A

Abatement

The act or process of lessening, reducing, or removing material or contaminants.

Abiotic degradation

Process in which a substance is converted to simpler products by physical or chemical mechanisms; examples include hydrolysis and photolysis.

Absorption

Absorption is the assimilation or incorporation of a gas, liquid, or dissolved substance into another substance.

Accuracy

Accuracy of an analytical measurement is how closely the result corresponds to the true value. This normally requires the use of standards in carefully calibrating the analytical methods.

Action level

The generic term applied to any numerical concentration value that will be compared with environmental data to arrive at a decision or determination about a potential contaminant of concern (from survey through remediation) or for a user-defined volume of media using environmental sample data.

Activity

Refers to the performance of a specific function by a microorganism (e.g., sulfate reduction, metabolism of benzene).

Acute toxicity

Any poisonous effect produced within a short period of time following an exposure, usually 24 to 96 hours (USEPA 2013 [MWT6DAWC] USEPA. 2013. http://water.epa.gov/scitech/methods/cwa/wet/.).

Adaptation

An adjustment, or preparation of, natural or human systems to a new or changing environment that moderates harm or exploits beneficial opportunities.

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.

Adaptive site management

A formal and systematic site or project management approach centered on rigorous site planning and a firm understanding of site conditions and uncertainties. This technique, rooted in the sound use of science and technology, encourages continuous reevaluation and management prioritization of site activities to account for new information and changing site conditions.

Adsorption

Adsorption is the adhesion of molecules of gas, liquid, or dissolved solids to a surface. The term also refers to a method of treating wastes in which activated carbon is used to remove organic compounds from wastewater. Additionally, adsorption is defined as the process by which nutrients such as inorganic phosphorous adhere to particles via a loose chemical bond with the surface of clay particles.

Noncovalent bonding of a chemical to a solid surface.

Advanced geospatial methods

Methods that include an explicit spatial correlation model. These methods may also include spatial trend and statistical error components. Advanced methods are also known as geostatistical methods.

Advanced sensors

Munitions-classifying sensors that are designed with many transmit and receive coils rigidly assembled in a fixed-array configuration. The combination of multiple receive coils, large bandwidth electronics, and supporting sensor data results in the collection of significantly more data than can be collected with single-axis EM61 sensors.

Advanced site characterization

Advanced site characterization is the method of using tools and procedures that are capable of rapid implementation and data generation and can be used to provide data for a more precise and accurate CSM.

Advection

Transport of a solute by the bulk motion of flowing groundwater.

Advective groundwater flux

The rate or movement of chemical or biological materials within a groundwater system per unit time in response to a concentration gradient or some advective force.

Adverse human health effects

Typically defined as an incremental lifetime cancer risk (for example, exceeding a range of 1E-4 to 1E-6) or a hazard quotient or hazard index (for example, one).

Aerobic

Pertaining to or caused by the presence of oxygen.

Alternate concentration limits (ACLs)

The USEPA, at its discretion may establish ACLs that vary from ARARs due to site-specific conditions at CERCLA or RCRA sites. USEPA has established guidance for how and when ACLs may be established.

Alternative endpoint

This term includes a variety of formal designations of alternate final remedial goals that are permitted by regulations and protective of human health and the environment. Examples of alternative endpoints include ARARs, ACLs, groundwater management or CEAs, groundwater reclassification, and land-use controls.

Alternative fuel

From the USEPA: “Alternative fuels are derived from sources other than petroleum. Most are produced domestically, reducing U.S. dependence on imported oil, and some are derived from renewable sources. Often, they produce less pollution than gasoline or diesel.”

Amendment

A chemical or chemicals placed in contaminated groundwater either in situ or ex situ designed to promote the degradation or transformation of the contaminants.

Anaerobic

Pertaining to or caused by the absence of oxygen.

Anisotropy

The property of being directionally dependent (as opposed to isotropy, which means homogeneity in all directions).

The degree of spatial correlation is dependent on direction, typically assessed using directional variograms, covariograms, or

correlograms.

Anthropogenic activity

Activity resulting from human activities.

Applicable or relevant and appropriate requirements (ARARs)

From the USEPA: “Section 121(d) of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA) requires that on-site remedial actions attain or waive federal environmental ARARs, or more stringent state environmental ARARs, upon completion of the remedial action. The 1990 National Oil and Hazardous Substances Pollution Contingency Plan (NCP) also requires compliance with ARARs during removal and remedial actions to the extent practicable.”

Aquifer

One or more stratum of rock or sediment that is saturated and sufficiently permeable to yield economically significant quantities of water to wells or springs.

Aquifer remediation wells

From the USEPA: Wells beneficially used to control groundwater contamination. These wells may be used for different specific purposes, including to: (1) introduce remediation agents (i.e., chemicals or microorganisms) into contaminated aquifers to neutralize the contamination; (2) increase groundwater flow through the contaminant zone in an aquifer to aid in contaminant removal; (3) form hydraulic barriers to contain contaminant plumes; and (4) re-inject treated groundwater for aquifer recharge after an onsite P&T system.

Areal loading rate

The amount of something applied to an area per time.

Assimilative capacity

A subjective term describing the amount of pollutant that an environmental system can take on before a negative impact results.

Asymptotic level

General term to describe the stage of remediation where observed conditions in affected environmental media approach the desired target condition but do not achieve it despite continued expenditure of valuable amounts of effort, resources, and time intended to achieve it.

Attenuation factor

A ratio of the indoor air concentration to soil gas or groundwater concentration; sometimes used to estimate the indoor air concentration from soil gas or groundwater concentration.

B

Back diffusion

Also referred to as reverse diffusion, it refers to solute transfer from lower permeability zones back to the higher permeability zones due to the reversal of the concentration gradient, typically after the source flux is near zero.

Background

Natural or baseline groundwater quality at a site that can be characterized by upgradient, historical, or sometimes cross-gradient water quality (USEPA Unified Guidance).

Background (reference conditions)

When used in characterization studies, refers to both the concentrations of contaminants that are not a result of the

activities at the site undergoing assessment and the locations of the background areas (MacDonald and Ingersoll 2002 [5KW8KE77] MacDonald, D. D., and C. G. Ingersoll. 2002. “A Guidance Manual to Support the Assessment of Contaminated Sediments in Freshwater Ecosystems.” www.clu-in.org/contaminantfocus/default.focus/sec/Sediments/cat/Site_Characterization.). Therefore, there are two types of background recognized by USEPA and many states: naturally occurring background and anthropogenic background. Users should verify whether their state and/or USEPA region has different definitions and requirements for assessing background conditions as part of environmental site assessments.

Best management practices (BMPs)

From the State of Nevada, Best Management Practices Handbook, 1994, the USEPA guidelines define BMPs as “methods, measures or practices to prevent or reduce water pollution, including but not limited to, structural and nonstructural controls, operation and maintenance procedures and scheduling and distribution of activities. BMPs are typically applied as a system of practices rather than a single practice. BMPs are selected on the basis of site-specific conditions that reflect natural background conditions and political, social, economic, and technical feasibility.”

Biodegradation

A process by which microorganisms transform or alter (through metabolic or enzymatic action) the structure of chemicals introduced into the environment (USEPA 2011 [DQXAJ4RX] USEPA. 2011. “Exposure Factors Handbook 2011 Edition (Final Report.” U.S. Environmental Protection Agency. https://cfpub.epa.gov/ncea/risk/recordisplay.cfm?deid=236252.).

The breakdown of chemicals by microorganisms.

Biofouling of a well

A form of biochemical incrustation that involves the creation of continuous or discontinuous biofilms.

Biokinetics

Movement of a chemical (for example, absorbed lead) throughout the body by physiologic or biochemical processes.

Bioremediation

The treatment of environmental contamination through the use of techniques that rely on biodegradation. Bioremediation has two essential components: biostimulation and bioaugmentation.

Bog

A wetland that accumulates peat.

Boundary

A location where water flows into or out of the model region due to external factors. For example, groundwater divides, lakes, streams, recharge, evapotranspiration, and wells are all examples of boundary conditions.

C

Calibrate

To refine a model, such as a CSM, through comparison to data by making scientifically consistent and rational adjustments of model parameters so that model outputs match actual measurements as closely as possible.

Capping

Technology that covers contaminated sediment or other substrate with material to isolate the contaminants from the surrounding environment.

Capture zone

The three-dimensional region that contributes the groundwater extracted by one or more wells or drains. Capture zone in

this context is equivalent to the zone of hydraulic containment.

Carbon footprint

From the USEPA: “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.”

Cell

An individual unit in a treatment system.

Chemical transformation

An abiotic or biotic chemical process (such as photolysis, hydrolysis, oxidation/reduction, radioactive decay) that transforms an element (Cr(VI) to Cr III) or compound (phenol to $CO_2 + H_2O$) to a different element or chemical compound.

Chronic toxicity values

Toxicity values used for repeated or persistent exposures (durations exceeding 10% of a lifetime [7 years or longer] and for exposures by children ages 0–6).

Clean Air Act

A rule passed in 1970 that sets nationwide ambient air quality standards for conventional air pollutants. The Clean Air Act sets standards for emissions from both stationary and mobile sources (for example, motor vehicles).

Clean Water Act

A rule passed in 1972 that mandates “fishable/swimmable” waters wherever attainable. Provides for (1) a construction grants program for publicly owned water treatment plants and requires plants to achieve the equivalent of secondary treatment, (2) a permit system to regulate point sources of pollution, and (3) area-wide water quality.

Cleanup

The assessment and reduction, removal, or control of chemicals in environmental media. Cleanup is synonymous with other terms such as “corrective action” and “remediation” used in various state, local, and federal programs.

Cobble

A stone measuring between 6.4 cm (2.5 in) and 25.6 cm (10.1 in).

Colloid

A particle that will not settle. Colloidal particles are generally 1–1,000 nm in size.

Community engagement

The process of communicating with local residents and other stakeholders to provide information throughout the investigation and cleanup of a contaminated site, provide opportunities for offering input about site investigation and cleanup plans and facilitate the resolution of community issues related to a contaminated site.

Compliance monitoring

The collection of data that, when analyzed, can allow for the evaluation of the contaminated media against standards such as soil or water quality regulatory standards, risk-based standards, or RAOs.

Compliance Tracking System (CTS)

From DOE: “This Federal Energy Management Program (FEMP) system tracks agency performance of energy and water evaluations, project implementation and follow-up measures, and annual building benchmarking requirements. These data

are collected as part of FEMP's responsibility for tracking Federal agency progress toward meeting Section 432 of the Energy Independence and Security Act (EISA) of 2007 for Federal facility energy and water management and benchmarking. Public reports and data are made available."

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)

Passed in 1980, commonly known as Superfund, this act covers the cleanup of hazardous substance spills from vessels and active or inactive facilities. Establishes a Hazardous Substances Response Trust Fund, financed by a tax on the sale of hazardous chemicals, to be used for removal and cleanup of hazardous waste releases. Cleanup costs must be shared by the affected state. Within certain limits and subject to a few defenses, anyone associated with the release is strictly liable to reimburse the fund for cleanup costs, including damage to natural resources.

Concentration gradient

The change of concentration over a certain distance.

Conceptual site model (CSM)

A representation of an environmental system and the biological, physical, and chemical processes that determine the transport and fate of contaminants through environmental media to environmental receptors and their most likely exposure modes.

A CSM is a hypothesis about how contaminant releases occurred, the current state of the source zone, and current plume characteristics (plume stability).

A CSM is a living collection of information about a site that considers factors such as environmental and land-use plans, site-specific chemical and geologic conditions, and the regulatory environment (ITRC 2007 [PQK6P3AJ] ITRC. 2007. "Improving Environmental Site Remediation Through Performance-Based Environmental Management." Interstate Technology & Regulatory Council, Remediation Process Optimization Team. https://higherlogicdownload.s3-external-1.amazonaws.com/ITRC/970aa487-6f1a-4318-9c13-de505a82b1f5_file.pdf?AWSAccessKeyId=AKIAVRDO7IEREB57R7MT&Expires=1686846610&Signature=f8yY8zHXsHRkee5lFnCn%2FRQ%2BStY%3D.). It is an iterative representation of the site that summarizes and helps project planners visualize and understand available information. The CSM is the primary planning and decision-making tool used to identify the key issues and the data necessary to transition a project from characterization through post-remedy.

Describes the potential chemical sources, release mechanisms, fate and transport pathways, impacted environmental media, receptors, and exposure pathways for current and reasonably anticipated future activities and land uses. This model documents current site conditions and serves to conceptualize the relationship between chemicals in environmental media, sources, and receptors through consideration of potential or actual migration and exposure pathways (ITRC 2012 [JVPK234H] ITRC. 2012. "Incremental Sampling Methodology." Washington, D.C.: Interstate Technology & Regulatory Council, Incremental Sampling Methodology Team. https://www.itrcweb.org/ism-1/.).

Conductance

In modeling, conductance is the resistance to flow between a boundary condition and an aquifer.

Consensus

ITRC defines consensus as general agreement or the collective opinion on an issue. ITRC does not require that everyone must agree before consensus is reached (ITRC 2013 [TSC9TJZQ] ITRC. 2013. "Framework for Developing Quality ITRC Technical and Regulatory Guidance Documents.").

Consent decree (CD)

Adapted from the USEPA: "A legal document submitted by the Department of Justice on behalf of the EPA for approval by a federal judge to settle a case. A consent decree can be used to formalize an agreement reached between EPA and potentially responsible parties (PRPs) for cleanup at a Superfund site. Consent decrees also are signed by regulated facilities to cease or correct certain actions or processes that are polluting the environment and include payment of penalties. The Clean Water Act, Clean Air Act, Toxic Substances Control Act, and others all use consent decrees." CDs are also used in

many state courts; alternately, states may be parties to federal CDs.

Constructed wetland

An artificially constructed treatment system using saturated soils or sediment beneath standing water to remove contamination. Constructed wetlands almost always treat wastewater of some type and almost always contain wetland plants.

Contaminant flux

The ebb and flow of contaminants from and through an ecosystem.

Contaminants of concern (COCs)

Materials, structures, or contaminants in an ecosystem that may have an effect on that or other environments. These may consist of chemicals, biota, natural features, or any other thing that could affect the area of concern.

In a risk assessment, a COC is a substance detected at a hazardous waste site that has the potential to affect receptors adversely due to its concentration, distribution, and mode of toxicity (USEPA 1997b). COC are generally categorized operationally, based on how they are measured in the analytical laboratory. “Inorganic” COC generally address metals, elements, and unique inorganic compounds such as perchlorate. “Organic” COC include VOCs (such as acetone, benzene, and trichloroethylene), SVOCs (such as chlorophenols, chlorobenzenes, and phthalate esters), pesticides (such as atrazine, DDT, and toxaphene), PCBs, and polychlorinated dibenzodioxin and dibenzofurans.

Control charts

Graphical plots of compliance measurements over time; alternative to prediction limits (USEPA Unified Guidance)

Control plane

The location of the control plane, or response boundary, is defined as a location within the source area, or upgradient or immediately downgradient of the source area, where changes in the plume configuration are anticipated due to the implementation of the DNAPL source zone treatment. The response boundary should not be confused with the term “point of compliance,” which USEPA defines as the point where media-specific standards (such as MCLs or risk-based cleanup goals) must be achieved.

Controlling document

A document that authorizes operation of the P&T system, provides reasoning for the choice of or changes to a site remediation project, and outlines how the remediation is expected to be conducted, such as a ROD, consent decree, U.S. federal or state court document, or permit or permit equivalency.

Coprecipitation

When a chemical is precipitated due to inclusion in a solid made from a different chemical.

Corrective action

Activities taken to investigate and clean up contaminant releases into the environment (i.e., soil, groundwater, surface water, and air).

Cost-efficiency

One way to evaluate P&T systems is through cost-efficiency: the calculation of costs associated with treating a fixed volume of water, often calculated in cents per gallon or dollars per thousand gallons.

Criterion

General term used in this document to identify a groundwater concentration that is relevant to a project; it is used instead of designations such as Groundwater Protection Standard, cleanup standard, or cleanup level.

D

Data base management system

Systems of software tools, including databases and geographic information systems, that allow a registry, monitoring, outreach, and enforcement.

Data gaps

Missing data or information needed to answer questions or allow a more refined analysis to be completed.

Data quality assessment

The scientific and statistical evaluation of data to determine whether data obtained from environmental operations are of the right type, quality, and quantity to support their intended use (USEPA 2006 [X5B5V2JX] USEPA. 2006. “Data Quality Assessment: Statistical Methods for Practitioners.” United States Environmental Protection Agency. https://doi.org/http://www2.epa.gov/quality/guidance-data-quality-assessment.).

Data quality objective (DQOs)

A qualitative and quantitative statement derived from the DQO process that clarifies study, technical, and quality objectives; defines the appropriate type of data; and specifies tolerable levels of potential decision errors that will be used as the basis for establishing the type, quality, and quantity of data needed to support decisions.

The qualitative and quantitative statements derived for the DQO process that clarify the study’s technical and quality objectives, define the appropriate type of data, and specify tolerable levels of potential decision errors that will be used as the basis for establishing the quality and quantity (USEPA 2006 [4CMBBJMK] USEPA. 2006. “Guidance on Systematic Planning Using the Data Quality Objectives Process.” In EPA QA/G-4. United States Environmental Protection Agency. https://doi.org/http://www2.epa.gov/quality/guidance-systematic-planning-using-data-quality-objectives-process-epa-qag-4.).

Data quality objective (DQO) process

A systematic planning tool (based on the scientific method) that identifies and defines the type, quality, and quantity of data needed to satisfy a specified use. DQOs are the qualitative and quantitative outputs from the DQO process (USEPA 2002 [2XFP32XV] USEPA. 2002. “Guidance for Quality Assurance Project Plans.” United States Environmental Protection Agency. https://doi.org/http://www2.epa.gov/quality/guidance-quality-assurance-project-plans-epa-qag-5-december-2002.).

Decay coefficient

This coefficient represents the rate of degradation of a chemical.

Decline curve analysis

Analysis of unit volume of LNAPL recovery or recovery rate per unit time.

Degradation (chemical)

(1) Changes brought about to an environment, ecosystem, or physical structure due to interaction with a chemical or chemicals; or (2) change in the composition and structure of a chemical due to influences from its environment.

Dense nonaqueous-phase liquid (DNAPL)

A water-immiscible organic liquid that is denser than water (such as tetrachloroethene).

Density

Describes the mass per unit volume of the DNAPL. It is sometimes expressed as specific gravity, which is the density relative to water.

Deposition rate

The amount of material deposited per unit time or volume flow.

Design basis

Often included as a pre-design item and/or within system design documents such as well logs and associated design elements such as screen/filter pack materials selection, construction, development, in-well equipment (i.e., pumps, piping, sensors, pressure transducers, wellhead), and the Operations, Monitoring, and Maintenance Manual, along with any addenda describing modifications to associated system, operations, monitoring, and maintenance activities.

Desorption

The process in which atomic or molecular species leave the surface of a solid and escape into the surroundings.

Destruction efficiency

Efficiency, expressed as a decimal fraction, of a control device in destroying or removing contaminants calculated as one minus the ratio of the amount of contaminant exiting the control device to the amount of contaminant entering the control device.

Diffusion

Molecular movement of solutes in groundwater that tends to equalize conditions between areas of higher and lower concentration. It is often defined as the movement of solutes from higher to lower concentration along a concentration gradient, although the process is due to random molecular behavior. Matrix diffusion is the transfer of mass between lower and higher permeability media, often resulting in storage of contaminant mass that then back diffuses into the primary groundwater flow paths when the concentration gradient reverses.

Diffusion sampler

A semipermeable membrane or dialysis tube filled with distilled water or gel that relies on solute gradient to establish equilibrium between pore water and the sampler.

Digital geophysical mapping

Mapping data generated from a geophysical system that digitally records geophysical and positioning information to support initial mapping and identification of buried metal objects on a site.

Dilution

A reduction in solute concentration caused by mixing with water at a lower solute concentration.

Direct sources

Direct sources include effluent outfalls from factories, refineries, waste treatment plants, and similar facilities that emit fluids of varying quality directly into urban water supplies.

Dispersion

The spreading (lateral, longitudinal, and vertical) of solutes in groundwater along a hydraulic gradient due to mechanical mixing within an aquifer.

Dissolved concentration

In water, the concentration of COC in filtered water, traditionally defined as water that will pass through a 0.45 µm filter.

Dual-porosity

A fractured porous medium that contains two regions with different characteristics, namely the fractures and the material itself.

Dye-LIF

Dye-enhanced laser-induced fluorescence. From Clu-In : “Laser-induced fluorescence (LIF) is a method for real-time, in situ field screening of residual and non-aqueous phase organic contaminants in undisturbed vadose, capillary fringe, and saturated subsurface soils and groundwater. The technology is intended to provide highly detailed, qualitative to

semiquantitative information about the distribution of subsurface contamination that fluoresces, such as petroleum products containing polycyclic aromatic hydrocarbons (PAHs)."

E

Effectiveness

From the USEPA: "Ability to achieve stated goals or objectives, judged in terms of both output and impact."

Efficiency

From the USEPA: "The degree to which outputs are achieved in terms of productivity and input (resources allocated). Efficiency is a measure of performance in terms of which management may set objectives and plan schedules and for which staff members may be held accountable."

Endpoint

The point at which site remediation activities are no longer necessary. This can be used to describe the end of active remediation (e.g., ending P&T operations, chemical injections, etc.) or the end of all remediation efforts, including long-term monitoring. The term "Endpoint" must be interpreted in the context of the site phase.

Engineering control

Physical modifications to a site or facility to reduce or eliminate the potential for exposure to residual contamination (for example, slurry walls, capping, or vapor intrusion liner).

Engineered and constructed physical barriers to contain, prevent, or mitigate exposure to chemicals in an environmental medium. Examples of engineering controls include engineered caps and sub-slab depressurization systems, mitigation barriers, and fences. Similar to activity and land-use restrictions, engineering controls also typically require a specific mechanism for noticing the presence of the engineering control and related restrictions, as well as long-term maintenance and management of the control. The timing of a decision to use an engineering control, and the specific mechanism to be used, may be based on criteria outlined in statute, regulation, policy, or guidance.

Environmental justice

The fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies

Environmental management system

Broad data-management system used by state and federal agencies.

Environmental medium

Soil, surface water, groundwater, indoor air, outdoor air, sediment, and other parts of the environment that may be impacted by the release of a chemical.

Evapotranspiration

From the USEPA: "The sum of evaporation and plant transpiration from the Earth's land and ocean surface to the atmosphere. Evaporation accounts for the movement of water to the air from sources such as the soil, canopy interception, and water bodies. Transpiration accounts for the movement of water within a plant and the subsequent loss of water as vapor through stomata in its leaves."

Explanation of significant difference (ESD)

Adapted from the USEPA: A document used to describe to the public the nature of the significant changes from the ROD made during the remediation. An ESD summarizes the information that led to making the changes and affirms that the revised remedy complies with the NCP and the statutory requirements of CERCLA. USEPA guidance recommends describing the nature of the significant changes and suggests that a side-by-side comparison of the original and proposed remedy components be used to clearly display the significant differences. The ESD should provide additional information on changes

that have resulted in the remedy because of the change (e.g., changes in the cleanup cost estimate or remediation time frame).

Exposure

Contact of a receptor with a chemical. Exposure is quantified as the amount of the chemical available at the exchange boundaries of the organism (for example, skin, lungs, gut) and available for absorption (USEPA 1989 [D9FJF3V5] USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS), (Part A) Volume I, Human Health Evaluation Manual. United States Environmental Protection Agency, Office of Emergency and Remedial Response. https://doi.org/http://www2.epa.gov/risk/risk-assessment-guidance-superfund-rags-part.).

Exposure pathway

The channel or path followed by pollutants from their source via air, soil, water, and food to humans, animals, and the environment.

The course a chemical takes from a source to a receptor. An exposure pathway describes a unique mechanism by which an individual or population is exposed to chemicals at or originating from a site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium (for example, air) or media (in cases of intermedia transfer) is also included (USEPA 1989 [D9FJF3V5] USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS), (Part A) Volume I, Human Health Evaluation Manual. United States Environmental Protection Agency, Office of Emergency and Remedial Response. https://doi.org/http://www2.epa.gov/risk/risk-assessment-guidance-superfund-rags-part.).

Exposure point

A location of potential contact between a receptor and a chemical (USEPA 1989 [D9FJF3V5] USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS), (Part A) Volume I, Human Health Evaluation Manual. United States Environmental Protection Agency, Office of Emergency and Remedial Response. https://doi.org/http://www2.epa.gov/risk/risk-assessment-guidance-superfund-rags-part.) exposure route. The way a chemical comes in contact with an organism (for example, by ingestion, inhalation, or dermal contact) (USEPA 1989 [D9FJF3V5] USEPA. 1989. Risk Assessment Guidance for Superfund (RAGS), (Part A) Volume I, Human Health Evaluation Manual. United States Environmental Protection Agency, Office of Emergency and Remedial Response. https://doi.org/http://www2.epa.gov/risk/risk-assessment-guidance-superfund-rags-part.).

Exposure scenario

A set of facts, data, assumptions, and professional judgment about how an exposure occurs or does not occur. An exposure scenario addresses the (1) chemicals in environmental media and their sources, (2) exposed populations (or receptors), (3) migration of chemicals in environmental media from sources to receptors, and (4) routes of exposure (ingestion, dermal contact, inhalation).

Extraction well

From the USEPA: A well employed to extract fluids (water, gas, free product, or a combination of these) from the subsurface. Extraction is usually accomplished by either a pump located within the well or suction created by a vacuum pump at the ground surface.

F

Five-year review

From the USEPA: “The purpose of the five-year review is to evaluate the implementation and performance of the remedy in order to determine whether the remedy is or will be protective of human health and the environment.”

Fluorescence in situ hybridization probes

Short sequences of single-stranded DNA carrying a fluorescent label. When the probe binds to the target DNA/RNA sequence of the microorganism(s) of interest in an environmental sample, the target cell will fluoresce and can be visualized and

counted using a specialized microscope or a flow cytometer.

Detects the presence of targeted genetic material in an environmental sample and estimates the number of specific microorganisms or groups of microorganisms.

Flux

Flow per unit area.

Rate of flow of fluid, particles, or energy through a given surface.

The mass (mass flux) or volume (flux) moving through an area per time.

G

Gene

A segment of DNA containing the code for a protein, transfer RNA, or ribosomal RNA molecule.

Geochemical factors

Geologic/chemical parameters such as oxidation/reduction potential, nitrate, and sulfate that may influence the distribution, concentration, or persistence of contaminants in the subsurface.

Geochemistry

(1) Science that deals with the chemical composition of and chemical changes in the solid matter of the earth or a celestial body (like the moon), and (2) the related chemical and geological properties of a substance.

Geophysical classification

The process of making principled decisions, using data collected by geophysical sensors, to differentiate between buried items that are potentially hazardous and those that can be safely left in the ground during munitions response actions.

Geospatial analysis

Process of compiling and analyzing data related in time or space.

Geospatial data

Data that are referenced in 2D (x and y) or 3D (x, y, and z) space and/or time (t), where x, y and z represent spatial coordinates (e.g., latitude, longitude, and depth, respectively) and t represents a specific time of sampling.

Geospatial methods

Spatial or temporal analytical methods used to estimate values (such as concentrations) at unsampled locations or times. These methods require data with information about sampling locations and times. Some methods can also generate measures of uncertainty associated with the estimates.

Geostatistics

A branch of statistics that focuses on the analysis of spatial or spatiotemporal data, such as groundwater data (Gilbert 1987 [SDCFSEEV] Gilbert, R. O. 1987. Statistical Methods for Environmental Pollution Monitoring. John Wiley & Sons, Inc.).

Geothermal energy

From DOE: “Geothermal energy is heat derived below the earth’s surface which can be harnessed to generate clean, renewable energy. This vital, clean energy resource supplies renewable power around the clock and emits little or no greenhouse gases—all while requiring a small environmental footprint to develop.”

Global data variation

Systemic changes in data over relatively large temporal or spatial scales.

Granulated activated carbon (GAC)

Adapted from Water and Waste Digest: Often referred to in shortened form, activated carbon, GAC is an organic carbon filtration media made from wood, coconut shells, coal, peat, or other carbon sources. The activation process creates a large surface area to enhance the adsorptive process. GAC can adsorb a wide range of chemicals, making it useful for water purification. (What is Granular Activated Carbon (GAC)? | WWD (wwdmag.com).)

Green remediation

From the USEPA: The practice of considering all environmental effects of remedy implementation and incorporating options to minimize the environmental footprints of cleanup actions.

Groundwater protection standard

Concentration limits set by the regulatory agency as a standard to be attained in groundwater monitoring. These limits may be fixed health- or risk-based limits (for example, MCLs) or a background level (USEPA Unified Guidance).

H

Hazard identification

The process of determining whether exposure to a chemical in environmental media by a receptor can cause an increase in the incidence of an adverse human health effect (for example, incremental lifetime cancer risk) (USEPA 2012 [74BEK545] USEPA. 2012. “Human Health Risk Assessment (Web Page), Science and Technology, EPA Risk Assessment.” United States Environmental Protection Agency, ahead of print. https://doi.org/http://www2.epa.gov/risk/human-health-risk-assessment.).

Head

A specific measurement of water pressure above a geodetic datum. It is usually measured as a water surface elevation expressed in units of length.

Heterogeneous

Consisting of dissimilar or diverse elements.

High-density polyethylene (HDPE)

A high-density linear polyethylene is made from petroleum and is often used as a liner for waste disposal interments.

Homogeneous

Possessing the quality of uniformity.

Hot spot

Generally described as an area of elevated contamination (ITRC 2008 [XMXV8NGJ] ITRC. 2008. “Use of Risk Assessment in Management of Contaminated Sites.” Interstate Technology & Regulatory Council, Risk Assessment Resources Team.). A hot spot is not typically identified visually (i.e., stained soil, free product) but is primarily identified by soil sampling results. The specific area and magnitude of contamination constituting a hot spot should be agreed on during systematic project planning.

Hot spots are considered to be soil volumes with relatively high concentrations that could be present at a site but whose locations and dimensions cannot be anticipated prior to sampling.

Hydraulic conductivity (K)

The capability of a geologic medium to transmit water; higher K indicates less resistance to flow. A medium has a hydraulic conductivity of unit length per unit time, and it will transmit in unit time a unit volume of groundwater at the prevailing viscosity and density through a cross section of unit area (measured at right angles to the direction).

Hydraulic gradient

The difference in hydraulic head between two points on a flow path divided by the distance between the two points. Groundwater flow is from higher to lower hydraulic head.

Hydraulic loading rate

The volume of water applied to a system per time.

Hydraulic plume containment

A design where dissolved-phased contaminants are intercepted and removed at a specific location to prevent or minimize continued expansion of the plume, or where feasible, to pull the plume back from expanded dimensions.

I

In situ treatment

Treatment conducted while the subject or material is in its natural environment.

Institutional control

Land-Use Controls, Activity and Use Limitations, and Land-Use Restrictions: A legal or administrative restriction on the use of or access to a site or facility to eliminate or minimize potential exposure to COCs (such as proprietary controls or governmental controls).

Nonengineered instruments that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy (USEPA 2001 [3RRGSXF4] USEPA. 2001. “Risk Assessment Guidance for Superfund (RAGS), Volume III, Part A: Process for Conducting Probabilistic Risk Assessment.” United States Environmental Protection Agency, Office of Emergency and Remedial Response. https://doi.org/https://itrcweb.org/FileCabinet/GetFile?fileID=6872.). Examples include deed restrictions on land use, groundwater use restrictions, and city ordinances prohibiting private well installations. The use of these controls typically requires a specific mechanism for placing the restriction and future compliance with the restriction. The timing of the decision to use an institutional control, as well as the specific mechanism to be used, may be based on criteria outlined in statute, regulation, policy, or guidance.

Nonengineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the remedy.

Instrument verification strip (IVS)

One or more buried inert munitions or industry standard objects spaced approximately 5 meters apart. Data are collected over the IVS twice daily to verify that the geophysical sensor system can deliver the expected detection and classification performance.

Interfacial tension

Represents the force parallel to the interface of one fluid with another fluid (usually air or water), which leads to the formation of a meniscus and the development of capillary forces and a pressure difference between different fluids in the subsurface.

J

K

Kinetics

The study of rates of reaction.

Kriging variance

A calculated value for the degree of confidence in the estimated values at unsampled locations. The kriging variance is calculated using the sampled values within the predefined search neighborhood.

L

Lag

A parameter of a variogram. When sampling on a regular grid, it is the distance between samples. If the distance between samples is irregular, then the lag may be calculated as the average of the distances between the sampling locations. A sampled interval in time that is used to express temporal relationships between sample observations.

Land-use restrictions (controls)

Land-use controls may consist of nonengineered instruments, such as administrative and legal controls, or engineered and physical barriers, such as fences and security guards. Land-use controls help to minimize the potential for exposure to contamination and/or protect the integrity of a response action and are typically designed to work by limiting land and/or resource use or by providing information that helps modify or guide human behavior at a site.

Leachate

The materials or substances that are the result of extraction into a liquid, usually from a solid (aka carrier), by a solvent (most often water, for our purposes).

Life cycle

The stages of remedial action from site assessment, site investigation, remedy selection, remedy implementation, and post-construction activities to, ultimately, site completion.

Light nonaqueous-phase liquid (LNAPL)

A liquid that is not soluble and has a lower density than water.

Lines of evidence

Pieces of evidence are organized to show relationships among multiple hypotheses or complex interactions among agents, events, or processes. A weight of evidence approach includes the assignment of a numeric weight to each line of evidence.

Loading

Mass of something per time entering a volume (volumetric loading rate) or flowing into an area (areal loading rate).

Long-term response action (LTRA)

From the USEPA: The Fund-financed operation of groundwater or surface water restoration remedies for up to 10 years after the remedy is declared operational and functional. After the LTRA period, responsibility for O&M shifts to the states.

M

Mass discharge

Mass discharge (Md) is related to mass flux but is not limited to a defined area. Instead, it represents the total mass of solute (such as a contaminant) moving in the groundwater from a given source. Md is expressed as simply mass/time (e.g., g/d)_.

Mass flux

Mass flux (J) is a mass of a chemical (e.g., contaminants, amendments, tracers, and other chemical additives) that passes through a defined cross-sectional area over a period of time. Simply put, mass flux combines two key features of a contaminant plume: how much contaminant is in the groundwater and how fast the water is moving through a defined cross-section area (i.e., the contaminant concentration and the groundwater flux).

Mass loading

Contaminant released to the environment (in this case, the aquifer or unsaturated zone) from the source material.

Mass transfer

The irreversible transport of solute mass from the nonaqueous phase (that is, DNAPL) into the aqueous phase, the rate of which is proportional to the difference in concentration.

Microbial community

The microorganisms present in a particular sample.

Microbial community composition

Description of the types or identities of microorganisms present in a sample.

Microbial diversity

Microbial diversity can have many definitions but in this context generally refers to the number of different microbial species and their relative abundance in an environmental sample (Nannipieri et al. 2003 [69NPR9A8] Nannipieri, P., J. Ascher, M. T. Ceccherini, L. Landi, G. Pietramellara, and G. Renella. 2003. “Microbial Diversity and Soil Functions.” European Journal of Soil Science 54: 655–70.).

Monitored natural attenuation (MNA)

A remedy that relies on natural processes (i.e., biodegradation, sorption, dilution, evaporation, and chemical reactions) to decrease or “attenuate” concentration of contaminants in soil and groundwater. Scientists monitor these conditions to make sure that natural attenuation is working. Monitoring typically involves collecting soil and groundwater samples to analyze them for the presence of contaminants and other site characteristics.

N

National Contingency Plan (NCP)

Passed in 1988, this five-step process is used to evaluate contaminated sites and suggest the best plan for remediation.

National Priorities List (NPL)

From the USEPA: “The National Priorities List (NPL) is the list of sites of national priority among the known releases or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States and its territories.”

Natural source zone depletion (NSZD)

Naturally occurring processes that facilitate attenuation of LNAPL, resulting in reduction in LNAPL mass over time.

Nonaqueous-phase liquid (NAPL)

A liquid solution that does not mix easily with water. Many common groundwater contaminants, including chlorinated solvents and many petroleum products, enter the subsurface in nonaqueous-phase solutions. Light (LNAPL) and dense (DNAPL) liquids either float on water or sink below its surface.

O

Objective basis

Focusing on the existing objectives, revising the project objectives to the new reality, or modifying the objectives to support the next generation of remedy/corrective measure.

Optimization

The efforts at any phase of removal or remedial response to identify and implement specific actions to improve the effectiveness and cost-efficiency of the remedy during that phase.

Organic matter

Strictly defined, compounds in which carbon is bonded to hydrogen. Generally describes decomposed biological residues and other organic compounds synthesized by organisms.

Overburden

Geological term for the material above solid rock. Sometimes called “soil.”

P

Parameters

Intrinsic characteristics of a buried metal object, including size, shape, symmetry, aspect ratio, wall thickness, and material composition.

Pathway

The physical course a chemical or pollutant takes from the source to the organism exposed.

Permeability

(1) Characteristic of a material or membrane that allows liquids or gases to pass through it, or (2) the rate of flow of a liquid or gas through a porous material.

Permeable reactive barrier (PRB)

An engineered treatment system that uses low hydraulic conductivity media to draw groundwater into contact with reactive substrate to reduce the concentration of one or more contaminants.

pH

A measure of the acidity or alkalinity of a solution, numerically equal to 7 for neutral solutions, increasing with increasing alkalinity and decreasing with increasing acidity. The pH scale commonly in use ranges from 0 to 14.

Phase partitioning

Separation of fuel into solid, liquid, and gas phases.

Photovoltaic (PV)

From the DOE: “Photovoltaic (PV) technologies—more commonly known as solar panels—generate power using devices that absorb energy from sunlight and convert it into electrical energy through semiconducting materials. These devices, known as solar cells, are then connected to form larger power-generating units known as modules or panels.”

Phytoremediation

A bioremediation process that uses various types of plants to remove, transfer, stabilize, and/or destroy contaminants in the soil and groundwater. There are several different types of phytoremediation mechanisms.

Plume moment analysis

A mathematical method used to determine the spatial and/or mass characteristics of a contaminant plume. MAROS modeling uses moment analysis.

Plume reduction strategy

A design that focuses on diminishing the dissolved-phase contamination below target concentrations

Plume stability

The description of a contaminant plume over time, stability is often described in contaminant concentration or mass changes or lack of change over time.

Point of compliance

From USEPA: The point where media-specific standards (such as MCLs or risk-based cleanup goals) must be achieved.

Pore volume

From the USEPA: (1) The total volume of pore space in a given volume of rock or sediment. Pore volume usually relates to the volume of air or water that must be moved through contaminated material to flush the contaminants. (2) The volume of water (or air) that will completely fill all the void space in a given volume of porous matrix. Pore volume is equivalent to the total porosity. The rate of decrease in the concentration of contaminants in a given volume of contaminated porous media is directly proportional to the number of pore volumes that can be exchanged (circulated) through the same given volume of porous media.

Pore water

Water located in the interstitial compartment (between solid-phase particles) of bulk sediment.

Potentially responsible party (PRP)

The PRP from RCRA Orientation Manual 2014 Glossary is the person or persons who may be held liable for hazardous substance contamination under CERCLA. PRPs may include the owners and operators, generators, transporters, and disposers of the hazardous substances.

Preferential pathway

A high-permeability conduit for vapor migration such as utility penetrations, lines, or drains; building sumps or drainage pits; elevator shafts; fractures in bedrock; or gravel channels.

Project manager

An individual from a regulatory agency (for example, federal, state, or local), a consulting company, or responsible party company who is coordinating the site cleanup, including the risk assessment.

Project risk

Project risks include any uncertain events or conditions that have the potential to adversely affect a project's objectives, scope, time, cost, or targeted primary outcomes, or to result in unintentional adverse outcomes.

Protectiveness

From the USEPA: The process of protecting human health and the environment through hazardous site remediation.

Pulse pumping

Pulse pumping is a method of pumping contaminated groundwater that uses timing to allow the groundwater to hydraulically recover between periods of pumping. Pulse pumping also allows time for the contaminants to enter the groundwater. The goal is to minimize the amount of pumping of low-concentration contaminated groundwater and maximize the contaminant loading to the treatment system.

Pump and treat (P&T) system

A common method for cleaning up groundwater contaminated with dissolved chemicals in which groundwater is pumped to an aboveground treatment system that removes the contaminants for the purposes of remediation or control.

Q

Quality system

A structured and documented management system describing the policies, objectives, principles, organizational authority, responsibilities, accountability, and implementation plan of an organization to ensure quality in work processes, products (items), and services. The quality system provides the framework for planning, implementing, and assessing the work performed by an organization and for carrying out required quality assurance and quality control activities.

R

Radius of influence

From the USEPA: The maximum distance away from an air injection or extraction source that is significantly affected by a

change in pressure and induced movement of air.

Rebound

The back diffusion of contaminant mass present in low-permeability units resulting in increases in dissolved-phase concentrations after shutdown of extraction wells following early reductions in plume concentrations.

Recharge

The volume of water that crosses the water table. Groundwater recharge is a hydraulic process where water moves downward from surface water to groundwater.

Recirculation

Injecting or infiltrating treated effluent from the treatment system into the subsurface so the introduced water is captured by the P&T system.

Record of decision (ROD)

From the USEPA: “The ROD explains which cleanup alternatives will be used at NPL sites. It contains information on site history, site description, site characteristics, community participation, enforcement activities, past and present activities, contaminated media, the contaminants present, description of the response actions to be taken, and the remedy selected for cleanup. The development of the ROD also includes consideration of how the site could be used in the future.”

Redox conditions

Description of the oxidation/reduction potential of the subsurface (e.g. aerobic, anaerobic, sulfate reducing, or methanogenic conditions)

Relative permeability

The actual or effective permeability of a fluid in a REV relative to the intrinsic water permeability of a porous medium. The value of relative permeability (kr) ranges from 0 to 1.0 as a nonlinear function of S, where kr = 1.0 at S = 1.0 and kr = 0 at S= 0.

Remedial action objective (RAO)

Specific goals for protecting human health and the environment. RAOs are developed by evaluating ARARs that are protective of human health and the environment and the results of the remedial investigations, including the human and ecological risk assessments.

RAOs are also cleanup goals for a selected remedial action. Preliminary RAOs are often developed during the preliminary assessment/site investigation phase of a munitions response and are refined into definitive RAOs during the course of the remedial investigation/feasibility study process. Final RAOs are documented in the ROD or decision document. Remediation efforts are considered complete upon attainment of the RAOs.

Remediation

The act or process of abating, cleaning up, containing, or removing a substance (usually hazardous or infectious) from an environment.

Renewable energy

From the DOE: “Renewable energy is energy produced from sources like the sun and wind that are naturally replenished and do not run out. Renewable energy can be used for electricity generation, space and water heating and cooling, and transportation.”

Resilience/resiliency

A capability to anticipate, prepare for, respond to, and recover from significant multi-hazard threats with minimum damage to human health and the environment.

Resource Conservation and Recovery Act (RCRA)

Enacted in 1976, this provides a comprehensive management scheme for hazardous waste disposal. This includes a system to track the transportation of wastes and federal performance standards for hazardous waste treatment, storage, and disposal facilities. Open dumps are prohibited.

Responsible party

The entity that is required to ensure that selected institutional controls are properly applied and maintained.

Retardation factor

From the USEPA: The rate at which dissolved contaminants moving through an aquifer can be reduced by sorption of contaminants to the solid aquifer matrix. The degree of retardation depends on both aquifer and contaminant properties.

Risk assessment

An organized process used to describe and estimate the likelihood of adverse health outcomes from environmental exposures to chemicals. The four steps are hazard identification, dose-response assessment, exposure assessment, and risk characterization (Commission 1997 [TU933MWX] Commission, Presidential/Congressional. 1997. Framework for Environmental Health Risk Management. Final Report,. The Presidential/Congressional Commission on Risk Assessment and Risk Management. https://doi.org/https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=9101K1C3.TXT.).

Risk characterization

The risk characterization integrates information from the preceding components of the risk assessment and synthesizes an overall conclusion about risk that is complete, informative, and useful for decision-makers (USEPA 2000 [ZSSDB5GH] USEPA. 2000. “Supplementary Guidance for Conducting Health Risk Assessment of Chemical Mixtures.” Environmental Protection Agency, ahead of print. https://doi.org/https://itrcweb.org/FileCabinet/GetFile?fileID=6855.).

Risk communication

Actions, words, and other messages, responsive to the concerns and values of the information recipients, intended to help people make more informed decisions about threats to their health and safety.

Risk communication is the formal and informal process of communication among and between regulatory agencies and organizations responsible for site assessment and management and the various parties who are potentially at risk from or are otherwise interested in the site.

Risk management

The process of identifying, evaluating, selecting, and implementing actions to reduce risk to human health and to ecosystems. The goal of risk management is scientifically sound, cost-effective, integrated actions that reduce or prevent risks while taking into account social, cultural, ethical, political, and legal considerations (Commission 1997 [TU933MWX] Commission, Presidential/Congressional. 1997. Framework for Environmental Health Risk Management. Final Report,. The Presidential/Congressional Commission on Risk Assessment and Risk Management. https://doi.org/https://nepis.epa.gov/Exe/ZyPURL.cgi?Dockey=9101K1C3.TXT.).

S

Sample extent

The observation domain or area of characterization. It can be defined by the spatial boundary of a site or the duration of sampling.

Sample interval

The sampling distance or frequency at which data are collected. A sampling interval can be regular (for example, equal-spaced sampling grid or time intervals) or irregular (for example, nested sampling intervals or time steps).

Sample support

The larger mass, length, area, or time represented by a smaller sample or group of composite samples.

Sampling optimization

Improving the spacing, timing, and number of sample observations to adequately and defensibly characterize a site. Sampling optimization is geared toward optimizing the cost, time, and labor associated with field sampling efforts.

Saturation

Represents the proportion of the subsurface pore space within a REV that is occupied by a fluid (either DNAPL, air, or water), ranging from 0 to 1.0. When multiple fluids are present, the sum of all fluid saturations equals 1.0. DNAPL saturation very rarely approaches 1.0, because the NAPL typically shares pore spaces with water or air, and most porous media are water wetting.

Screening

The comparison (by ratio, usually the environmental medium concentration divided by a benchmark, standard, criterion, or similar value) of site conditions to a screening value. Often this is synonymous with “compare to a list that is readily available.”

Secondary porosity

The openings or discontinuities in a rock matrix caused by breakage, fracture, or dissolution, which are further subdivided by origin as faults, joints, or karst channels.

Sedimentation

The process of depositing entrained particles from water.

Seepage velocity

The rate of movement of fluid particles through porous media along a line from one point to another.

Sensitivity

The degree to which a system is affected, either adversely or beneficially, by climate variability or change. The change may be direct or indirect.

Sentinel well

From the USEPA: A groundwater monitoring well situated between a sensitive receptor downgradient and the source of a contaminant plume upgradient. Contamination should be first detected in the sentinel well, which serves as a warning that contamination may be moving closer to the receptor. The sentinel well should be located far enough upgradient of the receptor to allow enough time before the contamination arrives at the receptor to initiate other measures to prevent contamination from reaching the receptor, or in the case of a supply well, provide for an alternative water source.

Sequestration

The act of segregation. In environmental terms this usually refers to separation of materials by use of various technologies. Carbon sequestration refers to the capture and removal of CO_2 from the atmosphere through biological or physical processes.

Shutdown evaluation

An overall evaluation conducted to determine whether the P& T system has reached its desired effect (for example, steady state) or remedial objectives to decide whether to shut the system down. Rebound testing and other evaluations can be performed to understand how the plume responds under nonpumping conditions.

Sludge

A watery semi-solid that is typically a by-product of an industrial, refining, or treatment process.

Soil pore space

The air- or water-filled space that is between soil particles.

Soil screening level (SSL)

From the USEPA: SSLs are risk-based concentrations derived from equations combining exposure information assumptions with USEPA toxicity data.

Solidification

To make solid, compact, or hard; to make strong or united; or to become solid or united.

Sorption

The uptake of a solute by a solid.

The process in which one substance takes up or holds another: adsorption or absorption.

Source

From the USEPA: An origination point, area, or entity that releases or emits an agent that may be an indirect cause or a proximate cause.

Source control

Those efforts that are taken to eliminate or reduce, to the extent practicable, the release of COCs from direct and indirect ongoing sources to the aquatic system being evaluated.

A design where the remedial goal is to intercept and capture dissolved-phase contamination from the saturated zone adjacent to or within the source area.

Source strength

Mass discharge at the source zone.

Spatial component

That part of a description that defines an object’s position or location.

Spatial correlation

A relationship between a measured factor, such as a mineral concentration, and its location.

Spatial trend

The differences in values between points across a sampled area or large-scale variation. The spatial trend represents the local average of the data as a function of the location.

Species

From Biology Online: The lowest taxonomic rank and the most basic unit or category of biological classification.

Specific discharge

An apparent velocity calculated from Darcy’s Law, specific discharge represents the flow rate at which water could flow in an aquifer if the aquifer were an open conduit.

Stakeholder

ITRC broadly defines stakeholders as members of environmental organizations, community advocacy groups, tribal entities, or other groups that are concerned or involved with environmental issues, or concerned citizens who are not a member of any organization or group. Stakeholders add key voices, as well as balance and diversity.

Steady state

A state or condition of a system or process that does not change over time.

Storage/Storativity (S), coefficient of storage, or storage coefficient

The volume of water released from storage per unit of surface area of the aquifer or aquitard per unit decline in hydraulic head. Storativity is also referred to as coefficient of storage and storage coefficient.

Substrate

Any substance that is acted upon by an enzyme. It may be (a) a chemical that reacts, (b) a solid surface, or (c) an electron donor.

Superfund Amendments and Reauthorization Act (SARA)

Passed in 1986, this act provides cleanup standards and stipulates rules through the NCP for the selection and review of remedial actions. It strongly recommends that remedial actions use on-site treatments that "permanently and significantly reduce the volume, toxicity, or mobility of hazardous substances" and requires remedial action that is "protective of human health and the environment, that is cost-effective, and that utilizes permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable."

Supervisory control and data acquisition (SCADA)

A technology that allows a user to collect data from sensors and control equipment, such as pumps and valves, from a remote location.

Suspended solids

The weight of material that can be sedimented out of a stated volume of water. The amount of suspended solids is usually determined by filtering water through a pre-weighed 0.45-µm pore-diameter filter, drying the filter, and determining the mass gained.

Sustainability

The holistic consideration of environmental, social, and economic impacts of an activity and evaluation of these impacts on future generations.

Sustainable best management practices (SBMPs)

SBMPs for green remediation that holistically address a cleanup project's energy requirements, air emissions, impacts on water, impacts on land and ecosystems, material consumption and waste generation, and long-term stewardship actions. SBMPs can be used for sustainable removal or cleanup activities at contaminated sites under Superfund, corrective action, UST, and brownfield cleanup programs. In other guidance these may be referred to simply as BMPs.

Systematic planning

A planning process that is based on the scientific method. It is a common-sense approach designed to ensure that the level of detail in planning is commensurate with the importance and intended use of the data, as well as the available resources. Systematic planning is important to the successful execution of all activities at hazardous waste sites, but it is particularly important to dynamic field activities because those activities rely on rapid decision-making. The DQO process is one formalized process of systematic planning. All dynamic field activities must be designed through the use of systematic planning, whether using DQO steps or some other system. See also data quality objective (USEPA [ZVEWICKZ] USEPA. 2015h. "EPA Terminology Services." http://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do.).

T

Tailing

From the USEPA: The progressively slower rate of decline in dissolved contaminant concentration with continued operation

of a P&T system (USEPA 1997 [TPBES2A9] USEPA. 1997. “Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessment. Interim Final, Office of Solid Waste and Emergency Response.” https://doi.org/https://semspub.epa.gov/work/HQ/157941.pdf.).

Technical impracticability (TI)

From the USEPA: Technical Impracticability from RCRA Corrective Action Terms and Acronyms refers to a situation where attaining required groundwater cleanup levels is not practicable based on hydrogeologic factors, contaminant-related factors, and remediation system design inadequacies (USEPA 1993 [K447EQCV] USEPA. 1993. “Guidance for Evaluating the Technical Impracticability of Ground-Water Restoration.” U.S. Environmental Protection Agency, Office of Solid Waste and Emergency Response. https://nepis.epa.gov/Exe/ZyPDF.cgi/100021PJ.PDF?Dockey=100021PJ.PDF.).

Temporal component

That part of a description that defines an object or activity with regard to time.

Total suspended solids

The weight of material that can be sedimented out of a stated volume of water. The amount of suspended solids is usually determined by filtering water through a pre-weighed 0.45-µm pore-diameter filter, drying the filter to constant weight, and determining the mass gained.

Toxic Substances Control Act

Enacted in 1976, this act requires premarket notification of USEPA by the manufacturer of a new chemical. Based on testing information submitted by the manufacturer or premarket test ordered by USEPA (including biodegradability and toxicity), a court injunction can be obtained barring the chemical from distribution or sale. USEPA can also seek a recall of chemicals already on the market. This act prohibits all but closed-circuit uses of PCBs.

Toxicity assessment

The combination of hazard identification and the dose-response assessment.

Toxicity values

Derived values (for example, reference doses and slope factors) that can be used to estimate the incidence or potential for adverse human health effects in receptors (USEPA [ZVEWICKZ] USEPA. 2015h. “EPA Terminology Services.” http://iaspub.epa.gov/sor_internet/registry/termreg/searchandretrieve/termsandacronyms/search.do.).

Transcription

The first step in activation of a biochemical pathway where a complementary RNA copy is synthesized from a DNA sequence.

Transient

A state or condition of a system or process that changes over time.

Triad approach

The Triad approach embraces scientific and process improvements in three areas: systematic project planning, dynamic work strategies, and real-time measurement technologies. The central principle of the Triad approach is the management of decision uncertainty.

U

Uncertainty

The lack of perfect knowledge of values or parameters used in a risk assessment. Uncertainty may be reduced by collection of additional data.

V

Vadose zone

The unsaturated zone of soil in which the pore space is filled with both air and water.

Vapor control technologies

Technologies employed to mitigate real or potential impacts from vapor intrusion.

Vapor intrusion

The process by which volatile vapors partition from contaminated groundwater or other subsurface sources and migrate upward through vadose zone soils and into overlying buildings.

Vertical separation distance

The vertical distance from a petroleum vapor source to a building foundation.

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; it is a function of the character, magnitude, and rate of climate variation to which a system is exposed; its sensitivity; and its adaptive capacity.

W

Well rehabilitation

The act of restoring a well to its most efficient condition by various treatments, development, or reconstruction methods.

Z