

GLOSSARY

GLOSSARY OF TERMS

Absolute Viscosity:	A measure of a fluid's resistance to tangential or shear stress. Also referred to as dynamic viscosity; see also viscosity. Units are usually given in centipoise.
Air/Oil Table:	The surface between the vadose zone and the oil; pressure of oil in the porous medium is equal to atmospheric pressure.
Anisotropy:	The conditions under which one or more of the hydraulic properties of an aquifer vary with direction.
Aquifer:	A geologic formation, group of formations or part of a formation that contains saturated permeable material that yields sufficient, economical quantities of groundwater.
Aquifer Test:	A test to determine hydraulic properties of an aquifer, involving the withdrawal or injection of measured quantities of water from or to a well and the measurement of resulting changes in hydraulic head in the aquifer.
Biodegradation:	A subset of biotransformation, it is the biologically mediated conversion of a compound to more simple products.
Bulk Density:	The mass of a soil per unit bulk volume of soil; the mass is measured after all water has been extracted and the volume includes the volume of the soil itself and the pore volume.
Capillary Forces:	Interfacial forces between immiscible fluid phases, resulting in pressure differences between the two phases.

Capillary Fringe:	The zone immediately above the water table within which the water is drawn by capillary forces (fluid is under tension). The capillary fringe is saturated and it is considered to be part of the unsaturated zone.
Cone of Depression:	A depression in the groundwater table (or potentiometric surface) that has the shape of an inverted cone and develops around a vertical discharge well.
Darcy's Law:	An empirically derived equation for the flow of fluids through porous media. It is based on the assumptions that flow is laminar and inertia can be neglected, and it states that the specific discharge, q , is directly proportional to the hydraulic conductivity, K , and the hydraulic gradient, I .
DNAPL:	Dense Non-Aqueous Phase Liquid. A liquid which consists of a solution of organic compounds (<i>e.g.</i> , chlorinated hydrocarbons) and which is denser than water. DNAPLs sink through the water column until they reach the bottom of the aquifer where they form a separate layer. Unlike LNAPLs, DNAPLs flow down the slope of the aquifer bottom which is independent of the direction of hydraulic gradient.
Drawdown:	A lowering of the water table of an unconfined aquifer or the potentiometric surface of a confined aquifer caused by pumping of groundwater from wells. The vertical distance between the original water level and the new water level.
Dual-Phase Extraction:	The active withdrawal of both liquid and gas phases from a well usually involving the use of a vacuum pump.
Effective Porosity:	The interconnected pore space through which fluids can pass, expressed as a percent of bulk volume. Part of the total porosity will be occupied by static fluid being held to mineral surface by surface tension, so effective porosity will be less than total porosity.

Extraction Well:	A discharge well used to remove groundwater or air.
Free Product:	Immiscible liquid phase hydrocarbon existing in the subsurface with a positive pressure such that it can flow into a well.
Groundwater:	The water contained in interconnected pores below the water table in an unconfined aquifer or in a confined aquifer.
Interfacial Tension:	The strength of the film separating two immiscible fluids (<i>e.g.</i> , oil and water) measured in dynes (force) per centimeter or millidynes per centimeter.
Henry's Law:	The relationship between the partial pressure of a compound and its equilibrium concentration in a dilute aqueous solution through a constant of proportionality known as the Henry's Law Constant.
Heterogeneity:	Characteristic of a medium in which material properties vary from point to point.
Homogeneity:	Characteristic of a medium in which material properties are identical throughout. Although heterogeneity, or non-uniformity, is the characteristic of most aquifers, assumed homogeneity, with some other additional assumptions, allows use of analytical models as a valuable tool for approximate analyses of groundwater movement.
Hydraulic Conductivity:	A coefficient of proportionality describing the rate at which water can move through a permeable medium. Hydraulic conductivity is a function of both the intrinsic permeability of the porous medium and the kinematic viscosity of the water which flows through it. Also referred to as the coefficient of permeability.
Hydraulic Gradient:	Slope of a water table or potentiometric surface. More specifically, change in the hydraulic head per unit of distance in the direction of the maximum rate of decrease.

Hydraulic Head:	Height above a datum plane (such as mean sea level) of the column of water that can be supported by the hydraulic pressure at a given point in a groundwater system. Equal to the distance between the water level in a well and the datum plane.
Hysteresis:	Phenomenon in which properties such as capillary pressure or relative permeability may differ depending on whether a fluid-fluid interface is advancing (imbibition) or receding (drainage).
Immiscible:	The chemical property where two or more liquids or phases do not readily dissolve in one another, such as soil and water.
Intrinsic Permeability:	Pertaining to the relative ease with which a porous medium can transmit a liquid under a hydraulic or potential gradient. It is a property of the porous medium and is independent of the nature of the liquid or the potential field.
Isotropy:	The condition in which the properties of interest (generally hydraulic properties of the aquifer) are the same in all directions.
Kinematic Viscosity:	The ratio of dynamic viscosity to mass density. It is obtained by dividing dynamic viscosity by the fluid density. Kinematic viscosity is typically reported in units of centistokes (cSt).
LNAPL:	Light Non-Aqueous Phase Liquid. A liquid consisting of a solution of organic compounds (<i>e.g.</i> , petroleum hydrocarbons) which is less dense than water and forms a separate layer that floats on the water's surface.
NAPL:	Non-Aqueous Phase Liquid. See also DNAPL and LNAPL.
Partitioning:	Chemical equilibrium condition where a chemical's concentration is apportioned between two different phases according to the partition coefficient, which is

the ratio of a chemical's concentration in one phase to its concentration in the other phase.

- Perched Aquifer: A special case of unconfined aquifer which occurs wherever an impervious (or semipervious) layer of limited areal extent is located between the regional water table of an unconfined aquifer and the ground surface.
- Porosity: Ratio of the total volume of voids to the total volume of a porous medium. The percentage of the bulk volume of a rock or soil that is occupied by interstices, whether isolated or connected. Porosity may be primary (formed during deposition or cementation of the material) or secondary (formed after deposition or cementation) such as fractures.
- Potentiometric Surface: A surface that represents the level to which water will rise in tightly cased wells. If the head varies significantly with depth in the aquifer, then there may be more than one potentiometric surface. The water table is a particular potentiometric surface for an unconfined aquifer.
- Pumping Test: A test that is conducted to determine aquifer or well characteristics. A test made by pumping a well for a period of time and observing the change in hydraulic head in the aquifer. A pumping test may be used to determine the capacity of the well and the hydraulic characteristics of the aquifer. Also called aquifer test.
- Radius of Influence: The radial distance from the center of a wellbore to the point where there is no lowering of the water table or potentiometric surface (the edge of its cone of depression). The radial distance from an extraction well that has adequate air flow for effective removal of contaminants when a vacuum is applied to the extraction well.
- Relative Permeability: The permeability of the rock to gas, NAPL, or water, when any two or more are present, expressed as a fraction of the single phase permeability of the rock.

Residual Saturation:	Saturation below which fluid drainage will not occur.
Saturation:	The ratio of the volume of a single fluid in the pores to pore volume expressed as a percentage or a fraction.
Saturated Zone:	Portion of the subsurface environment in which all voids are ideally filled with water under pressure greater than atmospheric. The zone in which the voids in the rock or soil are filled with water at a pressure greater than atmospheric. The water table is the top of the saturated zone in an unconfined aquifer.
Solubility, Aqueous:	The maximum concentration of a chemical that will dissolve in pure water at a reference temperature.
Sorption:	Processes that remove solutes from the fluid phase and concentrate them on the solid phase of a medium; used to encompass absorption and adsorption.
Transmissivity:	Rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit hydraulic gradient.
Unconfined:	Conditions in which the upper surface of the zone of saturation forms a water table under atmospheric pressure.
Unsaturated Zone:	The zone between the land surface and the water table. It includes the root zone intermediate zone, and capillary fringe. The pore spaces contain water, as well as air and other gases at less than atmospheric pressure. Saturated bodies, such as perched groundwater, may exist in the unsaturated zone, and water pressure within these may be greater than atmospheric. Also known as “vadose zone.”
Vapor Pressure:	The partial pressure exerted by the vapor (gas) of a liquid or solid substance under equilibrium conditions. A relative measure of chemical volatility, vapor pressure is used to calculate air-

water partition coefficients (*i.e.*, Henry's Law constants) and volatilization rate constants.

Viscosity: The internal friction within a fluid that causes it to resist flow. Absolute viscosity is typically given in centipoise; kinematic viscosity is the absolute viscosity divided by the fluid density. Kinematic viscosity is typically reported in units of centistokes (cSt).

Viscous Fingering: The formation of finger-shaped irregularities at the leading edge of a displacing fluid in a porous medium which moves out ahead of the main body of a fluid.

Volatilization: The transfer of a chemical from the liquid to the gas phase. Solubility, molecular weight, vapor pressure of the liquid, and the nature of the air-liquid interface affect the rate of volatilization.

Water Table: Upper surface of a zone of saturation, where that surface is not formed by a confining unit; water pressure in the porous medium is equal to atmospheric pressure. The surface between the vadose zone and the groundwater; that surface of a body of unconfined groundwater at which the pressure is equal to that of the atmosphere.

Well Point: A hollow vertical tube, rod, or pipe terminating in a perforated pointed shoe and fitted with a fine-mesh wire screen.

Wettability: The relative degree to which a fluid will spread on (or coat) a solid surface in the presence of other immiscible fluids.