which the discharge is pumped or ejected.

Sump Pump

A mechanism used for removing water or wastewater from a sump or wet well; it may be energized by air, water, steam, or electric motor. Ejectors and submerged centrifugal pumps, either float or manually controlled, are often used for the purpose.

Supernatant

(1) The liquid remaining above a sediment or precipitate after sedimentation. (2) The most liquid stratum in a sludge digester.

Supersaturation

(1) An unstable condition of a vapor in which its density is greater than that normally in equilibrium under the given conditions. (2) The condition existing in a given space when it contains more water vapor than is needed to cause saturation; that is, when its temperature is below that required for condensation to take place. This condition probably can occur only when water or ice is immediately present, and when the space contains no dust or condensation nuclei. (3) An unstable condition of a solution in which it contains a solute at a concentration exceeding saturation.

Super Ultra Low Emission Vehicle (SULEV)

A vehicle that meets the ARB's super ultra-low emission vehicle standard of 0.03 grams per mile of NMOG+NOx. See our Drive Clean website.

Supplementary Allocation Licence

The Supplementary Allocation Licence (SAL) is provided in the Water Sharing Plan and provides for water taken during supplementary events. You can't apply for an SAL, and if you don't have one, any water you take during a supplementary event will be deducted from your Usage Approval.

Supplementary Announcement

See ALLOCATION ANNOUNCEMENT. This is the basis upon which the Initial Water Allocation Announcement at the beginning of the Water Year is supplemented by additional Announcements during the Water Year.

Supplementary Event

A Supplementary Event is an event that temporarily changes water regulation and use in one or more sections of a stream. Supplementary Events include flooding (the most common supplementary event), tributary inflows and increases in flow due to spillage of storage. If a Supplementary Event occurs it may be declared for a period of days over one or more sections. When licence holders take water under these circumstances it is deducted from their Supplementary Access Licence (SAL) account. They are charged for the volume they pump, but their allocation is not affected.

Supplementary Water Access Licence

Holders of supplementary access licences are able to extract water during announced periods when flows exceed those required to meet other licensed obligations and environmental needs. This is typically during periods when the dam is spilling or as a result of high tributary inflows downstream of the dam. Replaces access to 'off-allocation' water and access under Special Additional Licences and High Flow Authorities.

Supplementary Water Account

Similar to the water account but only applicable to supplementary licenses (off allocation water). High Security licences, Domestic & Stock licences, and Local Water Utility licences do not have access to Supplementary water.

Supply Capability

The rate at which water can be supplied to a section of a water source after satisfying the environmental water provisions and the requirements for water to satisfy basic landholder rights.

Supply Water

Water, which usually has been treated, that passes into a distribution network or a service reservoir.

Support System

Structure such as underpinning, bracing, or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

Suppressed Weir

A weir with one or both sides flush with the channel of approach. This prevents contraction of the nappe adjacent to the flush side. The suppression may occur on one end or both ends.

Surcharge

The temporary increase in the level of water in a channel or storage caused by rapid inflow in excess of spillway capacity. It may also refer to an increase in loading on any structure, brought about by increased water pressure or other temporary load change.

Surface Aeration

The absorption of air through the surface of a liquid.

Surface Barrier Ratio

The ratio of the distance between successive surface barriers (Ds) to the height of the barriers (H), used in the planning of wind erosion control. A high ratio implies poor erosion control and a low ratio good erosion control. The CRITICAL SURFACE BARRIER RATIO is the ratio at which the arrangement of barriers just prevents the movement of erodible tractions by wind.

Surface Detention

The depth of water temporarily held on the land surface while moving freely downslope, before being transferred to the category of infiltration, channel or depression storage.

Surface Diversion

Natural or constructed drainage feature used to divert runoff and/or collect runoff and direct it to an effective outlet.

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 under-loaded. Also called overflow rate.

Surface Overflow Rate

A design criterion used for sizing clarifiers; typically expressed as the flow volume per unit amount of clarifier space ($\text{m}^3/\text{m}^2\cdot\text{s}$ [gpd/sq ft]).

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.

Surface Sealing (Soil Crusting)

The orientation and packing of dispersed soil particles in the immediate surface layer of the soil, rendering it relatively impermeable to water. Typically occurs due to the effect of raindrop impact on bare soil and results in a reduction in infiltration. Runoff and the potential for soil erosion are thus increased, and a crust may form on drying out. However, surface sealing can be an important factor in reducing wind erosion, as the seal tends to resist removal of soil particles by wind action.

Surface Tension

The attraction of molecules to each other on a liquid's surface. Thus, a barrier is created between the air and the liquid.

Surface Treatment

Any suitable means of cleaning and treating a surface that will result in the desired surface profile and cleanliness and the required coating characteristics.

Surface Water

Surface water is natural rain water from the ground surface, paved areas and roofs plus occasional courtyard and car washing wastewaters and incidental fire fighting water. Water that is on the Earth's surface, such as in a stream, river, lake, or reservoir.

Surfactant

Abbreviation for surface-active agent. The active agent in detergents that possesses a high cleaning ability. surfactant is a surface-active agent, such as ABS or LAS, that concentrates at interfaces, forms micelles, increases solution, lowers surface tension, increases adsorption, and may decrease flocculation. A surface-active agent; usually an organic compound whose molecules contain a hydrophilic group at one end and a lipophilic group at the other.

Surge

(1) A momentary increase in flow (in an open conduit) or pressure (in a closed conduit) that passes longitudinally along the conduit, usually because of sudden changes in velocity or quantity. (2) Any periodic, usually abrupt, change in flow, temperature, pH, concentration, or similar factor.

Surge Suppressor

A device used in connection with automatic control of pumps to minimize surges in a pipeline.

Surge Tank

A tank or chamber located at or near a hydroelectric powerhouse and connected with the penstock above the turbine. When the flow of water delivered to the turbine is suddenly decreased, the tank absorbs the water that is held back and cushions the increased pressure on the penstock caused by the rapid deceleration of the water flowing in it; also, when the flow delivered to the turbine is suddenly increased, the tank supplies the increased quantity of water required until the flow in the penstock has been accelerated sufficiently. Also used in connection with pumping systems.

Survey, Construction

Survey used to locate structures and provide required elevation points during their construction.

Survey, Land

Plane survey made for locating property lines, subdividing land into smaller parts, and determining land areas and other information involving the transfer of land from one owner to another; also known as a property survey, boundary survey, or cadastral survey.

Survey, Topographic

Survey made for locating objects and measuring the relief, roughness, or three-dimensional variations of the earth's surface; detailed information is obtained pertaining to elevations as well as to the locations of manmade and natural features (buildings, roads, streams, etc).

Surveying

Determining the dimensions and contour (or three-dimensional characteristics) of the earth's surface by the measurement of distances, direc-

tions and elevations. The collection of data by measurement of relative heights and distances needed for determining the boundaries, size, position, shape and/or contour of land.

In a soil conservation context, surveying is undertaken to enable the drafting of maps and plans on which soil conservation measures are shown.

Susceptibility to Separation (STS) Number

STS number is the oil contents in parts per million, of the suspend water after the specified settling period.

Suspended-Growth Process

Configuration wherein the microorganisms responsible for treatment are maintained in suspension within a liquid.

Suspended Matter

(1) Solids in suspension in water, wastewater, or effluent. (2) Solids in suspension that can be readily removed by standard filtering procedures in a laboratory.

Suspended Sediment

Very fine soil particles that remain in suspension in water for a considerable period of time without contact with the bottom. Such material remains in suspension due to the upward components of turbulence and currents and/or by suspension.

Suspended-Sediment Concentration

The ratio of the mass of dry sediment in a water-sediment mixture to the mass of the water-sediment mixture. Typically expressed in

milligrams of dry sediment per liter of water-sediment mixture.

Suspended-Sediment Discharge

The quantity of suspended sediment passing a point in a stream over a specified period of time. When expressed in tons per day, it is computed by multiplying water discharge (in cubic feet per second) by the suspended-sediment concentration (in milligrams per liter) and by the factor 0.0027.

Suspended Solids

Solids physically suspended in sewage that can be removed by proper laboratory filtering. Suspended solids is (1) Insoluble solids that either float on the surface of, or are in suspension in, water, wastewater, or other liquids. (2) Solid organic or inorganic particles (colloidal, dispersed, coagulated, or flocculated) physically held in suspension by agitation or flow. (3) The quantity of material removed from wastewater in a laboratory test, as prescribed in Standard Methods and referred to as nonfilterable residue.

Suspended Solids (SS) in sewage

Solid in suspension in sewage liquors as measured by filtration either through a glass fiber filter paper followed by washing and drying at 105 °C, or by centrifuging followed by washing and removal of the supernatant liquid.

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 two-phase system in which one phase, known as the “dispersed medium”, is distributed throughout the other, known as the “dispersion medium”. Particle movement in water or air where particles are kept dispersed by fluid motion in currents, by turbulence and/or by molecular motion of the surrounding medium. With respect to wind action, suspension involves the finer soil particles, which are commonly detached by saltation, and are lifted into the air and carried away as dust. Particles thus moved are usually less than 0.1 mm.

Sustainable Communities

Communities capable of maintaining their present levels of growth without damaging effects.

Sustainable Development

Sustainable development implies economic growth together with the protection of environmental quality, each reinforcing the other. The essence of this form of development is a stable relationship between human activities and the natural world, which does not diminish the prospects for future generations to enjoy a quality of life at least as good as our own.

Swale

Natural or constructed elongated, sloped depressional drainage feature used to collect runoff and direct the flow to an effective outlet to prevent runoff downslope; often used in conjunction with a berm.

Swamp

Swamp is an area that is saturated with water for much of the time but in which soil surface is not deeply submerged.

Swamp Waters

Waters with low velocities and other natural characteristics that differ from other surface waters.

Swing Ties

Distance from two fixed points to locate a system component.

Switchboard

A large panel or assembly of panels on which switches, overcurrent, and/or other protective devices such as buses and instruments are mounted. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets.

Symbiosis

Symbiosis is the living together in more or less close association of two dissimilar organisms, in which one or both derive benefit from the relationship.

Synergism

Interaction between two entities producing an effect greater than a simple additive one. See also ANTAGONISM.

Synthetic Minor Permit

A permit with practically, enforceable conditions issued to a facility. These conditions limit the amount of regulated pollutant emissions so the permitted amount of actual emissions from the

facility is below potential major source emission levels. These major source thresholds are usually 100 tons per year under Title V, 50 tons per year VOC/NO in the nonattainment area for ozone; 100/250 tons per year for P.D; 10 tons per year for a single hazardous air pollutant; 25 tons per year for a combination of all hazardous air pollutants; and 50 tons per year for a new source review.

System

Assembly of components and processes.

T

Tabulated Data

Information displayed in tables and charts, approved by a registered professional engineer, and used to design and construct a protective system.

Tafel Line, Tafel Slope, Tafel Diagram

An electrode when polarized frequently yields a current potential relationship over a region which can be approximated by:

$$H = \pm B \log(i/i_0)$$

where h = change in open circuit potential, i = the current density, B and i_0 = constants. B is known as the Tafel Slope.

If this behavior is observed a plot of the semi-logarithmic components is known as the Tafel line and the diagram is called the Tafel diagram.

Tafel Slope

The slope of the linear portion of a plot of potential versus the log of the current density for a particular electrode in a corroding system.

Take-off

Activities related to preparing to bid a system installation including reading blueprints and specifications; making notes of special details concerning the project after gathering the necessary information; and estimating the quantities of labor, materials, equipment and special items needed to complete the job.

Tank

An artificial container in which liquids are held or detained. Watertight structure or container used to hold wastewater for such purposes as aeration, equalization, holding, sedimentation, treatment, mixing, dilution, or addition of chemicals, or disinfection.

Tank, Cargo

Enclosed space (tank) mounted on a truck, trailer, or skid which is intended to receive and contain material for transport from the source facility to the receiving facility.

Tank, Dosing

Tank or compartment which provides storage of effluent and contains a device (pump or siphon) and associated appurtenances used to convey effluent to another pretreatment process or a final treatment and dispersal component.

Tank, Flow Equalization

Dosing tank that provides storage of effluent and uses timed dosing to allow for uniform delivery to a subsequent component over time, usually a day or more; *also known as a surge tank.*

Tank, Holding

(1) Watertight receptacle for the collection and holding of wastewater; (2) Sewage tank in a recreational vehicle, motor coach, trailer, camper, or boat, whether mobile or stationary.

Tank, Processing

Term applied to a septic tank when it is configured to receive a combination of raw sewage and recirculated effluent in order to enhance nitrogen removal.

Tank, Pump

Dosing tank which provides storage of effluent and houses a pump and associated appurtenances used to convey effluent to another pretreatment process or a final treatment and dispersal component.

Tank, Recirculation

Dosing tank that mixes effluent from two or more components within the treatment train and allows a portion of partially treated effluent to pass through one or more treatment components again.

Tank, Septic

Water-tight, covered receptacle for treatment of sewage; receives the discharge of sewage from a building, separates settleable and floating solids from the liquid, digests organic matter by anaerobic bacterial action, stores digested solids through a period of detention, allows clarified liquids to discharge for additional treatment and final dispersal, and attenuates flows.

Tank, Siphon

Dosing tank or compartment which provides storage of effluent, and contains a siphon to convey effluent from the tank to another pretreatment process or to a final treatment and dispersal component.

Tank Capacity

(1) Regarding a septic tank, volume in gallons as measured from the bottom of the tank to the invert of the outlet piping; (2) regarding a dosing tank, volume as measured from the bottom of the tank to the invert of the inlet.

Tap Water

Drinking water monitored (and often filtered) for protection against contamination and available for public consumption from sources within the home.

Tapered Aeration

The method of supplying varying quantities of air into the different parts of an aeration tank in the activated-sludge process, more at the inlet, less near the outlet, in approximate proportion to the oxygen demand of the mixed liquor under aeration.

Tarnish

Surface discoloration of a metal caused by formation of a thin film of corrosion product.

Technical Integrity

The state of a system which exists when, under specified operating conditions, there is no foreseeable risk of its failure endangering people, the environment or asset value.

Tee

A pipe fitting, either cast or wrought, that has one side outlet at right angles to the run. A single-outlet branch pipe.

Temper

(1) In heat treatment, to reheat hardened steel or hardened cast iron to some temperature below the eutectoid temperature for the purpose of decreasing hardness and increasing toughness. The process is also sometimes applied to normalized steel. (2) In tool steels, temper is sometimes inadvisably used to denote carbon content. (3) In nonferrous alloys and in some ferrous alloys (steels that cannot be hardened by heat treatment), the hardness and strength produced by mechanical or thermal treatment, or both, and characterized by a certain structure, mechanical properties. Or reduction of area during cold working.

Temper Color

A thin, tightly adhering oxide skin (only a few molecules thick) that forms when steel is tempered at a low temperature, or for a short time, in air or a mildly oxidizing atmosphere. The color, which ranges from straw to blue depending on the thickness of the oxide skin, varies with both tempering time and temperature.

Tempered Martensite Embrittlement

Embrittlement of ultra high-strength steels caused by tempering in the temperature range of 205–400 °C (400–750 °F); also called 350 °C or 500 °F embrittlement. Tempered martensite embrittlement is thought to result from the combined effects of cementite precipitation on prior-austenite grain boundaries or interlath boundaries and the segregation of impurities at prior-austenite grain boundaries.

Temper Embrittlement

Embrittlement of alloy steels caused by holding within or cooling slowly through a temperature range just below the transformation range. Embrittlement is the result of the segregation at grain boundaries of impurities such as arsenic, antimony, phosphorus, and tin; it is usually manifested as an upward shift in ductile-to-brittle transition temperature. Temper embrittlement can be reversed by retempering above the critical temperature range, then cooling rapidly.

Tempering

To reheat hardened steel or hardened cast Iron to some temperature below the eutectoid temperature for the purpose of decreasing hardness and increasing toughness.

Temperature

(1) The thermal state of a substance with respect to its ability to transmit heat to its environment. (2) The measure of the thermal state on some arbitrarily chosen numerical scale. See also CELSIUS, CENTIGRADE, FAHRENHEIT.

Temperature Controller

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

Temperature Inversion

One of the weather conditions that are often associated with serious smog episodes in some portions of the country. In a temperature inversion, air does not rise because it is trapped near the ground by a layer of warmer air above it. Pollutants, especially smog and smog-forming chemicals, including volatile organic compounds, are trapped close to the ground. As people continue driving, and sources other than motor vehicles continue to release smog-forming pollutants into the air, the smog level keeps getting worse.

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.

Temporary Hardness

Hardness that can be removed by boiling; more properly called carbonate hardness. See also CARBONATE HARDNESS, HARDNESS.

Tensile Strength

In tensile testing, the ratio of maximum load to original cross-sectional area. Also called ultimate tensile strength.

Tensile Stress

A stress that causes two parts of an elastic body on either side of a typical stress plane, to pull apart. Contrast with *compressive stress*.

Tension

The force or load that produces elongation.

TEOM

The tapered element oscillating microbalance (TEOM) is used to continuously measure particulate concentrations. It measures the mass collected on an exchangeable filter cartridge by monitoring the corresponding frequency changes of a tapered element. The sample flow passes through the filter, where particulate matter collects, and then continues through the hollow tapered element on its way to an electronic flow control system and vacuum pump. A principal concern with the TEOM instrument is that the filter is held at an elevated temperature (50 °C) in order to minimise errors associated with the evaporation and condensation of water vapour. This can lead to the loss of the more volatile species and has led to the identification of differences between TEOM and gravimetric measurements at co-located sites. In the past, a factor of 1.3 was applied to all TEOM-measured concentrations to estimate the gravimetric equivalent. Now, the Volatile Correction Method (VCM) uses measurements of volatile particulate matter made by nearby FDMS instruments to correct TEOM measurements for the loss of such volatile material. The corrected measurements have been demonstrated to be equivalent to the gravimetric reference equivalent.

Terminal Velocity

The final steady-state velocity of falling raindrops before they hit the soil surface.

Terne

An alloy of lead containing 3–15% Sn, used as a *hot dip coating* for steel sheet or plate. Terne coatings, which are smooth and dull in appearance, give the steel better corrosion resistance and enhance its ability to be formed, soldered, or painted.

Terne Plate

Deposition of lead-tin alloy on iron or steel sheets by the hot dip process.

Terrain

A tract of land having particular physical features. When classifying terrain various features may be selected depending on the purpose of the classification. For example, if process is important the terrain may be described as alluvial, colluvial or aeolian; if shape is important the terrain may be described as flat, gently sloping, undulating, hilly or mountainous. When evaluating terrain the aim is to subdivide the features such that each subdivision is essentially homogenous with respect to the properties of the critical attributes relevant to the purpose of the evaluation. For example, the PUCE, (Pattern Unit-Component-Evaluation) Program for Terrain Evaluation for Engineering Purposes identifies attributes related to feasibility or planning studies in open countryside.

Under the PUCE program a study area is divided into terrain provinces (areas of constant geology), thence terrain patterns (areas of recurring topography, soil associations and natural vegetation formations) and finally terrain units (areas containing a single topographic feature which has a characteristic soil association and natural vegetation formation).

Subsequently, detailed evaluation for design and construction purposes identifies terrain components. These are the basic units of the evaluation and each is homogenous with respect to slope (constant rates of change of curvature), underlying lithology, consistent association of soils (such that each layer can be expressed within one class of the USOS. and the whole profile within one class of a subdivision of the primary profile form), and consistent vegetation association.

Terrain classification and terrain evaluation do not aim to answer specific questions at specific sites; rather, each gives a probability of the occurrence of particular sets of conditions at particular sites.

Terrestrial

Terrestrial is that which is of, or related to the land.

Tertiary Effluent

The liquid portion of wastewater leaving tertiary treatment.

Tertiary Treatment

Any process of water renovation that upgrades treated wastewater to meet specific reuse requirements. May include general clean-up 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." tertiary treatment is the treatment of wastewater beyond the secondary or biological stage; term normally implies the removal of nutrients, such as phosphorus and nitrogen, and a high percentage of suspended solids; term now being replaced by advanced waste treatment. See also ADVANCED WASTE TREATMENT.

Tertiary Treatments (Effluent Polishing)

A furtherer stage of treating sewage by removing suspended solids. Consequential removal of residual BOD may occur. The use of filtration to remove microscopic particles from wastewater that has already been treated to a Secondary Level.

Tertiary Waste Treatment

Following secondary treatment, the clarified effluent may require additional aeration and/or other chemical treatment to destroy bacteria remaining from the secondary treating stage, and to increase the content of dissolved oxygen

needed for oxidation of the residual BOD. Tertiary treatment can also be used to remove nitrogen and phosphorous.

Tertiary Wastewater Treatment

Selected biological, physical, and chemical separation processes to remove organic and inorganic substances that resist conventional treatment practices; the additional treatment of effluent beyond that of primary and secondary treatment methods to obtain a very high quality of effluent. The complete wastewater treatment process typically involves a three-phase process: (1) First, in the primary wastewater treatment process, which incorporates physical aspects, untreated water is passed through a series of screens to remove solid wastes; (2) Second, in the secondary wastewater treatment process, typically involving biological and chemical processes, screened wastewater is then passed a series of holding and aeration tanks and ponds; and (3) Third, the tertiary wastewater treatment process consists of flocculation basins, clarifiers, filters, and chlorine basins or ozone or ultraviolet radiation processes.

Tertiary Wastewater Treatment (Advanced)

Biological or chemical polishing of wastewater to remove organics, solids and nutrients. Tertiary wastewater effluent limits are generally 10 mg/L BOD₅ and 10 mg/L TSS.

Test Flow

The gas flow rate through a separator during a rig test or a site test. This flow, which can differ from the rated flow, shall be specified or, failing this, agreed between the interested parties.

Thermal Bar

A temperature effect that may occur as a water body warms in spring or cools in fall. When higher temperature water becomes “trapped” in an inshore zone this is known as the thermal bar. Characteristics of the thermal bar include reduced mixing with offshore waters and dominant long-shore currents. These characteristics may temporarily affect the behaviour of an effluent plume and lengthen the time required to achieve effective mixing in the receiving water.

Thermal Break or Barrier

A non-metallic material positioned between metallic components of windows to prevent a direct path of heat loss through thermal conduction.

Thermal Barrier

A material applied over spray foam Insulation designed to slow the temperature rise of the foam during a fire situation and delay its involvement in the fire.

Thermal Bridge

A thermally conductive material which penetrates or bypasses an insulation system; such as a metal fastener or stud.

Thermal conductivity

The thermal transmission through unit area of a slab of a uniform material of unit thickness when unit difference of temperature is established between its faces [$W/(mK)$].

Thermal Cutting

The parting or shaping of materials by the application of heat with or without a stream of cutting oxygen.

Thermal Electromotive Force

The *electromotive force* generated in a circuit containing two dissimilar metals when one junction is at a temperature different from that of the other. See also THERMOCOUPLE.

Thermal Embrittlement

Intergranular fracture of maraging steels with decreased toughness resulting from improper processing after hot working. Thermal embrittlement occurs upon heating above 1095 °C (2000 °F) and then slow cooling through the temperature range of 815–980 °C (1300–1800 °F), and has been attributed to precipitation of titanium carbides and titanium carbonitrides at austenite grain boundaries during cooling through the critical temperature range.

Thermal Expansion

The increase in volume (and decrease in density) that results from warming water. A warming of the ocean leads to an expansion of the ocean volume, which leads to an increase in sea level.

Thermal Insulation

A material or system that has the property of resisting the transfer of heat.

Insulation applicable within the general temperature range of 300–1800 °F.

Thermal Insulation System

Applied or installed thermal insulation complete with including any accessories, vapor retarder, and facing required.

Thermal Pollution

A reduction in water quality caused by increasing its temperature, often due to disposal of waste heat from industrial or power generation processes. Thermally polluted water can harm the environment because plants and animals can have a hard time adapting to it.

Thermal Resistance (R)

An index of a material's resistance to heat flow. See R and RSI.

Thermal Shock

A building materials reaction to rapid changes in temperature.

Thermal Spraying

A process in which metallic or nonmetallic materials are heated to a molten or nearly molten state and are sprayed onto a surface to form a coating. The material may originate in the form of powder, rod, or wire before it is heated, prior to spraying and deposition. Materials can be heated by combustion of fuel gases (similar to welding) or by using electricity. Thermal spraying includes processes such as flame spraying, plasma spraying, high velocity oxyfuel (HVOF) spraying and twin wire electric arc spraying. A group of coating or welding processes in which finely divided metallic or nonmetallic materials are deposited in a molten or semimolten condition to form a coating. The coating material may be in the form of powder, ceramic rod, wire, or molten materials.

Thermal Stratification

The formation of layers of different temperatures in bodies of water.

Thermocline

The layer in a thermally stratified body of water in which the temperature gradient is at a maximum. The region in a body of water which separates warmer, oxygen-rich surface water from cold, oxygen-poor deep water, and in which temperature decreases rapidly with depth.

Thermocouple

A device for measuring temperatures, consisting of lengths of two dissimilar metals or alloys that are electrically joined at one end and connected to a voltage-measuring instrument at the other end. When one junction is hotter than the other, a *thermal electromotive force* is produced that is roughly proportional to the difference in temperature between the hot and cold junctions.

Thermodynamics

A branch of science within physics which deals with the conformity of energy and material consumption in different processes.

(1) The first principle of thermodynamics states that energy and material can be neither newly produced nor consumed. On the other hand, energy can be transformed from one form to another. Kinetic energy can, for example, be converted into electrical energy which can then be transformed into thermal energy.

(2) The second principle of thermodynamics states that disorder, entropy, increases in a closed system. Expressed in another way, this means that everything displays a tendency to spread on its own. It is possible to recreate order from disorder locally by supplying energy, but the problem is that there is always further increase in disorder somewhere else in the system.

Thermoelectric Power Water Use

Water used in the process of the generation of thermoelectric power. Power plants that burn coal and oil are examples of thermoelectric-power facilities.

Thermo-galvanic Corrosion

Corrosion resulting from an *electrochemical cell* caused by a thermal gradient.

Thermography

A building energy diagnostic technique using an infrared camera for locating areas of temperature differential in a building.

Thermohaline Circulation

Large-scale density-driven circulation in the ocean, caused by differences in temperature and salinity. In the North Atlantic the thermohaline circulation consists of warm surface water flowing northward and cold deep water flowing southward, resulting in a net poleward transport of heat. The surface water sinks in highly restricted sinking regions located in high latitudes.

Thermonuclear

The application of high heat, obtained via a fission explosion, to bring about fusion of light nuclei.

Thermophilic Digestion

Digestion occurring at a temperature approaching or within the thermophilic range, generally between 43 and 60 °C (110 and 140 °F).

Thermophilic Range

That temperature range most conducive to maintenance of optimum digestion by thermophilic bacteria, generally accepted as between 49 and 57 °C (120 and 135 °F). See also THERMOPHILIC DIGESTION.

Thermosphere

The outermost layer of the Earth's atmosphere extending from about 60 miles to several hundred miles above the planet's surface. The temperature of this layer varies from many hundreds to thousands of degrees Celsius.

Thermostat

Temperature sensitive control device that signals a heating or cooling system to operate if the temperature in the building reaches a preset limit.

Thickeners

Any equipment or process, after gravity sedimentation, that increases the concentration of solids in sludges with or without the use of chemical flocculents.

Threshold Stress

Threshold stress for *stress-corrosion-cracking*. The critical gross section stress at the onset of stress-corrosion cracking under specified conditions.

Threatened Species

Species of flora or fauna likely to become endangered within the foreseeable future.

Threshold Limit Values (TLVs)

Refer to air borne concentration of substances and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse health effects. Refers to maximum concentration of substances which could be discharged in wastewater issued by the national standard of environmental protection agency for industrial waste.

Threshold Odor

The minimum odor of the water sample that can barely be detected after successive dilutions with odorless water. Also called odor threshold.

Threshold Odor Number

The greatest dilution of a sample with odor-free water that yields a definitely perceptible odor.

Threshold Velocity

The wind velocity at which saltation is initiated.

Throwing Power

The relationship between the current density at a point on a surface and its distance from the counter electrode. The greater the ratio of the surface resistivity shown by the electrode reaction to the volume resistivity of the electrolyte, the better is the throwing power of the process. The ability of a plating solution to produce a uniform metal distribution on an irregularly shaped cathode.

Thickening

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

TIG-Welding

Tungsten Inert-Gas arc welding using a non-consumable electrode of pure or activated tungsten.

Thrust Block

Rough pore of concrete installed on the outside of an angled fitting (tee, cross, elbow or valve) that extends back to the native soil to provide a greater bearing surface and prevent loosening of joints due to stress created in pressurized applications.

Tidal Marsh

Tidal marsh is a low, flat, marshland traversed by inter laced channels and subject to tidal inundation. The only vegetation present is halo-tolerant bushes and grasses.

Tidal Saltwater

Tidal waters that generally have a natural chloride ion content in excess of 500 parts per million; includes all waters assigned S classifications by the Environmental Management Commission.

Tillage

The mechanical preparation of the soil to facilitate the growth of a crop or pasture, through the principal functions of seedbed preparation and weed control, It involves the rearrangement of the entire topsoil structure. Tillage is undertaken by various types of ploughs, scarifiers, cultivators, harrows or weeders. The use of drills for sowing is not generally regarded as tillage, although the soil is given a full cultivation when a combine drill or air seeder is used. PRIMARY TILLAGE constitutes the initial major soil working preceding a new crop or pasture. SECONDARY TILLAGE refers to subsequent tillage operations used for weed control or to refine soil conditions before sowing.

Tillage Depth

The vertical distance from the initial soil surface to the lowest point of penetration of a tillage implement during tillage.

Tillage Tool

An individual soil working element such as a point, share, sweep, coulter or blade.

Timber

Logged wood sold as a commodity.

Time and Event Meters

Primary Meters which record Time and Date water is taken, as well as the volume taken. Can usually be read remotely through telemetry.

Time of Concentration

The shortest time necessary for all points on a catchment area to contribute simultaneously to flow past a specified point. It is equivalent to the time required for runoff to 110w from the most remote part of the catchment to the specified point, normally the catchment outlet. The time of concentration is used to calculate the peak discharge for a catchment by using the rational formula. This formula assumes that the peak discharge will be caused by a storm of duration equal to the time of concentration for the catchment. Time of concentration is determined by either of two methods, depending on the presence or absence of significant runoff diversions within the catchment.

Timer

Controller for automatically starting and/or stopping a device at a given interval.

Timer Enable

Operating parameter that allows pump operation via a specified Schedule.

Tine (Shank)

That part of a tillage implement that extends downwards from the frame and to which the tillage tools are attached. The tine may be a single

rigid member, or one which hinges or deflects when its breakout force is exceeded. This tatter facility has resulted in the development of shear-bolt, spring release, hydraulic, stump-jump, coil and spring tines.

Tinning

Coating metal with a very thin layer of molten solder or brazing filler metal.

Title III

A section of the 1990 amendments to the federal Clean Air Act that deals with the control of toxic air emissions.

Title V

A section of the 1990 modifications to the federal Clean Air Act that requires a federally enforceable operating permit for major sources of air pollution.

Titration

The determination of a constituent in a known volume of solution by the measured addition of a solution of known strength to completion of the reaction as signalled by observation of an end point.

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.

TNT Equivalent

A measure of the energy released in the detonation of a nuclear weapon, expressed in terms of the quantity of TNT which would release the same amount of energy.

Toe Walls

Toe walls are raised curbs which control spillage and drainage of storm, process and fire water.

Toilet

Fixture used for defecation and urination.

Toilet, Chemical

Waterless toilet with a tank that contains a chemical to limit decomposition of non-water-carried human waste during storage prior to offsite treatment.

Toilet, Composting

Self-contained waterless toilet designed to decompose nonwater-carried human wastes through microbial action on a carbon source and store the resulting matter for further treatment and reuse/disposal.

Toilet, Flush

Toilet consisting of a bowl (for receiving human waste) and a waterflushing device.

Toilet, Pit

Self-contained waterless toilet used for disposal of non water-carried human waste; consists of a shelter built above a pit in the ground into which human waste falls.

Toilet, Vault

Waterless toilet mounted on a vented holding tank designed to store non-water-carried human waste prior to offsite treatment.

Toilet, Waterless

Toilet specifically designed to receive non-water-carried human waste; includes chemical, composting, pit, and vault toilets.

Tolerance

The ability of an organism to withstand exposure to a specific compound; a tolerance level may be defined as a period of exposure or a level of exposure (concentration) that is withstood.

TOMPS

Toxic organic micropollutants (TOMPs) are produced by the incomplete combustion of fuels. They comprise a complex range of chemicals some of which, although they are emitted in very small quantities, are highly toxic or carcinogenic. Compounds in this category include PAHs (Polycyclic Aromatic Hydrocarbons), PCBs (PolyChlorinated Biphenyls), Dioxins and Furans.

Top Water Level (TWL)

The maximum water level in a settlement tanks an aeration tank or a sludge storage tank.

Topography

The configuration of a surface, especially the earth's surface, including its relief and the position of its natural and man-made features. Physical features of the land surface including relative elevations and geometry.

Topsoil

That part of the soil profile, typically the A, horizon, containing material which is usually more fertile and better structured than underlying layers. When the A2 horizon also meets these criteria, it may be included. Topsoil is the most important part of the soil with respect to the growth of crops and pastures and its loss or degradation represents the most serious aspect of soil erosion, Its retention is particularly important in the revegetation of exposed batters or earthworks.

Torsion

A twisting deformation of a solid body about an axis in which lines that were initially parallel to the axis become helices.

Torsional Stress

The shear stress on a transverse cross section resulting from u twisting action.

Total Carbon (TC)

A quantitative measure of both total inorganic and total organic carbon as determined instrumentally by chemical oxidation to carbon dioxide and subsequent infrared detection in a carbon analyser. See also TOTAL ORGANIC CARBON.

Total Catchment Management

The management of land, water and other biophysical resources and activities, on a catchment basis. Its aim is to ensure:

- the continuing stability and productivity of the soils,
- the maintenance of an appropriate protective and productive vegetative cover, a satisfactory yield of water of high quality, and minimisation of adverse environmental effects due to

development. Such management is achieved by the coordination of policies and activities of relevant departments, authorities, companies and individuals who have responsibilities for the management of land within catchments.

Total Daily Extraction Limit (TDEL)

The volume of water that may be extracted under access licences from an unregulated river on a daily basis from a particular flow class.

Total Carbon

The sum of the *free carbon* and *combined carbon* (including carbon in solution) in a ferrous alloy.

Total Dissolved Solids

Total Dissolved Solids (TDS) is the combined total of all dissolved solids in wastewater, both organic and inorganic and very fine, such as colloidal minerals. Generally particles must be smaller than two micrometers to be considered a dissolved solid. For example, salt dissolved in water is a dissolved solid. Therefore TDS will “survive” screening or other coarse filtration. The sum of all dissolved solids (volatile and nonvolatile).

Total Dynamic Discharge Head

Total dynamic head plus the dynamic suction head or minus the dynamic suction lift.

Total Dynamic Head (TDH)

The difference between the elevation corresponding to the pressure at the discharge flange of a pump and the elevation corresponding to the vacuum or pressure at the suction flange of the pump, corrected to the same datum plane, plus

the velocity head at the discharge flange of the pump minus the velocity head at the suction flange of the pump.

Total Organic Carbon (TOC)

Measure of the concentration of organic carbon determined by oxidation of the organic matter into carbon dioxide (CO₂) typically expressed in mg/L.

Total Organic Gases (TOG)

Gaseous organic compounds, including reactive organic gases and relatively unreactive organic gases such as methane.

Total Head

(1) The sum of the pressure, velocity, and position heads above a datum. The height of the energy line above a datum. (2) The difference in elevation between the surface of the water at the source of supply and the elevation of the water at the outlet, plus velocity head and lost head. (3) The high distance of the energy line above the datum; energy head. (4) In open channel flow, the depth plus the velocity head.

Total Maximum Daily Load (TMDL)

The total waste (pollutant) loading from point and non-point sources that a water body can assimilate while still maintaining its water quality classification and standards.

The maximum amount of a pollutant that a water body can receive daily without violating water quality standards; includes best estimates of pollution from nonpoint sources, natural background sources, point sources, and a margin of safety; can also be defined as the strategy which is implemented to reduce or eliminate the impact of pollution.

Total Organic Carbon (TOC)

TOC is a measure of the amount of carbon in a sample originating from organic matter only. The test is run by burning the sample and measuring the CO₂ produced. The amount of carbon bound in organic compounds in a sample. Because all organic compounds have carbon as the common element, total organic carbon measurements provide a fundamental means of assessing the degree of organic pollution.

Total Oxygen Demand (TOD)

A quantitative measure of all oxidizable material in a sample water or wastewater as determined instrumentally by measuring the depletion of oxygen after high-temperature combustion. See also CHEMICAL OXYGEN DEMAND, TOTAL ORGANIC CARBON.

Total Pumping Head

The measure of the energy increase imparted to each pound of liquid as it is pumped, and therefore, the algebraic difference between the total discharge head and the total suction head.

Total Solids

The total amount of solids in solution and suspension. The sum of dissolved and suspended solid constituents in water or wastewater.

Total Suspended Particulates

Particles of solid and liquid matter suspended in air. TSP is collected on filtration media and analyzed by weight only. Particle sizes represented by the method are up to 100 Åµm in aerodynamic diameter.

Total Suspended Solids (TSS)

Concentration of all substances suspended in water (solids remaining after filtering of a water sample). The amount of insoluble solids floating and in suspension in the wastewater. Also referred to as total nonfilterable residue.

Toughness

The ability of a metal to absorb energy and deform plastically before fracturing.

Toxic

Means poisonous. Different substances have different toxic effects. Some, like dioxins, are toxic immediately and at very low doses. Others, like trace elements, are toxic in large doses and after long periods of storage in the body.

Toxic Air Pollutants

Air pollutants that may cause or contribute to an increase in mortality or in serious illness or which may pose a present or potential hazard to human health.

Toxic Air Contaminant (TAC)

An air pollutant, identified in regulation by the ARB, which may cause or contribute to an increase in deaths or in serious illness, or which may pose a present or potential hazard to human health. TACs are considered under a different regulatory process (California Health and Safety Code section 39650 et seq.) than pollutants subject to CAAQSs. Health effects to TACs may occur at extremely low levels and it is typically difficult to identify levels of exposure which do not produce adverse health effects.

Toxic Best Available Control Technology (TBACT)

Similar to BACT standards except applies to sources of toxic emissions. In many cases, it is the same as BACT. The standards are based on using the most up-to-date methods, systems, techniques, and production processes available to achieve the greatest feasible emission reductions. These are the most stringent requirements for new or modified sources and are determined on a case-by-case basis.

Toxic Emissions

Poisonous chemicals discharged to air, water, or land.

Toxic Event

Sudden introduction of a substance or substances that impair or destroy biological activity within a wastewater treatment process.

Toxic Hot Spot

A location where emissions from specific sources may expose individuals and population groups to elevated risks of adverse health effects—including but not limited to cancer—and contribute to the cumulative health risks of emissions from other sources in the area.

Toxic Pollutant

Pollutants or combinations of pollutants, including disease-causing agents, which after discharge and upon exposure, ingestion, inhalation or assimilation into any organism, either directly from the environment or indirectly by ingestion through food chains, will, on the basis of information available to the Administrator of EPA, cause death, disease, behavioural abnormalities, cancer, genetic mutations, physiological mal-

functions (including malfunctions in reproduction) or physical deformations, in such organisms or their offspring. Toxic pollutants also include those pollutants listed by the Administrator under CWA Section 307(a)(1) or any pollutant listed under Section 405(d) which relates to sludge management.

Toxic Release Inventory (TRI)

Database of toxic releases in the U.S. compiled from SARA Title III Section 313 reports.

Toxic Sites

Land contaminated with toxic pollution, usually unsuitable for human habitation.

Toxic Waste

Garbage or waste that can injure, poison, or harm living things, and is sometimes life-threatening.

Toxicant

A substance that kills or injures an organism through chemical, physical, or biological action; examples include cyanides, pesticides, and heavy metals.

Toxicity

The adverse effect that a biologically active substance has, at some concentration, on a living entity.

Toxicity

The characteristic of a soil relating to its content of elements or minerals which adversely affect plant growth. It is of particular concern in relation to acid soils. Soils with pH less than 5.0 may

give rise to manganese and aluminium toxicities which reduce plant growth and hence ground cover. It is also of concern in the rehabilitation of heavy metal mines, where toxic levels of such elements as copper, zinc and lead in mine tailings create difficulties in their revegetation.

Toxicity Test

A procedure to determine the toxicity of a chemical or an effluent using living organisms. A toxicity test measures the degree of effect on exposed test organisms of a specific chemical or effluent.

Toxic Wastes

Wastes that can cause an adverse response when they come in contact with a biological entity.

Trace Gas

Any one of the less common gases found in the Earth's atmosphere. Nitrogen, oxygen, and argon make up more than 99% of the Earth's atmosphere. Other gases, such as carbon dioxide, water vapor, methane, oxides of nitrogen, ozone, and ammonia, are considered trace gases. Although relatively unimportant in terms of their absolute volume, they have significant effects on the Earth's weather and climate.

Trace Nutrients

Substances vital to bacterial growth. Trace nutrients are defined in this text as nitrogen, phosphorus, and iron.

Trajectory Model

The trajectory model is used to predict episodes of photochemically generated pollutants in the summer, where long-range transport is an important factor in producing high UK concentrations.

It uses the output of numerical weather prediction models as its input, and predicts how air masses have been transported for the preceding 96 hours. These pathways are known as "back trajectories". The model uses a simplified chemical scheme to predict the formation of ozone as the air travels to the UK. Concentrations of the secondary particle contribution to PM10 are also predicted by this model.

Trace Organic Contaminants (TOrcs)

Organic compounds originating from residential and non-residential sources, such as ingredients in drugs, pesticides, consumer products, and industrial process agents (usually present in concentrations much lower than one mg/L) which may have adverse ecological and/or human health effects.

Transboundary Pollutants

Air pollution that travels from one jurisdiction to another, often crossing state or international boundaries. Also applies to water pollution.

Transfer Efficiency

For coatings, a measure of the percent of the total amount of coating used which is transferred to a unit surface by a spray gun or other device.

Transference

The movement of ions through the *electrolyte* associated with the passage of the electric current. Also called transport or migration.

Transformer

An electromagnetic device for changing the voltage of alternating current electricity.

Transgranular

Through or across crystals or grains. Also called intracrystalline or transcrystalline.

Transgranular Cracking

Cracking or fracturing that occurs through or across a crystal or grain. Also called transcrystalline cracking. Contrast with *intergranular cracking*.

Transgranular Fracture

Fracture through or across the crystals or grains of a metal. Also called transcrystalline fracture or intracrystalline fracture. Contrast with *intergranular fracture*.

Transition Metal

A metal in which the available electron energy levels are occupied in such way that the d-band contains less than its maximum number of ten electrons per atom, for example, iron, cobalt, nickel, and tungsten. The distinctive properties of the transition metals result from the incompletely filled d-levels.

Transition Temperature

(1) An arbitrarily defined temperature that lies within the temperature range in which metal fracture characteristics (as usually determined by tests of notched specimens) change rapidly, such as from primarily fibrous (shear) to primarily crystalline (cleavage) fracture. (2) Sometimes used to denote an arbitrarily defined temperature within a range in which the ductility changes rapidly with temperature.

Translucent Releases

Some portion of dam inflows are released coincidentally with their occurrence.

Transmissibility (Ground Water)

The capacity of a rock to transmit water under pressure. The coefficient of transmissibility is the rate of flow of water, at the prevailing water temperature, in gallons per day, through a vertical strip of the aquifer one foot wide, extending the full saturated height of the aquifer under a hydraulic gradient of 100%. A hydraulic gradient of 100% means a one foot drop in head in one foot of flow distance.

Transmission, Heat

The quantity of heat flowing through unit area due to all modes of heat transfer induced by the prevailing conditions.

Transparent Releases

All dam inflows are released coincidentally with their occurrence.

Transpassive region

The region of an *anodic polarization* curve, noble to and; above the passive *potential* range, in which there is a significant increase in current density (increased metal dissolution) as the potential becomes more positive (noble).

Transpassive State

(1) State of anodically passivated metal characterized by a considerable increase of the corrosion current, in the; absence of pitting, when the *potential* is increased. (2) The noble region of potential where an electrode exhibits at higher than passive current density.

Transpiration

Process by which water that is absorbed by plants, usually through the roots, is evaporated into the atmosphere from the plant surface, such as leaf pores.

Transport Refrigeration Unit (TRU)

Refrigeration systems powered by integral internal combustion engines designed to control the environment of temperature-sensitive products that are transported in trucks and refrigerated trailers. TRUs may be capable of both cooling and heating.

Transportation

That part of erosion processes in which detached soil or rock material is moved from one place to another. This may be accomplished by running water, rainfall, wind, gravity, ice action, or sub-surface seepage.

Transportation Control Measures (TCMs)

Strategies to reduce vehicle trips, vehicle use, vehicle miles traveled, vehicle idling or traffic congestion for the purpose of reducing motor vehicle emissions.

Trap

(1) A device used to prevent a material flowing or carried through a conduit from reversing its direction of flow or movement, or from passing a given point. (2) A device to prevent the escape of air from sewers through a plumbing fixture or catch basin.

Trash

Debris that may be removed from reservoirs, combined sewers, and storm sewers by coarse racks.

Trash Rack

A grid or screen placed across a waterway to catch floating debris.

Trash Trap

Optional first component of a wastewater treatment system, often used with a proprietary aerobic treatment unit (ATU), typically having a limited detention time, and used to remove larger items or inorganic material in the wastewater stream; trash traps also may provide a certain level of anaerobic treatment.

Treatability

How treatable a water sample is with a given substance.

Treated Sewage

Sewage that has received partial or complete treatment for the removal and mineralization of organic and other material.

Treatment

Method, technique, or process designed to remove solids and/or pollutants from wastewater.

Treatment, Aerobic

Digestion of organic matter in an environment containing molecular (or dissolved) oxygen (O₂).

Treatment, Advanced Secondary

Level of treatment that achieves 95% reduction in BOD and TSS, generally to levels below 10 mg/L.

Treatment, Anaerobic

Digestion of organic matter in an environment without molecular (or dissolved) oxygen (O₂).

Treatment, Biological

Process involving the metabolic activities of bacteria and other microorganisms in the breakdown of complex organic materials into simpler, more stable substances.

Treatment, Chemical

Process involving the addition of chemicals to obtain a desired result, such as precipitation, coagulation, flocculation, pH adjustment, disinfection, or sludge conditioning.

Treatment, Physical

Treatment which involves only physical means of solid-liquid separation, such as filtration, flotation, and sedimentation; chemical and biological reactions do not play an important role in physical treatment.

Treatment, Primary

Physical treatment processes involving removal of particles, typically by settling and flotation with or without the use of coagulants; (e.g. a grease interceptor or a septic tank provides primary treatment).

Treatment, Secondary

Biological and chemical treatment processes designed to remove organic matter; a typical standard for secondary effluent is BOD and TSS less than or equal to 20 mg/L each on a 30-day average basis.

Treatment, Tertiary

Advanced treatment of wastewater for enhanced organic matter removal, pathogen reduction, and nutrient removal; typical standards for

tertiary effluent vary according to regulatory requirements.

Treatment Train

Site-specific combination of components that make up a wastewater treatment system; a simple example of a treatment train is a septic tank and a soil treatment area.

Treatment Works

Any device or system used in the storage, treatment, disposal or reclamation of sewage and industrial wastes, including but not limited to pumping, power and other equipment and appurtenances, septic tanks and any works, including land, that are or will be an integral part of the treatment process or used for ultimate disposal of residues or effluent resulting from such treatment.

Trench

(1) Excavation with a width of 3 feet or less containing distribution media and one lateral; (2) Below-grade soil treatment area consisting of one or more trenches installed in an excavation such that the bottom of the infiltrative surface is typically 18–36 inches below original ground elevation; utilizes pressure or gravity distribution; a final cover of suitable soil stabilizes the completed installation, supports vegetative growth, and sheds runoff; (3) Excavation in the soil for drainage diversion; (4) excavation for placement of piping or installation of electrical wire or conduit.

Trench, Shallow

Trench installed in an excavation typically greater than 6 but less than 18 inches deep such that most of the entire infiltrative surface is below the original ground elevation; the orifices in the distribution piping are at or below original ground elevation.

Trench (Trench Excavation)

Narrow excavation (in relation to its length) made below the surface of the ground; in general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6 m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

Trencher

Machine that uses a chain with attached cutters to open a trench by cutting, removing, and depositing spoil to the side of the trench or onto a discharge conveyor.

Tributary

A stream or river that flows into a larger stream or river. A body of water that drains into another, usually larger, body of water.

Tributary Strategies

A state watershed initiative, Virginia's Tributary Strategy Program, which requires the development of strategies and written plans to restore water quality and living resources of the Chesapeake Bay and its tributaries.

Trickling Filter

An aerobic biological wastewater treatment process used as secondary treatment of sewage. Effluent from the primary clarifier is distributed over a bed of rocks. As the liquid trickles over the rocks, a biological growth on the rocks breaks down the organic matter in the sewage.

The effluent is then taken to a clarifier to remove biological matter coming from the filter. Trickling filter is secondary treatment process where wastewater trickles over rock or honey-combed-shaped plastic media. Biomass and slimes containing microorganisms form on the media and utilize the organic matter for growth and energy.

Tri-Halomethanes (THM)

Derivatives of methane (CH₄) in which three halogen atoms (chlorine, bromine, or iodine) are substituted for three of the hydrogen atoms.

Troposphere

The layer of the atmosphere nearest the earth's surface. The troposphere extends outward about 5 miles at the poles and 10 miles at the equator.

Trough

A structure, usually with a length several times its transverse dimensions, used to hold or transport water or other liquids.

Trout Waters

Freshwaters protected for natural trout propagation and survival of stocked trout.

Truncated

Describes a soil profile that has been cut down by accelerated erosion or by mechanical means. The profile may have lost part or all of the A horizon and sometimes the B horizon, leaving only the C horizon. Comparison of an eroded soil profile with a virgin profile of the same area, soil type, and slope conditions, indicates the degree of truncation.

TSS (Total Suspended Solids)

Total suspended solids in wastewater. As the name implies, the total solid particles that are suspended (as opposed to dissolved) in the wastewater. TSS must be filtered out, flocculated, digested and so on for removal in the treatment of wastewater. Though not necessarily pollutants TSS is considered to be a measure of pollutants in water by the EPA in the US.

Tube Settler

A series of tubes, about 2 in. in diameter or 2-in. square, placed in a sedimentation tank to improve the solids removal efficiency.

Tuberculation

The formation of *localized corrosion* products scattered over the surface in the form of knoblike mounds called tubercles.

Tubing

(1) Flexible pipe of small diameter, usually less than 2 in. (2) A special grade of high-test pipe fitted with couplings and fittings of special design.

Tundra

A treeless, level, or gently undulating plain characteristic of the Arctic and sub-Arctic regions characterized by low temperatures and short growing seasons.

Turbidimeter

An instrument for measurement of turbidity in which a standard suspension is used for reference.

Turbidity

(1) A condition in water or wastewater caused by the presence of suspended matter and resulting in the scattering and absorption of light. (2) Any suspended solids imparting a visible haze or cloudiness to water that can be removed by filtration. (3) An analytical quantity usually reported in turbidity units determined by measurements of light scattering. See also FORMAZINE TURBIDITY UNIT, NEPHELOMETRIC TURBIDITY UNIT.

The cloudy appearance of water caused by the presence of suspended and colloidal matter. In the Handbook on Wastewater Management 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. Any finely divided, insoluble impurities that mar the clarity of the water. A measure of the clarity of water. Typically turbidity is measured by determining light transmission through the water.

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 0–100 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.

Turbine Pump

A centrifugal pump in which fixed guide vanes partially convert the velocity energy of the water to pressure head as the water leaves the impeller.

Turbulence

(1) The fluid property that is characterized by irregular variation in the speed and direction of movement of individual particles or elements of the flow. (2) A state of flow of water in which the water is agitated by cross currents and eddies, as opposed to laminar, streamline, or viscous flow. See also TURBULENT FLOW.

Turbulent Flow

(1) The flow of a liquid past an object such that the velocity at any fixed point in the fluid varies irregularly. (2) A type of fluid flow in which there is an unsteady motion of the particles and the motion at a fixed point varies in no definite manner. Also called eddy flow or sinuous flow.

Turning Point (TP)

Temporary point on which rod readings are taken to move the leveling instrument along a survey path; a Foresight (FS or +) is taken on the turning point to obtain its elevation (initially, elevation of turning point is unknown); the instrument is then moved from its position and set up at a new posi-

tion beyond the turning point; a backsight (BS or +) is then taken on the turning point to determine the height of the instrument (HI); the turning point must be a firm object, such as a stone, stake, pipe, fence post, or axe head so that the elevation will not change while the instrument is being moved; if the turning point is altered while the instrument is being moved, the survey must go back to the last permanent point of known elevation (i.e., a bench mark).

Turnover

The phenomenon of vertical circulation that occurs in large bodies of water. It results from the increase in density of water above and below 39.2 °F (4 °C), the temperature of minimum density. In the spring, as the surface of the water warms above the freezing point, the water increases in density and tends to sink, producing vertical currents; in the fall, as the surface water becomes colder, it also tends to sink. Wind may also create such vertical currents. Also called overturn.

Turn-up

Ninety- or forty-five degree change in piping orientation from horizontal to diagonal and/or vertical at the end of a pressure distribution line; effectively brings the pipe to or above grade, facilitating periodic flushing of the lateral and enabling certain operational activities.

Two-Staged Digestion

The biological decomposition of organic matter in sludge followed by solids–liquid separation of the digested sludge. Two-stage digestion uses two compartments or two tanks to separate the violent initial digestion period from the slower final period to enhance both the digestion and the solids–liquid separation after digestion.

Type 1 Insulation

Type 1 insulation is dry cellulose insulation intended for pneumatic application into open areas with slopes up to 4.5:12, or injection application into closed cavities, such as walls, floors and cathedral ceilings. Type 1 insulations may also be manually applied.

Type 2 Insulation

Type 2 insulation is intended for spray application with water or liquid adhesive into open areas regardless of slope (e. attics), exposed surfaces (e.g. Walls or ceilings) and/or into any open cavity (wall, floor or ceiling) that may be closed later. This type of product may also contain internal binders to increase the adhesive/cohesive capabilities of the sprayed fibres in order to reduce settlement and /or ensure it remains in place.

Type A

OSHA soil classification that includes cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater; examples of cohesive soils are: clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam; cemented soils such as caliche and hardpan are also considered Type A; however, no soil is Type A if: (1) the soil is fissured; or (2) the soil is subject to vibration from heavy traffic, pile driving, or similar effects; or (3) the soil has been previously disturbed; or (iv) the soil is part of a sloped, layered system where the layers dip into the excavation on a slope of four horizontal to one vertical (4H:1V) or greater; or (v) the material is subject to other factors that would require it to be classified as a less stable material.

Type B

OSHA soil classification that includes cohesive soil with (1) an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa); or (2) granular cohesionless soils including: angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam. (3) Previously disturbed soils except those which would otherwise be classed as Type C soil. (4) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration; or (5) dry rock that is not stable; or (6) material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than four horizontal to one vertical (4H:1V), but only if the material would otherwise be classified as Type B.

Type C

OSHA soil classification that includes cohesive soil with (1) an unconfined compressive strength of 0.5 tsf (48 kPa) or less; or (2) granular soils including gravel, sand, and loamy sand; or (3) submerged soil or soil from which water is freely seeping; or (4) submerged rock that is not stable, or (5) material in a sloped, layered system where the layers dip into the excavation or a slope of four horizontal to one vertical (4H:1V) or steeper.

Type III MSD

US Coast Guard approved Marine Sanitation Device that is designed to simply hold waste material for pump-out into a shore-based facility, *also known as* holding tank which performs no treatment.

U

U-Bend Specimen

Horseshoe-shaped test piece used to detect the susceptibility of a material to stress corrosion cracking.

U-Value

Overall thermal conductance. U value is equal to the inverse of the sum of the R-values in a system ($U = 1 / R$ total).

U-Value (Transmittance)

The combined thermal value of all the materials in a building section, air spaces and surface air films. It is the time rate of heat flow per unit (sq. ft.), per degree F temperature difference with units in; (Btu/h ft² °F). The lower the overall U-value, the more energy efficient the assembly.

Ultimate Biochemical Oxygen Demand (BOD_u)

(1) Commonly, the total quantity of oxygen required to completely satisfy the first-stage BOD. (2) More strictly, the quantity of oxygen required to completely satisfy both the first-stage and second-stage BOD.

Ultimate Disposal

The final release of a biologically and chemically stable wastewater or sludge into the environment.

Ultimate Strength

The maximum stress (tensile, compressive, or shear) a material can sustain without fracture, determined by dividing maximum load by the original cross-sectional area of the specimen. Also called nominal strength or maximum strength.

Ultra Filtration

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

Ultra Low Emissions Vehicle (ULEV)

A vehicle that meets the ARB's ultra-low emission standards of 0.125 grams per mile of NMOG+NO_x. The average 2010 car sold in California is a ULEV.

Ultrasonic Measurement

The timing of the transmission of ultrasonic sound waves through a material to determine the material's thickness.

Ultrasonics

The sound of frequency more than 20,000 Hz.

Ultraviolet Disinfection (UV)

A disinfection method in which final wastewater effluent is exposed to ultraviolet light to kill pathogens and microorganisms.

Ultraviolet B (UVB)

A type of sunlight. The ozone in the stratosphere filters out ultraviolet B rays and keeps them from reaching the Earth. Ultraviolet B exposure has been associated with skin cancer, eye cataracts, and damage to the environment. Thinning of the ozone layer in the stratosphere results in increased amounts of ultraviolet B reaching the Earth.

Ultraviolet Radiation (UV)

Light waves shorter than the visible blue-violet waves of the spectrum. The energy range just beyond the violet end of the visible spectrum. Although ultraviolet radiation constitutes only about 5% of the total energy emitted from the sun, it is the major energy source for the stratosphere and mesosphere, playing a dominant role in both energy balance and chemical composition. Most ultraviolet radiation is blocked by Earth's atmosphere, but some solar ultraviolet penetrates and aids in plant photosynthesis and helps produce vitamin D in humans. Too much ultraviolet radiation can burn the skin, cause skin cancer and cataracts, and damage vegetation.

Ultraviolet Ray

Light rays beyond the violet of the spectrum; these are invisible to humans.

Unacceptable

Condition in which a component is not operating as intended, indicating the need for implementing maintenance, upgrades, repairs, or further investigation; an unacceptable condition may or may not be a failure from a regulatory perspective.

Unconfined Aquifer

An aquifer that is under atmospheric pressure. It is usually the uppermost aquifer in the subsurface with its upper limit being the water table.

Unconfined Compressive Strength

Load per unit area at which a soil will fail in compression; determined by laboratory testing, field estimation using a pocket penetrometer, thumb penetration tests, and other methods.

Unconsolidated Alluvial Aquifers

Aquifers formed by sediment deposited by the action of flowing water in particular along river beds and floodplains, but not including lakes and seas.

Uncontrolled Flow (UCF)

Water flowing in a regulated stream which, by virtue of the fact that it is "spilled from storage" or that it has come from tributary inflow, is not able to be controlled. These flows occur at a particular location when the stream flow at that location is greater than that required to meet the environmental needs and consumptive orders from that location to the end of the regulated water source.

Uncontrolled Flow Usage Limit

This is the maximum limit of Uncontrolled Flow water that can be taken by an Access Licence. It is defined as a percentage of the Annual Share Component.

Underdrain

A drain that carries away groundwater or the drainage from prepared beds to which water or wastewater has been applied.

Underfilm Corrosion

Corrosion that occurs under organic films in the form of randomly distributed threadlike filaments or spots. In many cases this is identical to *filiform corrosion*. A type of corrosion attack (deterioration) uniformly distributed over metal surface. Corrosion that proceeds at approximately the same rate over a metal surface. Also called general corrosion. General corrosion is characterized by a chemical or electro-chemical reaction that occurs uniformly over the exposed surface. Anodic and cathodic sites shift constantly so that corrosion spreads over the entire metal surface. Identifying general corrosion is usually simple, but determining its cause is often difficult. Chemical dissolution by acids, bases or chelants frequently results in general corrosion.

Underground or Buried Insulation

Insulation applied on piping and equipment located below grade and usually in direct contact with the surrounding soil.

Unfaced Insulation

Insulation with no attached vapour barrier.

Unified Soil Classification System

A soil classification system based on the identification of soil materials according to their particle size, grading, plasticity index and liquid limit. These properties have been correlated with the engineering behaviour of soils including soil compressibility and shear strength. The system is used to determine the suitability of soil materials for use in earthworks, optimal conditions for their construction, special precautions which may be needed, such as soil ameliorants, and final batter grades to be used to ensure stability.

Uniform Distribution

Concept of distributing effluent evenly over the surface of a component over both time and space.

Uniform Soil

A soil in which there is little, if any, change in soil texture between the A and B horizons (e.g. loam over loam, sandy clay over silty clay). The soil is dominated by the mineral fraction and shows minimal texture differences throughout, such that no clearly defined texture boundaries are to be found. The range of texture throughout the solum is not more than the equivalent span of one soil texture group.

Uniformity Coefficient

Description or specification of particle size distribution calculated by dividing the diameter of particle (millimeters) of which 60% by weight is smaller, by the diameter of particle (millimeters) of which 10% by weight is smaller; expressed mathematically as D_{60}/D_{10} .

Unit Operations, Physical

Treatment methods in which the application of physical forces predominates as a means for removal of wastewater constituents; includes flocculation, sedimentation, flotation, filtration, screening, mixing and gas transfer.

Unit Processes, Biological

Treatment methods in which the removal or conversion of constituents is brought about by biological activity; primarily used to remove the biodegradable organic constituents through conversion to cell tissue or gases; also used to remove nutrients (nitrogen and phosphorous).

Unit Processes, Chemical

Treatment methods in which the removal or conversion of constituents is brought about through the addition of chemicals or by other chemical reactions; includes precipitation, adsorption and disinfection.

Unit Risk Number

The number of potential excess cancer cases from a lifetime exposure to 1 microgram per cubic meter (μm^3) of a given substance. For example, a unit risk value of 5.5×10^{-6} would indicate an estimated 5.5 cancer cases per million people exposed to an average concentration of $1 \mu\text{m}^3$ of a specific carcinogen for 70 years.

United Nations Framework Convention on Climate Change (UNFCCC)

The Convention on Climate Change sets an overall framework for intergovernmental efforts to tackle the challenge posed by climate change. It recognizes that the climate system is a shared

resource whose stability can be affected by industrial and other emissions of carbon dioxide and other greenhouse gases. The Convention enjoys near universal membership, with 189 countries having ratified. Under the Convention, governments:

- gather and share information on greenhouse gas emissions, national policies and best practices
- launch national strategies for addressing greenhouse gas emissions and adapting to expected impacts, including the provision of financial and technological support to developing countries
- cooperate in preparing for adaptation to the impacts of climate change

The Convention entered into force on 21 March 1994.

Unit or Units

Unit or Units refer to one or all process, offsite and/or utility Units and facilities as applicable to form a complete operable refinery and/or complex.

Unit Operations, Physical

Treatment methods in which the application of physical forces predominates as a means for removal of wastewater constituents; includes flocculation, sedimentation, flotation, filtration, screening, mixing and gas transfer.

Unit Processes, Biological

Treatment methods in which the removal or conversion of constituents is brought about by biological activity; primarily used to remove the biodegradable organic constituents through conversion to cell tissue or gases; also used to remove nutrients (nitrogen and phosphorous).

Unit Processes, Chemical

Treatment methods in which the removal or conversion of constituents is brought about through the addition of chemicals or by other chemical reactions; includes precipitation, adsorption and disinfection.

Unreconciled Orders

Water orders are reconciled once a meter reading has been entered into the Water Accounting System. Unreconciled orders are those orders that have not yet been reconciled by a meter reading.

Unregulated River

A river that is not controlled by releases from a dam or regulated via the use of weirs and gated structures.

Unregulated Stream

A River, Stream or other Water Course, the flow of which is not regulated by artificial structures such as Dams, Weirs, Off-takes, Storages, etc.

Unregulated Water

A River, Stream or other watercourse, the flow of which is not regulated by artificial structures such as Dams, Weirs, Off-takes, Storages, etc.

Unsaturated Flow

Movement of water in a porous soil or media that is not filled to capacity with water; the water flow is along the surface of the particles, allowing air and gases to move through the interior of the larger pore space.

Unsaturated Soil

Soil in which the pore spaces contain water at less than atmospheric pressure; typically, smaller pore spaces contain water because of tension and larger pore spaces contain air and other gases.

Unsaturated Zone

The zone immediately below the land surface where the pores contain both water and air, but are not totally saturated with water. These zones differ from an aquifer, where the pores are saturated with water.

Unsteady Nonuniform Flow

Flow in which the velocity and the quantity of water flowing per unit time at every point along the conduit varies with respect to time and position.

Upflow

Term used to describe treatment units in which flow enters at the bottom and exits at the top.

Upflow Clarifier

A treatment unit in which liquid containing suspended solids is passed upward through a blanket of settling sludge; mixing, flocculation, and solids removal are all accomplished in the same unit.

Upflow Coagulation

Coagulation achieved by passing liquid, to which coagulating chemicals may have been added, upward through a blanket of settling sludge.

Upflow Filter

A gravity or pressure filtration system in which the wastewater flows upward, generally first through a coarse medium and then through a fine medium, before discharging.

Upflow Tank

A sedimentation tank in which water or wastewater enters near the bottom and rises vertically, usually through a blanket of previously settled solids. The clarified liquid flows out at the top and settled sludge flows out the bottom; a vertical-flow tank.

Upgrade

Act of improving a system by adding a device or component (or replacing a given device or component with one of higher quality) to increase the system's effectiveness or facilitate operation and maintenance.

Upgradient

In the direction of increasing static head.

Uprights

Vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting".

Urine

Aqueous fluid containing urea and other materials generally exiting via the human urogenital pathway.

Urine-Separating Device

Toilet fixture designed to separate urine from other waste materials.

Upset

An exceptional incident in which there is unintentional and temporary noncompliance with the permit limit because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Upstream Emissions

Emissions from processes that take place up to when the fuel enters a vehicle—typically during extraction, production, distribution and dispensing of the fuel.

Uranium

A heavy, radioactive metal (atomic number 92) used in the explosion of nuclear weapons (especially one isotope, U-235).

Urban Airshed Model

A three-dimensional photochemical grid model designed to calculate the concentrations of both inert and chemically reactive pollutants in the atmosphere. It simulates the physical and chemical processes that affect pollution concentrations.

Urban Runoff

Stormwater from city streets and adjacent domestic or commercial properties that carries nonpoint source pollutants of various kinds into the sewer systems and receiving waters.

Urban Planning

The science of managing and directing city growth.

Use Limit

The volume of water available for extraction within the water year.

User

The party who is billed, usually for sewer service from a single connection; has no reference to the number of persons served. Also called a customer.

User Charge

Charge made to users of wastewater services supplied.

Utilization Equipment

Equipment that uses electrical energy for mechanical, chemical, heating, lighting, or similar useful purposes.

Utilities

Companies (usually power distributors) permitted by a government agency to provide important public services (such as energy or water) to a region; as utilities are provided with a local monopoly, their prices are regulated by the permitting government agency.

V

Vacuum Breaker

A device for relieving a vacuum or partial vacuum formed in a pipeline, thereby preventing backsiphoning.

Vacuum Deposition/Vapor Depositions/Gas Plating

Deposition of metal coatings by the precipitation, sometimes in vacuum, or metal vapor on the treated surface. Vapor may be produced by thermal decomposition, cathode sputtering or by evaporation of the molten metal in air or inert gas.

Vacuum Filter

(1) A filter used to accomplish sludge dewatering and consisting of a cylindrical drum mounted on a horizontal axis, covered with filter media, and revolving partially submerged in a dilute sludge mixture. A vacuum is maintained under the media for the larger part of a revolution to extract moisture. The dewatered cake that is formed is scraped off mechanically for disposal. See also VACUUM FILTRATION. (2) A diatomaceous earth filter open to the atmosphere and on the inlet side of a pump.

Vacuum Filtration

A usually continuous filtration operation that is generally accomplished on a rotating cylindrical drum. As the drum rotates, part of its circumference is subject to an internal vacuum that draws sludge to the filter medium and removes water for subsequent treatment. The dewatered sludge cake is released by a scraper.

Vacuum Inches

Measurement of the suction produced in a vacuum system relative to ambient atmospheric pressure.

Vacuum Pump

(1) A pump for creating a partial vacuum in a closed space. (2) A pump in which water is forced up a pipe by the difference in pressure between the atmosphere and a partial vacuum. (3) An air compressor used in connection with steam condensers and for improving the suction head on other pumps. The compressor takes its suction at low absolute pressure, performs a large number of compressions, and generally discharges at atmospheric pressure.

Vacuum Truck

Motorized vehicle equipped with a vacuum system consisting of vacuum pump, cargo tank and associated equipment.

Vadose Zone

The portion of a porous medium above the water table within which the capillary pressure is less than atmospheric and the moisture content is usually less than saturation. The vadose zone includes the capillary fringe.

Valence

An integer representing the number of hydrogen atoms with which one atom of an element (or one radical) can combine (negative valence), or the number of hydrogen atoms the atom or radical can displace (positive valence). A positive number that characterizes the combining power of an element for other elements, as measured by the number of bonds to other atoms that one atom of the given element forms upon chemical combination: hydrogen is assigned valence 1, and the valence is the number of hydrogen atoms, or their equivalent, with which an atom of the given element combines.

Valley

A geographical expanse containing one or more streams and which constitutes a distinct and definable unit for management and operational purposes. For example, the Hunter Valley is a part of State Water's Central Area and contains the Upper Hunter River, Glennies Creek and the Lower Hunter River.

Valve

(1) A device installed in a pipeline to control the magnitude and direction of the flow. It consists essentially of a shell and a disk or plug fitted to

the shell. (2) In a pump, a waterway, passage through which is controlled by a mechanism. A valve is a device that regulates the flow of substances (either gases, fluidised solids, slurries, or liquids) by opening, closing, or partially obstructing various passageways.

Valve, Air/Vacuum Release

Valve that allows air in the lines to be purged during pressurizing flow, and allows air to enter during depressurized flow.

Valve, Alternating

Valve used to manually or automatically direct flow from one final treatment and dispersal component to another.

Valve, Ball

Valve with the closing and opening mechanism formed in the shape of a ball with a hole; rotating the ball orients the hole so that it is either parallel to the flow, allowing unrestricted passage of fluid or perpendicular to the flow, shutting it off.

Valve, Ball Check

Non-return valve in which a ball sits within a cylindrical fluid line.

Valve, Check

Valve that allows flow in only one direction by closing when the flow direction reverses.

Valve, Diaphragm

Valve employing a stem that depresses a diaphragm (membrane) to control flow, typically used in treatment of industrial wastewater.

Valve, Drain

Valve that allows drainage of a distribution system.

Valve, Four-Way

Valve that controls the effective action of the pump associated with a cargo tank; valve either directs the air flow into the cargo tank to create pressure or it directs the flow out of the cargo tank to create a vacuum.

Valve, Flush

Valve used to control the expelling of effluent and accumulated materials from a distribution system.

Valve, Gate

Valve employing a gating mechanism to control flow of fluid; gates may be of a plate design located in slots and opened either fully or partially.

Valve, Globe

Valve consisting of a movable disk-type element and a stationary ring seat in a generally spherical body; often used for throttling.

Valve, Isolation

Valve that is placed before or after a piece of equipment in case that equipment may need to be removed from service.

Valve, Pressure-Regulating (PRV)

Valve designed to maintain a set pressure on the downstream side of the valve regardless of pressure changes on the upstream or source side.

Valve, Pressure Relief

Valve that limits pressure to a preset level by exhausting surplus air or water volume, thereby assuring that the permissible operating pressure is not exceeded.

Valve, Recirculating Splitter

Valve that contains a floating ball that rises when the tank level rises, and prevents more water from entering the tank; when the water level drops, the ball drops and allows water to flow into the tank again.

Valve, Sequencing

Valve used to automatically direct flow to two or more final treatment and dispersal components, one or more at a time, and in a prescribed order.

Valve, Shut Off

Valve that prevents flow from entering a component.

Valve, Solenoid

Valve that uses an electro-magnetically operated mechanical device (electric coil) to turn on, shut off, or regulate the flow of effluent.

Valve, Spring Check

Non-return valve in which a spring causes a disc to seat against an opening within a cylindrical fluid line and stops flow.

Valve, Swing Check

Non-return valve in which a hinged flapper seats against an opening within a cylindrical fluid line and stops flow.

Valve, Switching

Valve used to dose multiple components one at a time.

Valve, Vacuum Breaker

Valve that serves as a type of backflow-prevention device that prevents cross-contamination by reverse flow.

Valve, Vacuum Relief

Valve that limits the vacuum level in a vacuum cargo tank (or suction line) to a preset level by allowing air to enter, thereby assuring that the operating vacuum level is not exceeded.

Valve, Zone

Valve that mechanically and sequentially diverts the flow of fluid to multiple zones within a soil treatment area.

Valve Box

Housing that encloses an operating component or device and extends to the ground surface, allowing access for component inspection, operation, etc.

Valve Throttling

Controlling or modulating flow through a system by manually or automatically opening or closing a valve to various degrees; in a pump system, changing the valve to various positions between full open and full closed regulates the amount of flow delivered and the operating pressure or head.

Value

One of the three variables of color, described as the degree of lightness or darkness of the color in relation to a neutral gray scale; on a neutral gray scale, value extends from pure black to pure white.

Vapor

(1) The gaseous form of any substance. (2) A visible condensation such as fog, mist, or steam that is suspended in air. The gaseous phase of liquids or solids at atmospheric temperature and pressure.

Vapor Barrier

A vapor check with water vapor permeance not exceeding 0.067 g/(s MN), when tested in accordance with BS 2972.

Vapor Density

The vapor density is expressed in grams per liter (g/L) and is compared to the density of air (air=1).

Vapour Permeable Underlay

A vapour permeable underlay repels water that penetrates a roofing finish but is permeable to water vapour escaping from the structure. It is usually defined as a material with a vapour resistance of not more than 0.25 MNs/g.

Vapor Plating

Deposition of a metal or compound on a heated surface by reduction or decomposition of a volatile compound at a temperature below the melting points of the deposit and the base material.

The reduction is usually accomplished by a gaseous reducing agent such as hydrogen. The decomposition process may involve thermal dissociation or reaction with the base material. Occasionally used to designate deposition on cold surfaces by vacuum evaporation.

Vapor Retarder/Barrier

A layer of moisture resistant material usually which controls moisture diffusion (defined as less than 1 perm) to prevent moisture build up in the walls.

Velocity Head

(1) The vertical distance or height through which a body would have to fall freely, under the force of gravity, to acquire the velocity it possesses. It is equal to the square of the velocity divided by twice the acceleration of gravity. (2) The theoretical vertical height through which a liquid body may be raised by its kinetic energy. It is equal to the square of the velocity divided by twice the acceleration caused by gravity.

Vent

Device that allows the active or passive entrance or exit of gases from a component.

Ventilation

Ventilating (the V in HVAC) is the process of “changing” or replacing air in any space to provide high indoor air quality (i.e. to control temperature, replenish oxygen, or remove moisture, odors, smoke, heat, dust, airborne bacteria, and carbon dioxide).

Vapor Pressure

(1) Pressure exerted by a vapor in a confined space. It is a function of the temperature. (2) The partial pressure of water vapor in the atmosphere.

See also RELATIVE HUMIDITY. (3) The partial pressure of any liquid. The equilibrium pressure exerted on the atmosphere by a liquid or solid at a given temperature. Also a measure of a substance’s propensity to evaporate or give off flammable vapors. The higher the vapor pressure, the more volatile the substance.

Vapor Recovery Nozzles

Special gas pump nozzles that reduce the release of gasoline vapor into the air gas is pumped into car tanks. There are several types of vapor recovery nozzles. Therefore, nozzles may not look the same at all gas stations. The 1990 Clean Air Act requires the installation of vapor recovery nozzles at gas stations in smoggy areas.

Vapor Recovery Systems

Mechanical systems that collect and recover chemical vapors resulting from transfer of gasoline from operations such as tank-to-truck systems at refineries, tanker-to-pipeline systems at offshore oil operations, and pump-to-vehicle systems at gasoline stations.

Vaporization

The process by which a substance such as water changes from the liquid or solid state to the gaseous state.

Variance

Permission granted for a limited time (under stated conditions) for a person or company to operate outside the limits prescribed in a regulation.

Velocity Meter

A vane water meter that operates on the principle that the vanes of the wheel move at approximately the same velocity as the flowing water.

Ventilation Index

The ventilation index is formed by multiplying the mixed layer height by the average wind speed in this mixed layer. Stronger wind speeds and thicker mixed layers will produce higher ventilation index values. For convenience, the actual numbers are converted to a scale of 0–100. A ventilation index of “0” implies no ability of the atmosphere to disperse pollutants while a value of “100” implies an excellent ability to disperse pollutants.

The ventilation index in British Columbia is divided into the following categories:

0–33=POOR	Open burning is not acceptable (or permitted by some by-laws)
34–54=FAIR	Open burning is not acceptable
55–100=GOOD	Conditions are acceptable for burning

For most locations, ventilation index values are poor from sunset until late morning. For locations within valleys, the ventilation index should be lowered if the mixing height is less than the height of the surrounding hills.

Venturi Meter

A differential meter for measuring the flow of water or other fluid through closed conduits or pipes. It consists of a Venturi tube and one of several proprietary forms of flow-registering devices. The difference in velocity heads between the entrance and the contracted throat is an indication of the rate of flow.

Vermiculite

An expanded mineral insulation consisting of a mica-like substance which expands when heated. The resulting granules are generally used as loose fill insulation.

Vertebrate

Vertebrate is any of a major group of animals (fish, amphibians, reptiles, birds and mammals) with a segmented spinal column (backbone).

Vertical Pump

(1) A reciprocating pump in which the piston or plunger moves in a vertical direction. (2) A centrifugal pump in which the pump shaft is in a vertical position.

Vertical Screw Pump

A pump, similar in shape, characteristics, and use to a horizontal screw pump, but which has the axis of its runner in a vertical position.

Vertical Separation

Vertical distance between the infiltrative surface and a limiting condition, such as highest groundwater level, bedrock, etc.

Virgin Forest

A forest never logged.

Virgin Soil

A soil that has not been significantly disturbed from its natural environment.

Virus

The smallest (10–300 mm in diameter) life form capable of producing infection and diseases in man and animals. Organism too small to be seen by light microscopy; an obligate parasite dependent on a host cell for its metabolic and reproductive needs.

Viscosity

In flowing liquids the existence of internal friction or the internal resistance to relative motion of the fluid particles with respect to each other must be considered; this resistance is called viscosity.

The molecular attractions within a fluid that make it resist a tendency to deform under applied forces. The thickness or resistance to flow of a liquid. Viscosity generally decreases as temperature increases; application temperatures of spray foam components are specified in part, to control viscosity at the spray gun.

Visibility

A measurement of the ability to see and identify objects at different distances. Visibility reduction from air pollution is often due to the presence of sulfur and nitrogen oxides, as well as particulate matter.

V-Notch Weir

A triangular weir.

VOD (Volatile Oxygen Demand)

Compounds which under favourable conditions may participate in photochemical reaction to form oxidants typically excludes methane and ethane.

Void

A pore or open space in rock or granular material not occupied by solid matter. It may be occupied by air, water, or other gaseous or liquid material. Also called interstice or void space.

Voids

A term generally applied to paints to describe *holidays*, holes, and skips in a *film*. Also used to describe shrinkage in castings and weld.

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 min 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. Capable of being evaporated at relatively low temperatures.

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. Fatty acids containing six or fewer carbon atoms. They are soluble in water and can be steam-distilled at atmospheric pressure. They have pungent odors and are often produced during anaerobic decomposition.

Volatile Organic Compounds (VOCs)

Organic chemicals all contain the element carbon (C). Organic chemicals are the basic chemicals found in living things and in products derived from living things, such as coal, petroleum, and refined petroleum products. Many of the organic chemicals we use do not occur in nature, but were synthesized by chemists in laboratories. Volatile chemicals readily produce vapors at room temperature and normal atmospheric pressure. Vapors escape easily from volatile liquid chemicals. Volatile organic chemicals include gasoline, industrial chemicals such as benzene, solvents such as toluene and xylene, and tetrachloroethylene (perchloroethylene, the principal dry cleaning solvent). Many volatile organic chemicals, such as benzene, are also hazardous air pollutants. Any compound containing carbon and hydrogen or containing carbon and hydrogen in combination with other elements.

Volatile Solids

Those solids in water, wastewater, or other liquids that are lost on ignition of the dry solids at 550°C for 60 min. Materials, generally organic, that can be driven off from a sample by heating, usually to 550°C (1022°F); nonvolatile inorganic solids (ash) remain.

Volatile Suspended Solids (VSS)

That fraction of suspended solids, including organic matter and volatile inorganic salts, that will ignite and burn when placed in an electric muffle furnace at 550°C (1022°F) for 60 min.

Volatilization

The process of transfer of a chemical from the water or liquid phase to the air phase. Solubility, molecular weight, and vapor pressure of the liquid and the nature of the air-liquid/water interface affect the rate of volatilization.

Volt

The unit of electromotive force or electrical pressure (analogous to water pressure). It is the electromotive force that, if steadily applied to a circuit having a resistance of 1 ohm, will produce a current of 1 ampere.

Voltage (of a Circuit)

The root mean square (effective) difference in potential between any two points of the circuit concerned. On various systems such as a three-phase, four-wire and a single-phase, three-wire, there may be various circuits of varying voltages.

Volume, Alarm Activation

Volume between “pump on” level and “alarm on” level in a demand dosing configuration.

Volume, Average Daily

Volume dosed within a 24-h period using a flow equalization configuration.

Volume, Delivered Dose

Net amount of effluent applied to a component in a dose or unit time; includes the dose volume minus drainback volume and pipe fill volume.

Volume, Dose

(1) Amount of effluent delivered to the distribution system during a dosing event including the drainback volume, pipe fill volume and the delivered dose volume; (2) Amount of effluent delivered as determined by the pump on and pump off levels in a demand dosed system.

Volume, Drainback

Amount of effluent that flows back into a pump tank after a dosing event.

Volume, Minimum

Smallest amount of effluent in a dosing tank (with either demand or timed dosing) required to maintain pump submergence.

Volume, Minimum Dose

Design parameter that specifies the smallest amount of effluent to be delivered to a component during a dosing event.

Volume, Operating

Amount of effluent contained in a tank under normal operating conditions; for a septic tank, operating volume is determined relative to the invert

of the outlet; for a dosing tank, operating volume under normal conditions is determined relative to the invert of the inlet and the control off level.

Volume, Pipe Fill

Amount of effluent necessary to fill a supply line and distribution system.

Volume, Reserve

Volume in the head space of a dosing tank between alarm on level and the inside top of the tank; intended for temporary storage of effluent in the event of component malfunction or excessive flow.

Volume, Surge

(1) Volume above the average daily volume and below the reserve volume in a flow equalization tank; (2) Volume of effluent in excess of average daily flow.

Volume, Tank

Total volume of a tank from the inside bottom of the tank to the inside top of a tank.

Volumetric

Pertaining to measurement by volume. It is of or pertaining to measurement by volume.

Volute Pump

A centrifugal pump with a casing made in the form of a spiral or volute as an aid to the partial conversion of the velocity energy into pressure head as the water leaves the impellers.

Vortex

A revolving mass of water in which the stream lines are concentric circles and in which the total head for each stream line is the same.

Vulcanized Rubber

Treatment of rubber with sulphur or sulphur compound resulting in a change in physical properties of rubber.

Vulnerability

The degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

Vulnerability Assessment (Water)

An evaluation of drinking water source quality and its vulnerability to contamination by pathogens and toxic chemicals.

W

Wales

Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

Wash Primer

A thin, inhibiting paint, usually chromate pigmented with a polyvinyl butyrate binder.

Washer

Any dust separator, droplet separator or gas purifier that depends for its operation on a liquid acting as a collecting medium.

Washout

Condition whereby excessive influent flows (typically at peak flow conditions) cause the solids in the aeration basins and/or clarifiers to be carried over into downstream processes or discharged to the receiving stream.

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. That portion of sludge from the secondary clarifier in the activated sludge process that is wasted to avoid a buildup of solids in the system. Solids removed from the activated-sludge process to prevent an excessive buildup in the system.

Waste Site

Dumping ground.

Waste Stream

Overall waste disposal cycle for a given population.

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.” The liquid-borne waste products of domestic, industrial, agricultural and manufacturing activities. In a community, an average of 50–100 gallons of wastewater is generated per person per day. The spent or used water of a community or industry containing dissolved and suspended matter. Clear water, storm water, industrial, sewage (domestic or commercial), or any combination thereof, carried by water.

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 Stabilization Pond

Constructed basin lined with either soil with very low permeability or a synthetic material, surrounded with berms and which contains at least 3 feet of wastewater which utilizes sunlight, wind or mechanical aeration, and natural bacteria to break down waste via physical, chemical and biological processes to stabilize wastewater; typically consists of two or more basins with operational controls allowing or facilitating flow through the basins.

Wastewater Treatment Plant

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

Wastewater-Treatment Return Flow

Water returned to the environment by wastewater-treatment facilities.

Wastewater, Commercial

Non-toxic, non-hazardous wastewater from commercial establishments, including but not limited to commercial food preparation operations, that is similar in composition to domestic wastewater, but which may have one or more of its constituents exceed typical domestic ranges.

Wastewater, Domestic

Water or liquid-carried waste from plumbing fixtures, appliances and devices such as toilets, bath, laundry, and dishwashers.

Wastewater, High-Strength

(1) Influent having BOD₅ greater than 300 mg/L; and/or TSS greater than 200 mg/L; and/or fats, oils, and grease greater than 50 mg/L entering a pretreatment component (as defined by NSF Standard 40 testing protocol); (2) Effluent from a septic tank or other pretreatment component that has BOD₅ greater than 170 mg/L; and/or TSS greater than 60 mg/L; and/or fats, oils, and grease greater than 25 mg/L and is applied to an infiltrative surface.

Wastewater, Industrial

Water or liquid-carried waste from an industrial process resulting from industry, manufacture, trade, automotive repair, vehicle wash, business or medical, activity; this wastewater may contain toxic or hazardous constituents.

Wastewater, Residential Strength

Effluent from a septic tank or other treatment device with a BOD₅ less than or equal to 170 mg/L; TSS less than or equal to 60 mg/L; and fats, oils, and grease less than or equal to 25 mg/L.

Wastewater, Raw

Any wastewater leaving a source.

Wastewater Reclamation

Treatment or processing of wastewater to produce water of a quality appropriate for another use, including recycling or reuse; see also WASTEWATER RECYCLING and WASTEWATER REUSE.

Wastewater Recycling

Reclamation process of collection and treatment of wastewater on-site for return and use back into the same site; for example, collection and reclamation of graywater from an establishment for subsequent toilet flushing in that same establishment.

Wastewater Reuse

Reclamation process of collection and treatment of wastewater for the deliberate application of that treated wastewater for a beneficial purpose such as turf irrigation.

Wastewater Treatment System

Assembly of components for collection, treatment and dispersal of sewage or effluent.

Wastewater Treatment System, Cluster

Wastewater treatment systems designed to serve two or more sewage-generating dwellings or facilities with multiple owners; typically includes a comprehensive, sequential land-use planning component and private ownership.

Wastewater Treatment System, Collector

Wastewater treatment system that conveys sewage or effluent from multiple sources to a location where treatment and dispersal occurs.

Wastewater Treatment System, Community

Publicly owned wastewater treatment system for collection, treatment and dispersal of wastewater from two or more lots, or two or more equivalent dwelling units.

Wastewater Treatment System, Decentralized

Wastewater treatment system for collection, treatment, and dispersal/reuse of wastewater from individual homes, clusters of homes, isolated communities, industries, or institutional facilities, at or near the point of waste generation.

Wastewater Treatment System, Individual

Wastewater treatment system designed to serve one sewage-generating dwelling or facility.

Wastewater Treatment System, Onsite (OWTS)

Wastewater treatment system relying on natural processes and/or mechanical components to collect and treat sewage from one or more dwellings,

buildings, or structures and disperse the resulting effluent on property owned by the individual or entity.

Waterborne Contaminants

Unhealthy chemicals, microorganisms (like bacteria) or radiation, found in tap water.

Water Balance (Soil)

An estimated state of equilibrium within the soil moisture regime based on rainfall, evapotranspiration, runoff, drainage and soil moisture storage. Soil moisture is assumed to severely limit plant growth in months when rainfall, together with an antecedent moisture content up to a maximum of 100 mm, is less than 40% of pan evaporation. At other times soil moisture is regarded as being adequate for plant growth. When the assumed field capacity of the soil is reached any further rainfall is regarded as being lost as runoff. The water balance provides information as to suitable tillage and sowing times, condition of ground cover and also whether other activities are restricted by wet or dry soil conditions. It also gives useful information concerning periods of major catchment flow and trickle flows. However, being based on monthly averages, short periods of intense rainfall are omitted. This rainfall is important in initiating soil erosion and providing runoff for stock watering purposes.

Water Column

- (1) The water above the valve in a set of pumps.
- (2) A measure of head or pressure in a closed pipe or conduit.

Water Conservation

Management of water resources so as to eliminate waste or maximize efficiency utilizing such methods as using the same water again before it becomes wastewater, installing water-efficient plumbing, or wastewater recycling and reuse.

Water Cycle

The circuit of water movement from the oceans to the atmosphere and to the Earth and return to the atmosphere through various stages or processes such as precipitation, interception, runoff, infiltration, percolation, storage, evaporation, and transportation.

Water Filters

Substances (such as charcoal) or fine membrane structures used to remove impurities from water.

Water Flow Metering Station

A water flow metering station is an asset designed measure the volume of water passing through a pipeline.

Water Hammer

Water hammer is a pressure surge in a pipeline as a result of changes in fluid flow velocities. The faster the changes in the velocities, the greater the magnitude of the pressure surge. Pressure surges in pipe lines are due to closing and opening of valves or stopping and starting of pumps, or by sudden releases of trapped air.

Water Hydrant

The term water hydrant is a synonym for fire hydrant.

Water Inlet Structure

A water inlet structure is a structure located within a river, lake, reservoir or other water source designed to receive water from its surroundings for use within a water treatment plant or other facility.

Water Main

A water main is water pipe which is a part of the water supply system.

Water Meter

A water meter is a device used to measure the volume of water usage.

Water Packing

Method of settling backfill using water.

Water Pollution

A general term signifying the introduction into water of micro-organisms, chemicals, wastes, or sewage which renders the water unfit for its intended use.

Water Property Service

A Water Property Service is the portion of a water service pipe located between the water reticulation main and the water meter.

Water Pump Station

A water pump station (or water pumping station) is an asset designed to pump water from one location to another.

Water Quality

A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Water Quality Criteria

Levels of water quality expected to render a body of water suitable for its designated use. Criteria are based on specific levels of pollutants that would make the water harmful if used for drinking, swimming, fish production, or industrial uses.

Water Quality Standard (WQS)

A law or regulation that consists of the beneficial use or uses of a waterbody, the numeric and narrative water quality criteria that are necessary to protect the use or uses of that particular waterbody, and an antidegradation statement.

Water Quality Testing

Monitoring water for various contaminants to make sure it is safe for fish protection, drinking, and swimming.

Water Quality-Based Effluent Limit (WQBEL)

A value determined by selecting the most stringent of the effluent limits calculated using all applicable water quality criteria (e.g., aquatic life, human health, and wildlife) for a specific point source to a specific receiving water for a given pollutant.

Water-Repellent Soils (Hydrophobic Soils)

Soils which resist wetting when dry. Drops of water do not spread spontaneously over their surface and into pores. The degree of water repellence may be severe where water drops remain on a flattened surface for some minutes.

In other cases drops appear to be absorbed readily, but quantitative measurements show that the height of capillary rise is diminished. This characteristic is mainly a feature of some sandy soils (topsoils) and is generally attributed to organic coatings on the sand grains which resist water entry into the soil.

Water Reticulation Main

A water reticulation main as a water main that connects a distribution main with service pipes. Reticulation mains are typically between 100 mm and 375 mm in diameter.

Water Reticulation Network

A water reticulation network is net work of pumps, pipes and water storages designed to store and distribute water.

Water Service

A water service is the pipeline that connects a property to a water main.

Water Service Pipe

A water service pipe is a pipe that extends from a potable water source to the interior of a building.

Water Softening

Reduction in the number of and/or removal of polyvalent cations which are the principal cause of hardness in water.

Water Solubility

The solubility of a substance in water provides information on the fate and transport in the environment. The higher the water solubility, the

greater the tendency to remain dissolved and the less likely to volatilize from the water. Low water soluble substances will volatilize more readily in water and will partition to soil or bioconcentrate in aquatic organisms.

Water-Stable Aggregation

An indication of the resistance of soil aggregates to breakdown by water. This is normally measured by the degree to which different size fractions of aggregates are broken up by agitation in water using a wet-sieving procedure. The degree of water-stable aggregation is used as a general indicator of soil erodibility. However, the procedure is not widely accepted because of problems of standardisation and the paucity of clear evidence relating it objectively to a soil's susceptibility to erosion.

Water Storage

A State owned dam, weir or other structure which is used to regulate and manage river flows in this water source and the water bodies impounded by these structures.

Water Supply

Water Supply is the process of self-provision or provision by third parties in the water industry, commonly a Council or Water Authority, of water resources of various qualities to different users.

Water Supply Facility

A Water Supply Facility is a group of related water supply assets located within close proximity.

Water Supply System

A water supply system (or water supply network) is a system designed to collect, store, purify and distribute water.

Water Supply Work

Any water pump, water bore or other construction that is used for the purpose of taking water from a water source, or any tank, dam, pipe, channel or other construction that is used for capturing, storing, diverting or impounding water.

Water Table

Upper surface of groundwater or that level in the ground where the water is at atmospheric pressure. The uppermost surface of ground water saturation—the level in the saturated zone at which the pressure is equal to atmospheric pressure.

Water Trading

The process in buying and selling Entitlements (Permanent Transfers) and/or Allocations (Temporary Transfers) with the intention not of extraction but for profit.

Water Transfer Main

A Water Transfer Main is a water main used to transport bulk quantities of water from a source or storage to another Water Facility as part of the water supply system. The water transfer main is not part of the reticulation system and does not have any property services connected. It may carry bore water, raw surface water or potable water.

Water Treatment Discharge

By-product from a water treatment device, such as regeneration water from an ion-exchange unit, reject water from a reverse-osmosis unit, or the backwash from an iron filter.

Water Treatment Plant

A Water Treatment Plant is a facility designed to produce potable water for a Water Reticulation Network.

Water Usage

The determination of the volume of water actually taken from the water source over any period of time.

Water Use

Water that is used for a specific purpose, such as for domestic use, irrigation, or industrial processing. Water use pertains to human's interaction with and influence on the hydrologic cycle, and includes elements, such as water withdrawal from surface- and ground-water sources, water delivery to homes and businesses, consumptive use of water, water released from wastewater-treatment plants, water returned to the environment, and instream uses, such as using water to produce hydroelectric power.

Water Use Development

Includes all privately owned water management structures, and all aspects of farm, industry, town or private household development which affect the volumes of water taken from water sources, and the management practices that are applied in relation to them.

Water Valve

A water valve is a valve that regulates the flow of water through a pipe.

Water Vapor

The gaseous form of water; molecules of water present as a gas in an atmosphere of other gases. Movement takes place from higher to lower vapor pressure regions to maintain vapor pressure equilibrium. Also called aqueous vapor.

Water Vapor is the most abundant greenhouse gas, it is the water present in the atmosphere in gaseous form. Water vapor is an important part of the natural greenhouse effect. While humans are not significantly increasing its concentration through direct emissions, it contributes to the enhanced greenhouse effect because the warming influence of greenhouse gases leads to a positive water vapor feedback. In addition to its role as a natural greenhouse gas, water vapor also affects the temperature of the planet because clouds form when excess water vapor in the atmosphere condenses to form ice and water droplets and precipitation.

Water-Vapor-Permeability

The time rate of water-vapor transmission through unit area of flat material of unit thickness induced by unit vapor pressure difference between two specific surfaces, under specified temperature and humidity condition.

Water Vapor Permeance

The time rate of water vapor transmission through unit area of flat material or construction induced by unit vapor pressure difference between two specific surfaces, under specified temperature and humidity condition.

Water Vapor Retarder (Barrier)

A material or system that adequately impedes the transmission of water vapor under specified condition.

Water Vapor Transmission Rate

The steady water vapor flow in unit time through unit area of a body, normal to specific parallel surfaces, under specific conditions of temperature and humidity at each surface.

Water Well or Well

Any artificial opening or artificially altered natural opening, however made, by which ground water is sought or through which ground water flows under natural pressure or is intended to be artificially drawn; provided this definition shall not include wells drilled for exploration or production of gas or oil; building foundation investigation and construction; elevator shafts; grounding of electrical apparatus; or the modification or development of springs.

Water Year

Continuous 12-month period selected to present data relative to hydrologic or meteorological phenomena during which a complete annual hydrologic cycle normally occurs. The water year used by the U.S. Geological Survey runs from October 1 through September 30, and is designated by the year in which it ends.

Watercourse

A channel, having defined bed and banks, down which surface water flows on a permanent or semi-permanent basis or at least, under natural conditions, for a substantial time after periods of heavy rainfall within its catchment. It is a general term including:

RIVER

A watercourse that conveys relatively large flows. Under average coastal and tableland climatic conditions rivers typically have continuous flows.

CREEK (STREAM)

A smaller watercourse than a river which usually forms the link between a drainage line and a river in a natural catchment flow path.

Waterlogged

The condition of a soil which is saturated with water and in which most or all of the soil air has been replaced. The condition, which is detrimental to most plant growth, may be caused by excessive rainfall, irrigation or seepage, and is exacerbated by inadequate site and/or internal drainage.

Waterproof

Impervious to prolonged exposure to water or water entry.

Watershed

A geographic area in which water, sediment, and dissolved materials drain to a common outlet such as a point on a larger stream, a lake, an underlying aquifer, an estuary, or an ocean. A drainage area or basin in which all land and water areas drain or flow toward a central collector such as a stream, river, or lake at a lower elevation. Drainage basin area contained within the bounds specified by a divide and above a specified point such as a lake, wetland, or stream.

Watertight

Condition ascribed to a device that is constructed so that no water can move into or out of it except by design through inlets and outlets.

Watt

The electrical unit of power. Power is the measure of the rate of doing work. A watt is the rate of energy transfer from 1 ampere flowing under a pressure of 1 volt at a unity power factor. It is analogous to horsepower or foot-pounds per minute of mechanical power. One horsepower is equivalent to approximately 746 W.

Watt-hour (Wh)

An electrical energy unit of measure equal to 1 watt of power supplied to, or taken from, an electrical circuit steadily for 1 h.

Weather

Weather is the result of unequal heating of the earth's atmosphere, as a function of terrain, latitude, time-of-year and other secondary factors. **Weather** is Atmospheric condition at any given time or place. It is measured in terms of such things as wind, temperature, humidity, atmospheric pressure, cloudiness, and precipitation. In most places, weather can change from hour-to-hour, day-to-day, and season-to-season. Climate in a narrow sense is usually defined as the "average weather", or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years. The classical period is 30 years, as defined by the World Meteorological Organization (WMO). These quantities are most often surface variables such as temperature, precipitation, and wind. Climate in a wider sense is the state, including a statistical description, of the climate system. A simple way of remembering the difference is that climate is what you expect (e.g. cold winters) and "weather" is what you get (e.g. a blizzard).

Weather Barrier

A breather jacket or coating which allows passage of water vapor and protects from atmospheric conditions.

Weather Barrier (Weather Coat)

A material or materials which when installed on the outer surface of thermal insulation, protects the insulation from the ravages of weather, such as rain, snow, select, wind, solar radiation, atmospheric contamination, and mechanical damage.

Weather Resistance

Ability of a material to resist all ambient weather conditions. These include changes of temperature, precipitation, effect of wind and humidity, sunlight, oxygen and other gases and impurities in the atmosphere, ultraviolet rays, radiation and ozone.

Weather-Stripping

Material such as vinyl, foam, or metal strips installed to seal small cracks around the moving parts of doors and windows. Weather-stripping is designed to block uncontrolled infiltration of cold air through these spaces and sometimes to repel wind-driven rain and moisture. The term weather-stripping often applies to caulking, a compound used to fill in joints and cracks in the house exterior. Flexible gaskets, often mounted in rigid metal strips, for limiting air leak age at opening in the shell like doors and windows.

Weathering

The process where a complex compound is reduced to its simpler component parts, transported through physical processes, or biodegraded over time.

Weathering

The physical and chemical disintegration, alteration and decomposition of rocks and minerals at or near the earth's surface by atmospheric and biological agents.

Weathershield Cellulose Insulation

Weathershield is a loose-fill blown-in type 1 cellulose insulation for installation in attics, walls, ceilings and floors.

Weep Hole

(1) Drain hole to allow moisture or air to escape, such as a weep hole in a concrete tank that allows water to drain out of tanks while they are in storage; (2) Drain hole in the discharge assembly that allows drainback to the tank after a dosing event.

Weight of Evidence

The extent to which the available information supports the hypothesis that a substance causes an effect in humans. For example, factors which determine the weight-of-evidence that a chemical poses a hazard to humans include the number of tissue sites affected by the agent; the number of animal species, strains, sexes, relationship, statistical significance in the occurrence of the adverse effect in treated subjects compared to untreated controls; and, the timing of the occurrence of adverse effect.

Weir

Device designed to measure or control flow; consists of a wall or obstruction of known geometric shape placed perpendicular to the direction of flow. A wall or plate placed in an open channel to regulate or measure the flow of water. A device that has a crest and some side containment of known geometric shape, such as a V, trapezoid,

or rectangle, and is used to measure flow of liquid. The liquid surface is exposed to the atmosphere. Flow is related to the upstream height of water above the crest, position of crest with respect to downstream water surface, and geometry of the weir opening.

Weld

A union between pieces of metal at faces rendered plastic or liquid by heat or by pressure, or by both. A filler metal whose melting temperature is of the same order as that of the parent metal may or may not be used.

Welding

The making of a weld.

Weld Cracking

Cracking that occurs in the weld metal. See also COLD CRACKING, HOT CRACKING, LAMELLAR TEARING, and STRESS-RELIEF CRACKING.

Weld Decay

Intergranular corrosion, usually of stainless steels or certain nickel-base alloys, that occurs as the result of *sensitization* in the *heat-affected zone* during the welding operation.

Weld Metal

All metal melted during the making of a weld and retained in the weld.

Weld Zone

The zone containing the weld metal and the heat-affected zone.

Well (Water)

An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies or oil, or to store or bury fluids below groundhole bored or drilled into the ground.

Wet-Air Oxidation

A method of sludge disposal that involves the oxidation of sludge solids in water suspension under high pressure and temperature. Also called the wet oxidation process.

Wire-to-Water Efficiency

The ratio of mechanical output of a pump to the electrical input at the meter.

Weir Overflow Rate

The amount of flow applied to a treatment process (typically a clarifier) per linear measure of weir (gpd/lin ft).

Well

Hole bored or drilled into the ground.

Well, Monitoring

Well constructed for the purpose of determining groundwater level or constituents.

Well, Water

Well constructed for the purpose of extracting potable water.

Well-Graded

Material of variable size with minimum pore space; *also known as* poorly-sorted.

Well-Sorted

Material of uniform size with maximum void space.

Wetlands

Areas inundated or saturated by surface or groundwater at a frequency and duration to support and that, under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Coastal wetlands extend back from estuaries and include salt marshes, tidal basins, marshes, and mangrove swamps. Inland freshwater wetlands consist of swamps, marshes, and bogs. Areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions; wetlands generally include swamps, marshes, bogs, and similar areas; constructed wetlands used in wastewater treatment are purposely excluded.

Wet Soil

Soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated; granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

Wetted Perimeter

The length of the boundary wetted by flow in a channel or pipe at a specified section, measured along a plane at right angles to direction of flow. Used in calculating the hydraulic radius for Manning's formula.

Wetting

A condition in which the interfacial tension between a liquid and a solid is such that the contact angle is 0–90 degrees.

Wetting Agent

A substance that reduces the surface tension of a liquid, thereby causing it to spread more readily on a solid surface.

White Liquor

Cooking liquor from the kraft pulping process produced by recausticizing *green liquor* with lime.

White Rust

Zinc oxide: the powdery product of corrosion of zinc or zinc-coated surfaces.

Wildlife

Animals living in the wilderness without human intervention.

Wildlife Refuges

Land set aside to protect certain species of fish or wildlife.

Whole Effluent Toxicity (WET)

The total toxic effect of an effluent measured directly with a toxicity test.

Whole House Plenum

An enclosed (non-ventilated) and insulated crawl space used as a return or supply duct for a forced air heating/cooling system.

Wilderness

Land remaining in basically wild (i.e., undisturbed) condition, with few if any traces of human activities.

Windpower

Power or energy derived from the wind (via windmills, sails, etc.). Indirect energy from the sun which is produced when air is heated and rises upwards and is replaced by cooler air from the side, thereby creating circulation. Windpower has very little environmental impact. Noise and the effect on the natural and cultural values by changing the landscape can, however, make certain locations unsuitable.

Windwashing

The phenomenon of air movement driven by wind pressures wind passing through or behind the thermal insulation within enclosures, causing significant loss of heat flow control and potentially causing condensation. Typically occurs at exposed building edges, such as at the outside corners and roof eaves because of the large pressure gradients at these locations.

Wood Fiber

Insulation composed of Wood/cellulosic fibres, with or without binders.

Withdrawal

Water removed from a ground- or surface-water source for use.

Wood Burning Pollution

Air pollution caused by emissions of particulate matter, carbon monoxide, and odorous and toxic substances from wood burning stoves and fireplaces.

Wood-Burning Stove Pollution

Air pollution caused by emissions of particulate matter, carbon monoxide, total suspended particulates, and polycyclic organic matter from wood-burning stoves.

X

Xeriscaping

A method of landscaping that uses plants that are well adapted to the local area and are drought-resistant. Xeriscaping is becoming more popular as a way of saving water at home.

Y

Yellow Water

Isolated waste stream consisting of urine collected from specific fixtures and not contaminated by feces or diluted by gray water sources.

Yield

Mass per unit time per unit area. Evidence of *plastic deformation* in structural materials. Also called plastic flow or creep.

Yield (Hydraulic)

The amount of runoff that is produced or expected to be produced from a catchment. It may be expressed on a unit area or unit time basis.

Yield Point

The first stress in a material, usually less than the maximum attainable stress, at which an increase in strain occurs without an increase in

stress. Only certain metals—those that exhibit a localized, heterogeneous type of transition from *elastic deformation* to *plastic deformation*—produce a yield point. If there is a decrease in stress after yielding, a distinction may be made between upper and lower yield points. The load at which a sudden drop in the flow curve occurs is called the upper yield point. The constant load shown on the flow curve is the lower yield point.

Yield Strength

The stress at which a material exhibits a specified deviation from proportionality of stress and strain. An onset of 0.2% is used for many metals.

Yield Stress

The stress level in a material at or above the *yield strength* but below the *ultimate strength*, i.e., a stress in the plastic range.

Z

Zero Air

Pure air, used for calibrating air monitoring instruments. The EPA requires zero air to have less than 0.1 ppm of hydrocarbons.

Zero Emission Vehicle (ZEV)

Vehicles which produce no emissions from the on-board source of power (e.g., an electric vehicle).

Zeta Potential

Electrokinetic potential.

Zone

Portion of a component that is separately managed as a single unit.

Zone of Dispersal

Layers of soil or rock material surrounding the zone of treatment through which the effluent moves away from the final treatment and dispersal component.

Zone of Saturation

Layer in the ground in which interstitial voids (cracks, crevices, holes, etc.) are filled with water; the level at the top of this zone is the water table.

Zone of Treatment

Soil or fill material which removes pollutants from pretreated effluent by processes which include physical filtration of bacteria and other constituents, adsorption of viruses and bacteria by clay and organic matter, biological destruction of pathogens by soil microorganisms, sorption or precipitation of phosphorus, biochemical transformations of nitrogen compounds, and biological assimilation of phosphorus and nitrogen.

Zoned Embankment

The earth wall of a dam built with different types of materials comprising different parts of the wall. It is used when materials with particular useful properties are in short supply. For example when clayey material is scarce, the available supply is used as a central core in the wall to prevent it from leaking.

Zones and Agglomerations

The UK has been divided into zones and agglomerations for the purposes of air pollution monitoring, in accordance with EC Directive 96/62/EC. There are 16 zones. They match: The boundaries of England's Government Offices for the Regions; and The boundaries agreed by the Scottish Executive, National Assembly for Wales, and Department of the Environment in Northern

Ireland. There are 28 agglomerations in the UK. An agglomeration is defined as any urban area with a population greater than 250,000.

Zoning

The arrangement or partitioning of land areas for various types of usage in cities, boroughs or townships.

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