

Glossary

Abiotic Pertaining to the nonliving parts of a system.

Abiotic degradation The transformation of a compound by living organisms, most commonly microorganisms.

Advection Transport of contaminants due only to the flow of water.

Aerobic biodegradation The breakdown of organic contaminants by microorganisms when oxygen is present. Aerobic biodegradation also is known as aerobic respiration.

Ambient ground water Untreated ground water that is characteristic of the aquifer resource. Studies of ambient ground water by the NAWQA Program typically exclude contaminated ground water at regulated point-source release sites.

Anoxic Ground water that has no dissolved oxygen or a very low concentration of dissolved oxygen (that is, less than 0.5 milligrams per liter).

Anthropogenic Derived from, or caused by human activity.

Anthropogenic compound A compound that occurs in the environment primarily as a result of human activity.

Aquifer A geologic formation, group of formations, or part of a formation that contains sufficient saturated permeable material (soil, sand, gravel and/or rock) to yield significant quantities of water to wells and springs.

Aquifer sample As used in this report, a water sample collected as part of an aquifer study.

Aquifer study A study to assess the general water quality of an aquifer, a part of an aquifer, or an aquifer system by sampling primarily existing wells. Typically 20 to 30 wells are sampled once. Wells are randomly selected using a stratified, areally distributed design. Wells are distributed over a large area, and the study constitutes a resource assessment.

Assessment level A concentration selected by a hydrologist and applied to water-quality data that have variable laboratory reporting levels either for a specific compound or between individual compounds. The assessment level is applied to data received from the laboratory and is applied subsequent to the laboratory reporting level. Concentrations reported by the laboratory but below the assessment level are considered as “non-detections” in the calculation of occurrence statistics. The primary purpose of the assessment level is for accurate comparison of detection frequencies and median concentrations between individual VOCs, groups of VOCs, and to previous studies.

Atmospheric deposition The process by which chemical constituents are deposited from the atmosphere to the earth’s surface by rain, sleet, and snow.

Biodegradation See definition for biotic degradation.

Biotic Pertaining to the living parts of a system.

Biotic degradation As used in this report, the conversion of a parent VOC to a by-product by microorganisms. Also known as biodegradation.

By-product A compound that results from the degradation of another (that is, parent) compound.

Chlorinated solvent An organic compound that contains chlorine and is used in a variety of industrial, commercial, and domestic applications. In general, chlorinated solvents have relatively high densities, relatively high vapor pressures and solubilities, and relatively long half-lives in ground water.

Community water system (CWS) A public water system that supplies water to the same population year-round. A CWS serves a residential population, such as a municipality, mobile home park, or nursing home.

Concentration The amount or mass of a substance present in a given volume or mass of sample. Concentrations in this report generally are expressed in micrograms per liter, but are also expressed in milligrams per liter and nanograms per liter.

Concentration of potential human-health concern As used in this report: (1) for a regulated compound with a U.S. Environmental Protection Agency drinking-water standard, a concentration greater than the Maximum Contaminant Level; and (2) for an unregulated compound, a concentration greater than the Health-Based Screening Level.

Degradation The breakdown of substances like VOCs through abiotic or biotic processes.

Detection frequency The frequency of detection of an individual VOC that was computed as the number of samples with a detection of an individual VOC divided by the number of samples in which the VOC was analyzed, times 100. In most cases, the detection frequency reported in this assessment was computed at a prescribed assessment level.

Detection frequency of VOCs by group The frequency of detection of one or more VOCs from a particular use group that was computed as the number of samples with a detection of one or more VOCs from a particular use group divided by the number of samples analyzed for the particular use group, times 100. In all cases, the detection frequency of VOCs by group was computed at a prescribed assessment level.

Dispersion The process whereby solutes are mixed and spread during advective transport due to velocity variations.

Domestic well A privately owned well that typically serves one home and supplies water for human consumption and other homeowner uses.

Domestic well water Self-supplied water that is withdrawn from a private well and used for human consumption and other

homeowner uses. Water supplied for domestic wells often is untreated and is not subject to federally enforceable drinking-water standards.

Drinking water Water for human consumption that meets all applicable Federal, State, and local requirements.

Fifteen most frequently detected VOCs The 15 compounds with the largest detection frequency in samples from aquifers, domestic wells, or public wells, based on samples from all wells and an assessment level of 0.2 microgram per liter.

Fumigant A compound or mixture of compounds that produces a gas, vapor, fumes, or smoke intended to destroy, repel, or control organisms such as insects, bacteria, or rodents. Bromomethane is an example of a fumigant used for large-scale strawberry farming.

Gasoline hydrocarbon A straight, branched, and (or) cyclic structured organic compound containing only carbon and hydrogen atoms that is a common ingredient in gasoline and other petroleum product formulations. Benzene, toluene, ethylbenzene, and xylenes, commonly referred to as BTEX, are a subset of the gasoline hydrocarbons.

Gasoline oxygenate A compound that contains oxygen and was added to gasoline in order to meet the requirements of the 1990 Clean Air Act Amendments. As used in this report, gasoline oxygenates include the four ethers MTBE, TAME, DIPE, and ETBE.

Ground water Water beneath the land surface in the saturated zone.

Half-life The time required for the concentration of a compound in a given environmental medium to be reduced to one-half of its original value by one or more processes, such as degradation or transport into another environmental medium.

Halogenated aliphatic organic compound A compound belonging to a group of compounds that consist of carbon and hydrogen atoms, and any of the five nonmetallic elements including bromine, chlorine, fluorine, iodine, or astatine. Atoms are linked in an open chain.

Health-Based Screening Level (HBSL) An estimate of concentration (for a noncarcinogen) or concentration range (for a carcinogen) in water that (1) may be of potential human-health concern; (2) can be used as a threshold value against which measured concentrations of contaminants in ambient ground-water samples can be compared; and (3) is consistent with USEPA Office of Water methodologies.

Hydric soil Soil that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anoxic conditions in the upper part of the soil profile.

Intrinsic susceptibility A measure of the ease with which a contaminant in water enters and moves through an aquifer. It is a characteristic of the aquifer and overlying material and

hydrologic conditions, and is independent of the chemical characteristics of the contaminant and its sources.

Laboratory reporting level A level of reporting concentrations of VOCs in a water sample that is set by the laboratory to minimize the rate of false positives and false negatives. Concentrations below the laboratory reporting level are denoted by a less than designation, "<," preceding a concentration value.

Lithology The physical character of a rock based on such characteristics as color, structure, mineralogical composition, and grain size.

Low-level (analytical) method A new GC/MS method for the analysis of VOCs in ambient water samples, USGS method 0-4127-96, which was implemented in 1996.

Low-level contamination As used in this report, concentrations of individual VOCs or VOC groups, and total VOC concentrations less than 1 microgram per liter. Although arbitrary, this concentration is approximately the laboratory reporting level for VOCs by many agencies. The USGS low-level method identifies VOCs at concentrations 2-3 orders of magnitude below this benchmark.

Maximum Contaminant Level (MCL) As used in this report, a USEPA drinking-water standard that is legally enforceable, and that sets the maximum permissible level of a contaminant in water that is delivered to any user of a public water system.

Maximum Contaminant Level Goal (MCLG) As established by the USEPA, a non-enforceable health goal that is set at a level at which no known or anticipated adverse effect on the health of persons occurs and which allows an adequate margin of safety.⁽¹²¹⁾

Median A compound's concentration for which 50 percent of the laboratory analyses, when arranged in order of magnitude, lie on each side. In this report, this median is based on samples from all wells.

Median (concentrations) of detections A compound's concentration for which 50 percent of the detections, when arranged in order of magnitude, lie on each side. For the 0.02-microgram per liter assessment level, this median for this report is based on the subset of wells for which samples were analyzed by the low-level (analytical) method.

Non-aqueous-phase liquid An organic liquid that can exist in a separate phase in equilibrium with water after the dissolved concentration in water has reached the saturation limit for water.

Occurrence The presence, frequencies of detection, concentrations, and ranges of concentrations of VOCs and the locations (areal patterns) of VOC detections in ground water.

Old ground water As used in this report, ground water recharged prior to 1955.

Organic synthesis compound A compound that is used in the formation of other organic compounds. Chloroethene is an example of an organic synthesis compound used in the production of polyvinyl chloride plastics.

Oxic Ground water that has a concentration of dissolved oxygen greater than or equal to 0.5 milligrams per liter.

Permeability A measure of the relative ease with which a porous medium can transmit a fluid.

Primary drinking-water standard A regulation that (1) applies to public water systems; (2) specifies contaminants that may have any adverse effect on the health of persons; (3) specifies for each contaminant a maximum contaminant level or treatment technique; and (4) contains criteria and procedures to ensure compliance.

Principal aquifer A regionally extensive aquifer or aquifer system that has the potential to be used as a source of potable water.

Probable human carcinogen Under the USEPA's cancer classification, an agent that is likely to be carcinogenic to humans.⁽¹²²⁾ Probable human carcinogens also have been expressed as a USEPA cancer "group" and included agents for which the weight of evidence of human carcinogenicity based on epidemiologic studies was limited ("Group B1"), and those for which the weight of evidence of carcinogenicity based on animal studies was "sufficient" ("Group B2").⁽¹²¹⁾

Public water system (PWS) Any publicly or privately owned water system that provides water for human consumption if such system has 15 connections or regularly serves at least 25 people for at least 60 days out of the year. PWSs include (1) community water systems, such as municipalities, mobile home parks, or nursing homes; (2) transient non-community water systems, such as campgrounds, motels, and gasoline stations; and (3) non-transient, non-community systems, such as schools, factories, and hospitals.

Public well As used in this report, a privately or publicly owned well that provides water to a public water system (PWS).

Public well water As used in this report, water provided by a public water system that is for human consumption and other homeowner uses. Water may be treated or blended prior to distribution.

RCRA Hazardous-Waste Facilities As used in this report, includes treatment, storage, and disposal facilities regulated under the Resource Conservation and Recovery Act.

Recharge The process involved in the addition of water to the saturated zone. Also, the amount of water added.

Redox condition As used in this report, redox condition refers to the position that a system is in for the redox scale between very oxidizing and very reducing.

Reductive dechlorination A reductive process, usually mediated by bacteria, in which chlorine atoms on a chlorinated aliphatic hydrocarbon are replaced sequentially with hydrogen. Also known as dehalogenation, hydrogenolysis, and hydrogenolytic dehalogenation.

Reformulated Gasoline (RFG) Program A program applied to an area established under the Clean Air Act Amendments in which gasoline contained 2 percent oxygen by weight year-round to control levels of tropospheric ozone.

Refrigerant A compound used for producing refrigeration, either as a working substance in a refrigerator or by direct absorption of heat. The chlorofluorocarbons (CFCs) are classified as refrigerants for the purposes of this report.

Regulated compound As used in this report, a compound for which a Federal drinking-water standard has been established.

Respiration The metabolic processes whereby certain organisms obtain energy from organic molecules.

Rural area An area that has a population density of less than 386 persons/km² (1,000 persons/mi² or 1.56 persons/acre).

Saturated zone The region in the subsurface in which all the interstices or voids are filled with water under a pressure exceeding that of the atmosphere.

Shallow ground-water study An investigation of the concentrations and distribution of water-quality constituents in recently recharged ground water (generally less than 10 years old) associated with a particular land use. For each study, usually about 20-30 shallow monitoring wells are sampled.

Solvent A compound that is used to dissolve other substances. Two of the more common solvents are trichloroethene (TCE) and perchloroethene (PCE).

Sorption The interaction, through binding or association, of a solute ion or molecule with a solid.

Source of contamination Includes any natural or anthropogenic chemical or physical property of the ground-water resource that is not desirable from a health or other perspective such as interference with water-treatment practices.

Study Unit A major hydrologic system of the United States in which NAWQA studies are focused, geographically defined by surface- or ground-water features and usually encompassing more than 10,000 km² of land area. The NAWQA studies during the first decade of assessments included 51 of these systems, collectively covering a large part of the Nation, encompassing the majority of population and water use, and including diverse hydrologic settings that differ widely in the natural and human factors that affect water quality.

Study-Unit investigation The systematic study of water quality in a NAWQA Study Unit. Study Units are organized into three groups that are studied on a rotational schedule, with 3-year intensive study periods repeated about every decade.

Susceptibility See definition for intrinsic susceptibility.

Total trihalomethane concentration The sum of all quantified concentrations for bromodichloromethane, bromoform, chloroform, and dibromochloromethane in a water sample.

Total VOC concentration The sum of all quantified concentrations for all VOCs analyzed in a sample.

Total xylene concentration The sum of all quantified concentrations for *m*-xylene, *o*-xylene, and *p*-xylene in a water sample.

Trihalomethane (THM) As used in this report, a compound belonging to a group of VOCs that includes bromodichloromethane, bromoform, chloroform, and dibromochloromethane. These compounds are known by-products of water chlorination.

Unregulated compound As used in this report, a compound for which no Federal drinking-water standard has been established. Note that a compound that is unregulated under the Safe Drinking Water Act may be regulated in other contexts and under other statutes.

Unsaturated zone The subsurface region above the water table in which the pore spaces may contain a combination of air and water.

Urban area An area that has a population density of 386 persons/km² (1,000 persons/mi² or 1.56 persons/acre) or greater.

VOC mixture The co-occurrence of two or more VOCs in a water sample.

Volatile organic compound (VOC) An organic chemical that has a high vapor pressure relative to its water solubility. VOCs include components of gasoline, fuel oils, and lubricants, as well as organic solvents, fumigants, some inert ingredients in pesticides, refrigerants, some compounds used in organic synthesis, and some by-products of water chlorination.

Vulnerability The tendency or likelihood for contaminants to reach a specified position in the ground-water system after introduction at some location above the uppermost aquifer. The vulnerability of a ground-water resource to contamination depends on its intrinsic susceptibility as well as the locations and types of sources of naturally occurring and anthropogenic contamination, relative location of wells, and the fate and transport of the contaminant(s). As used in this report, an aquifer is considered vulnerable if at least one VOC was detected in aquifer samples.

Well sample As used in this report, water collected (prior to treatment and blending) from a domestic or public well built into or drilled into the zone of saturation.

Young ground water As used in this report, ground water recharged after 1955.