Glossary

absorption – The process by which the number and energy of particles or photons entering a body of matter is reduced by interaction with the matter.

adsorption – The accumulation of gases, liquids, or solutes on the surface of a solid or liquid.

activity – See radioactivity.

air stripping – The process of bubbling air through water to remove volatile organic compounds from the water.

alpha particle – A positively charged particle emitted from the nucleus of an atom having the same charge and mass as that of a helium nucleus (two protons and two neutrons).

ambient air – The atmosphere around people, plants, and structures.

analyte – A constituent or parameter being analyzed.

analytical detection limit – The lowest reasonably accurate concentration of an analyte that can be detected; this value varies depending on the method, instrument, and dilution used.

aquifer – A geologic formation, group of formations, or part of a formation capable of yielding a significant amount of groundwater to wells or springs.

aquitard – A geologic unit that inhibits the flow of water.

assimilate – To take up or absorb.

atom – Smallest particle of an element capable of entering into a chemical reaction.

beta particle – A negatively charged particle emitted from the nucleus of an atom. It has a mass and charge equal to those of an electron.

biota – The animal and plant life of a particular region considered as a total ecological entity.

CERCLA-reportable release – A release to the environment that exceeds reportable quantities as defined by the Comprehensive Environmental Response, Compensation, and Liability Act.

chain-of-custody form – A form that documents sample collection, transport, analysis, and disposal.

closure – Formal shutdown of a hazardous waste management facility under Resource Conservation and Recovery Act requirements.

compliance – Fulfillment of applicable requirements of a plan or schedule ordered or approved by government authority.

concentration – The amount of a substance contained in a unit volume or mass of a sample.

conductivity – A measure of a material's capacity to convey an electric current. For water, this property is related to the total concentration of the ionized substances in water and the temperature at which the measurement is made.

confluence – The point at which two or more streams meet; the point where a tributary joins the main stream.

congener – Any particular member of a class of chemical substances. A specific congener is denoted by a unique chemical structure.

contained landfill – A solid waste site or facility that accepts disposal of solid waste. The technical requirements for contained landfills are found in 401 K.A.R. 47:080, 48:050, and 48:070 to 48:090.

contamination – Deposition of unwanted material on the surfaces of dissolved into structures, areas, objects, or personnel.

cosmic radiation – Ionizing radiation with very high energies that originates outside the earth's atmosphere. Cosmic radiation is one contributor to natural background radiation.

Curie (Ci) – A unit of radioactivity. One Curie is defined as 3.7×10^{10} (37 billion) disintegrations per second. Several fractions and multiples of the Curie are commonly used:

- **kiloCurie (kCi)** – 10^{3} Ci, one thousand curies; 3.7×10^{13} disintegrations per second.
- **milliCurie (mCi)** – 10^{-3} Ci, one-thousandth of a curie; 3.7×10^{7} disintegrations per second.
- **microCurie (µCi)** – 10^{-6} Ci, one-millionth of a curie; 3.7×10^{4} disintegrations per second.
- **picoCurie (pCi)** – 10^{-12} Ci, one-trillionth of a curie; 3.7×10^{-2} disintegrations per second.

daughter – A nuclide formed by the radioactive decay of a parent nuclide.

decay, radioactive – The spontaneous transformation of one radionuclide into a different radioactive or nonradioactive nuclide or into a different energy state of the same radionuclide.

dense, nonaqueous-phase liquid (DNAPL) – The liquid phase of chlorinated organic solvents. These liquids are denser than water and include commonly used industrial compounds such as tetrachloroethylene and trichloroethylene.

derived concentration guide (DCG) – The concentration of a radionuclide in air or water that, under conditions of continuous exposure for one year by one exposure mode (i.e., ingestion of water, submersion in air, or inhalation), would result in either an effective dose equivalent of 0.1 rem (1 mSv) or a dose equivalent of 5 rem (50 mSv) to any tissue, including skin and the lens of the eye. The guidelines for radionuclides in air and water are given in DOE Order 5400.5, *Radiation Protection of the Public and the Environment.*

disintegration, nuclear – A spontaneous nuclear transformation (radioactivity) characterized by the emission of energy and/or mass from the nucleus of an atom.

dose – The energy imparted to matter by ionizing radiation. The unit of absorbed dose is the rad, equal to 0.01 joules per kilogram in any medium.

- **absorbed dose** – The quantity of radiation energy absorbed by an organ divided by the organ's mass. Absorbed dose is expressed in units of rad (or gray) (1 rad = 0.01 Gy).
- **dose equivalent** – The product of the absorbed dose (rad) in tissue and a quality factor. Dose equivalent is expressed in units of rem (or sievert) (1 rem = 0.01 Sv).
- **committed dose equivalent** – The calculated total dose equivalent to a tissue or organ over a 50-year period after known intake of a radionuclide into the body. Contributions from external dose are not included. Committed dose equivalent is expressed in units of rem (or sievert).
- **committed effective dose equivalent** – The sum of the committed dose equivalents to various tissues in the body, each

multiplied by the appropriate weighting factor. Committed effective dose equivalent is expressed in units of rem (or sievert).

- **effective dose equivalent** – The sum of the dose equivalents received by all organs or tissues of the body after each one has been multiplied by an appropriate weighting factor. The effective dose equivalent includes the committed effective dose equivalent from internal deposition of radionuclides and the effective dose equivalent attributable to sources external to the body.
- **collective dose equivalent/collective effective dose equivalent** – The sums of the dose equivalents or effective dose equivalents of all individuals in an exposed population within a 50-mile (80-km) radius expressed in units of person-rem (or person-sievert). When the collective dose equivalent of interest is for a specific organ, the units would be organ-rem (or organ-sievert). The 50-mile distance is measured from a point located centrally with respect to major facilities or DOE program activities.

downgradient – In the direction of decreasing hydrostatic head.

downgradient well – A well that is installed hydraulically downgradient of a site and that may be capable of detecting migration of contaminants from a site.

drinking water standards (DWS) – Federal primary drinking water standards, both proposed and final, as set forth by the EPA in 40 C.F.R. 141 and 40 C.F.R. 143.

effluent – A liquid or gaseous waste discharge to the environment.

effluent monitoring – The collection and analysis of samples or measurements of liquid and gaseous effluents for purposes of characterizing and quantifying the release of contaminants, assessing radiation exposures to members of the public, and demonstrating compliance with applicable standards.

Environmental Restoration – A DOE program that directs the assessment and cleanup of its sites (remediation) and facilities (decontamination and decommissioning) contaminated with waste as a result of nuclear-related activities.

exposure (radiation) – The incidence of radiation on living or inanimate material by accident or intent. Background exposure is the exposure to natural background ionizing radiation. Occupational exposure is that exposure to ionizing radiation received at a person's workplace. Population exposure is the exposure to the total number of persons who inhabit an area.

external radiation – Exposure to ionizing radiation when the radiation source is located outside the body.

fauna – The population of animals in a given area, environment, formation, or time span.

flora – The population of plants in a given area, environment, formation, or time span.

formation – A mappable unit of consolidated or unconsolidated geologic material of a characteristic lithology or assemblage of lithologies.

gamma ray – High-energy, short-wavelength electromagnetic radiation emitted from the nucleus of an excited atom. Gamma rays are identical to X-rays except for the source of the emission.

Gaussian puff/plume model – A computer-simulated atmospheric dispersion of a release using a Gaussian (normal) statistical distribution to determine concentrations in air.

grab sample – A sample collected instantaneously with a glass or plastic bottle placed below the water surface to collect surface-water samples (also called dip samples).

groundwater, unconfined – Water that is in direct contact with the atmosphere through open spaces in permeable material.

half-life, radiological – The time required for half of a given number of atoms of a specific radionuclide to decay. Each nuclide has a unique half-life.

hardness – The amount of calcium carbonate dissolved in water, usually expressed as part of calcium carbonate per million parts of water.

hydrogeology – Hydraulic aspects of site geology.

hydrology – The science dealing with the properties, distribution, and circulation of natural water systems.

in situ – In its original place; field measurements taken without removing the sample from its origin; remediation performed while groundwater remains below the surface.

internal dose factor – A factor used to convert intakes of radionuclides to dose equivalents.

internal radiation – Occurs when natural radionuclides enter the body by ingestion of foods or liquids or by inhalation. Radon is the major contributor to the annual dose equivalent for internal radionuclides.

ion – An atom or compound that carries an electrical charge.

irradiation – Exposure to radiation.

isotopes – Forms of an element having the same number of protons but differing numbers of neutrons in their nuclei.

- **long-lived isotope** – A radionuclide that decays at such a slow rate that a quantity of it will exist for an extended period (half-life is greater than three years).

- **short-lived isotope** – A radionuclide that decays so rapidly that a given quantity is transformed almost completely into decay products within a short period (half-life is two days or less).

lower limit of detection – The smallest concentration or amount of analyte that can be reliably detected in a sample at a 95 percent confidence level.

maximally exposed individual – A hypothetical individual who remains in an uncontrolled area and would, when all potential routes of exposure from a facility's operations are considered, receive the greatest possible dose equivalent.

migration – The transfer or movement of a material through air, soil, or groundwater.

milliroentgen (mR) – A measure of X-ray or gamma radiation. The unit is one-thousandth of a roentgen.

minimum detectable concentration – The smallest amount or concentration of a radionuclide that can be distinguished in a sample by a given measurement system at a preselected counting time and at a given confidence level.

monitoring – Process whereby the quantity and quality of factors that can affect the environment or human health are measured periodically to regulate and control potential impacts.

mrem – The dose equivalent that is one-thousandth of a rem.

natural radiation – Radiation from cosmic and other naturally occurring radionuclide (such as radon) sources in the environment.

nuclide – An atom specified by its atomic weight, atomic number, and energy state. A radionuclide is a radioactive nuclide.

outfall – The point of conveyance (e.g., drain or pipe) of wastewater or other effluents into a ditch, pond, or river.

part per billion (ppb) – A unit measure of concentration equivalent to the weight/volume ratio expressed as µg/L or mg/mL.

part per million (ppm) – A unit measure of concentration equivalent to the weight/volume ratio expressed as mg/L.

pathogen – A disease-producing agent; usually refers to living organisms.

person-rem – Collective dose to a population group. For example, a dose of 1 rem to 10 individuals results in a collective dose of 10 person-rem.

pH – A measure of the hydrogen-ion concentration in an aqueous solution. Acidic solutions have a pH from 0 to 6, neutral solutions have a pH equal to 7, and basic solutions have a pH greater than 7.

piezometer – An instrument used to measure the hydraulic potential of groundwater at a given point; also, a well designed for this purpose.

polychlorinated biphenyl (PCB) - Any chemical substance that is limited to the biphenyl molecule and that has been chlorinated to varying degrees.

polynuclear aromatic hydrocarbon (PAH) – Any organic compound composed of more than one benzene ring.

process water – Water used within a system process.

purge – To remove water before sampling, generally by pumping or bailing.

quality assurance (QA) – Any action in environmental monitoring to ensure the reliability of monitoring and measurement data.

quality control (QC) – The routine application of procedures within environmental monitoring to obtain the required standards of performance in monitoring and measurement processes.

quality factor – The factor by which the absorbed dose (rad) is multiplied to obtain a quantity that expresses, on a common scale for all ionizing radiation, the biological damage to exposed persons. A quality factor is used because some types of radiation, such as alpha particles, are more biologically damaging than others.

rad – An acronym for Radiation Absorbed Dose. The rad is a basic unit of absorbed radiation dose. (This is being replaced by the "gray," which is equivalent to 100 rad.)

radiation detection instruments – Devices that detect and record the characteristics of ionizing radiation.

radioactivity – The spontaneous emission of radiation, generally alpha or beta particles or

gamma rays, from the nucleus of an unstable isotope.

radioisotopes – Radioactive isotopes.

radionuclide – An unstable nuclide capable of spontaneous transformation into other nuclides by changing its nuclear configuration or energy level. This transformation is accompanied by the emission of photons or particles.

reference material – A material or substance with one or more properties that is sufficiently well established and used to calibrate an apparatus, to assess a measurement method, or to assign values to materials.

release – Any discharge to the environment. Environment is broadly defined as any water, land, or ambient air.

rem – The unit of dose equivalent (absorbed dose in rads multiplied by the radiation quality factor). Dose equivalent is frequently reported in units of millirem (mrem), which is one-thousandth of a rem.

remediation – The correction of a problem. See Environmental Restoration.

Resource Conservation and Recovery Act (RCRA) – Federal legislation that regulates the transport, treatment, and disposal of solid and hazardous wastes.

RFI Program – RCRA Facility Investigation Program; EPA-regulated investigation of a solid waste management unit with regard to its potential impact on the environment.

roentgen – A unit of exposure from X-rays or gamma rays. One roentgen equals 2.58 x 10^{4} coulombs per kilogram of air.

screen zone – In well construction, the section of a formation that contains the screen, or perforated pipe, that allows water to enter the well.

semivolatile organic analyte (SVOA) – Any organic compound with a high boiling point which will volatilize upon heating.

sievert (Sv) – The SI (International System of Units) unit of dose equivalent; 1 Sv = 100 rem.

slurry – A suspension of solid particles (sludge) in water.

source – A point or object from which radiation or contamination emanates.

specific conductance – The ability of water to conduct electricity; this ability varies in proportion to the amount of ionized minerals in the water.

stable – Not radioactive or not easily decomposed or otherwise modified chemically.

storm-water runoff – Surface streams that appear after precipitation.

strata – Beds, layers, or zones of rocks.

substrate – The substance, base, surface, or medium in which an organism lives and grows.

surface water – All water on the surface of the earth, as distinguished from groundwater.

suspended solids – Mixture of fine, nonsettling particles of any solid within a liquid or gas.

terrestrial radiation – Ionizing radiation emitted from radioactive materials, primarily ^{40}K, thorium, and uranium, in the earth's soils. Terrestrial radiation contributes to natural background radiation.

thermoluminescent dosimeter (TLD) – A device used to measure external gamma radiation.

total activity – The total quantity of radioactive decay particles that are emitted from a sample.

total solids – The sum of total dissolved solids and suspended solids.

total suspended particulates – Refers to the concentration of particulates in suspension in the air irrespective of the nature, source, or size of the particulates.

transuranic element (TRU) – An element above uranium in the Periodic Table, that is, with an atomic number greater than 92. All 11 TRUs are produced artificially and are radioactive. They are neptunium, plutonium, americium, curium, berkelium, californium, einsteinium, fermium, mendelevium, nobelium, and lawrencium.

troughing system – A collection and containment system designed to collect leaks of oil that have been contaminated with PCBs.

turbidity – A measure of the concentration of sediment or suspended particles in solution.

upgradient – In the direction of increasing hydrostatic head.

vadose zone – Soil zone located above the water table.

volatile organic compound (VOC) – Any organic compound which has a low boiling point and readily volatilizes into air (e.g., trichloroethane, tetrachloroethylene, and trichloroethylene).

watershed – The region draining into a river, river system, or body of water.

wetland – A lowland area, such as a marsh or swamp, inundated or saturated by surface or groundwater sufficiently to support hydrophytic vegetation typically adapted to life in saturated soils.