

Glossary

Metric and U.S. Customary Unit Equivalents

Category	From metric unit to U.S. customary equivalent unit		From U.S. customary unit to metric equivalent unit	
	Metric	U.S.	U.S.	Metric
Length	1 centimeter (cm)	0.39 inches (in.)	1 inch (in.)	2.54 centimeters (cm)
	1 millimeter (mm)	0.039 inches (in.)		25.4 millimeters (mm)
	1 meter (m)	3.28 feet (ft)	1 foot (ft)	0.3048 meters (m)
		1.09 yards (yd)	1 yard (yd)	0.9144 meters (m)
1 kilometer (km)	0.62 miles (mi)	1 mile (mi)	1.6093 kilometers (km)	
Volume	1 liter (L)	0.26 gallons (gal)	1 gallon (gal)	3.7853 liters (L)
	1 cubic meter (m ³)	35.32 cubic feet (ft ³)	1 cubic foot (ft ³)	0.028 cubic meters (m ³)
		1.35 cubic yards (yd ³)	1 cubic yard (yd ³)	0.765 cubic meters (m ³)
Weight	1 gram (g)	0.035 ounces (oz)	1 ounce (oz)	28.6 gram (g)
	1 kilogram (kg)	2.21 pounds (lb)	1 pound (lb)	0.373 kilograms (kg)
	1 metric ton (MT)	1.10 short ton (2000 pounds)	1 short ton (2000 pounds)	0.90718 metric ton (MT)
Area	1 hectare	2.47 acres	1 acre	0.40 hectares
Radioactivity	1 becquerel (Bq)	2.7×10^{-11} curie (Ci)	1 curie (Ci)	3.7×10^{10} becquerel (Bq)
Radiation dose	1 gray (Gy)	100 rad	1 rad	0.01 gray (Gy)
Radiation dose equivalent	1 sievert (Sv)	100 rem	1 rem	0.01 sievert (Sv)
Temperature	Metric to U.S. °Centigrade = (°Fahrenheit – 32) / 1.8		U.S. to metric. °Fahrenheit = (°Centigrade x 1.8) + 32	

Symbols and Units of Measure

α	alpha
β	beta
°C	degrees centigrade
°F	degrees Fahrenheit
γ	gamma
σ	sigma
aCi	attocurie
μ Bq	microbecquerel
μ Sv	microsievert
μ Sv/y	microsievert per year
ac	acre
Bq	becquerel
Bq/mL	becquerel per milliliter
Ci	curie
cm	centimeter(s)

cm ³ /min	cubic centimeter(s) per minute
ft	foot (feet)
fCi/m ³	femtocurie per cubic meter
ft/y	foot (feet) per year
g	gram(s)
gal	gallon(s)
gal/yr	gallon(s) a year
GBq	gigabecquerel (10 ⁹ Bq)
ha	hectare
in.	inch(es)
kg	kilogram(s)
kg/day	kilogram(s) per day
km	kilometer(s)
kWh	kilowatt-hour(s)
L	liter(s)
lb	pound(s)
m ³ /min	cubic meter(s) per minute
m	meter(s)
mCi	millicurie (10 ⁻³ Ci)
mi	mile(s)
ML	million liters
mph	mile(s) per hour
mrem	millirem
mrem/y	millirem per year
m/s	meter(s) per second
mSv	millisievert (10 ⁻³ Sv)
m/y	meter(s) per year
nBq	nanobecquerel
nSv	nanosievert (10 ⁻⁹ Sv)
pg/m ³	picogram(s) per cubic meter
ppb	part(s) per billion
ppm	part(s) per million
ppm _{v/v}	part(s) per million on a volume-per-volume basis
Sv	sievert
TBq	terabecquerel

Acronyms and Abbreviations

%RSD	Percent relative standard deviation
ACCDA	Alameda County Community Development Agency
ACDEH	Alameda County Department of Environmental Health
ACHP	Advisory Council on Historic Preservation
ACOE	Army Corps of Engineers

AFV	alternative fuel vehicle
ALARA	as low as reasonably achievable
ANSI	American National Standards Institute
ATSDR	Agency for Toxic Substances and Disease Registry
AWQC	ambient water quality criteria
BAAQMD	Bay Area Air Quality Management District
BCG	Biota Concentration Guide
BMP	best management practice
BOD	Biochemical (biological) oxygen demand
BSA	Blanket Service Agreement
BSL-3	Biosafety Level 3
CAM	continuous air monitor
CAMP	Corrective Action Monitoring Program
CAP	corrective action plan
CARB	California Air Resources Board
CCB	Change Control Board
CCR	California Code of Regulations Container Content Report
CEI	Compliance Evaluation Inspection
CEQA	California Environmental Quality Act of 1970
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act of 1980
CFR	Code of Federal Regulations
Chromium(VI)	hexavalent chromium
CMP	Compliance Monitoring Program
CNPS	California Native Plant Society
CO	carbon monoxide
COC	constituent of concern
COD	chemical oxygen demand
CRLF	California red-legged frog
CSA	container storage area
CTC	Closing-the-Circle
CUPA	Certified Unified Program Agencies
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	(Federal) Clean Water Act
DCG	derived concentration guide
DHS	California Department of Health Services
DIS	distal
DMP	Detection Monitoring Program
DMT	Data Management Team
DOE	U.S. Department of Energy
DOECAP	U.S. Department of Energy Consolidated Auditing Program
DRB	Drainage Retention Basin (now Lake Haussmann)
DTSC	(California Environmental Protection Agency) Department of Toxic Substances Control
DU	depleted uranium

DWTF	Decontamination and Waste Treatment Facility
E85	Vehicle fuel, 85% ethanol and 15% gasoline
EA	environmental assessment
EDE	effective dose equivalent
EDO	Environmental Duty Officer
EIR	environmental impact report
EIS	environmental impact statement
EMP	Environmental Management Plan
EMRL	Environmental Monitoring Radiation Laboratory
EMS	Environmental Management System
EOG	Environmental Operations Group
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act of 1986
EPD	Environmental Protection Department (LLNL)
EPL	effluent pollutant limit
ERA	Environmental Resource Associates
ERD	Environmental Restoration Division (of the Environmental Protection Department at LLNL)
ES&H	Environment, Safety, and Health
ESB	East Settling Basin
ESI	enhanced surveillance inspection
EWSF	Explosives Waste Storage Facility
EWTF	Explosives Waste Treatment Facility
FFA	federal facility agreement
FIFRA	Federal Insecticide, Fungicide, and Rodenticide Act
FONSI	Finding of No Significant Impact
FY	fiscal year
GPS	global positioning system
GSA	General Services Area (Site 300)
GWP	(Livermore site) Ground Water Project
HAP	hazardous air pollutants
HCAL	Hazards Control Department's Analytical Laboratory
HEPA	high-efficiency particulate air (filter)
HMX	cyclotetramethyltetramine (high explosive); also referred to as octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine
HPGe	high-purity germanium
HSU	hydrostratigraphic unit
HT	tritiated hydrogen gas (see "tritium" in Key Terms)
HTO	tritiated water or tritiated water vapor (see "tritium" in Key Terms)
HWCA	Hazardous Waste Control Act
HWFP	Hazardous Waste Facility Permit
IQR	interquartile range
ISCORS	Interagency Steering Committee on Radiation Standards
ISMS	Integrated Safety Management System

ISO	International Organization for Standardization
ITS	Issues Tracking System
IWS	integration work sheet
LCCE	life-cycle cost effective
LEPC	Local Emergency Planning Committee
LLD	lower limit of detection
LLNL	Lawrence Livermore National Laboratory
LLNL SW/SPEIS	<i>Final Site-wide Environmental Impact Statement for the Continued Operation of Lawrence Livermore National Laboratory and Supplemental Stockpile Stewardship and Management Programmatic Environmental Impact Statement</i>
LOS	limit of sensitivity
LRS	laws, regulations, standards
LSO	Livermore Site Office
LWRP	Livermore Water Reclamation Plant
MAPEP	Mixed Analyte Performance Evaluation Program
MCL	maximum contaminant level
MDC	minimum detectable concentration
MNA	monitored natural attenuation
MRP	Monitoring and Reporting Program
MSDS	material safety data sheet
MW	mixed waste
NCR	nonconformance report
NCRP	National Council on Radiation Protection
NEPA	National Environmental Policy Act
NESHAPs	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act
NIF	National Ignition Facility
NNSA	National Nuclear Security Administration
NOD	notice of deficiency
NOV	notice of violation
NOx	nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRC	Nuclear Regulatory Commission
NRHP	National Register of Historic Places
NU	natural uranium
NWP	nationwide permit
OBT	organically bound tritium
OFI	opportunities for improvement
OR	occurrence report
ORAD	Operations and Regulatory Affairs Division (of the LLNL Environmental Protection Department)
OU	operable unit
P2	pollution prevention
PCB	polychlorinated biphenyl
PCE	perchloroethylene (or perchloroethene); also called tetrachloroethylene or tetrachloroethene

pHMS	pH Monitoring Station
PM-10	particulate matter, diameter equal to or less than 10 microns
PPOA	Pollution Prevention Opportunity Assessment
PQL	practical quantitation limit
PRX	proximal
QA	quality assurance
QC	quality control
R	Roentgen
RAIP	Remedial Action Implementation Plan
RCRA	Resource Conservation and Recovery Act of 1976
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine (high explosive)
REC	renewable energy credit
RHWM	Radioactive and Hazardous Waste Management Division (of the LLNL Environmental Protection Department)
RL	reporting limit
ROD	Record of Decision
ROGs/POCs	reactive organic gases/precursor organic compounds
ROI	return on investment
RWQCB	Regional Water Quality Control Board
Sandia/California	Sandia National Laboratories/California
SARA	Superfund Amendment and Reauthorization Act of 1986 (see also CERCLA/SARA)
SDF	Sewer Diversion Facility
SERC	State Emergency Response Commission
SFBRWQCB	San Francisco Bay Regional Water Quality Control Board
SHPO	State Historic Preservation Officer
SI	Système International d'Unités
Site 300	LLNL's Experimental Test Site, located approximately 24 km east of the Livermore site
SJCEHD	San Joaquin County Environmental Health Department
SJVAPCD	San Joaquin Valley Air Pollution Control District
SMOP	Synthetic Minor Operating Permit
SMS	Sewer Monitoring Station
SOO	summary of observations
SOV	summary of violations
SOx	sulphur oxides
SPCC	Spill Prevention Control and Countermeasure
SRC	source
STP	Site Treatment Plan
SWESR	Site-Wide Remediation Evaluation Summary Report
SW-MEI	site-wide maximally exposed individual member (of the public)
SWPPP	Storm Water Pollution Prevention Plan
TAG	Technical Assistance Grant
TCE	trichloroethene (or trichloroethylene)
TDS	total dissolved solids

TEF	toxicity equivalency factor
TEQ	toxicity equivalency
TF	treatment facility
TLD	thermoluminescent dosimeter
TNT	trinitrotoluene
TOC	total organic carbon
TOX	total organic halides
TRI	Toxics Release Inventory
Tri-Valley CAREs	Tri-Valley Communities Against a Radioactive Environment
TRR	technical release representative
TRU	transuranic (waste)
TSCA	Toxic Substances Control Act
TSS	total suspended solids
TTO	total toxic organics
UC	University of California
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VOC	volatile organic compound
VTF	vapor treatment facility
WAA	waste accumulation area
WDAR	Waste Discharge Authorization Requirement
WDR	Waste Discharge Requirement
WGMG	Water Guidance and Monitoring Group
WIPP	Waste Isolation Pilot Plant
WMA	Waste Management Area
WSS	Work Smart Standard
Zone 7	Alameda County Flood Control and Conservation District, Zone 7

Key Terms

Absorbed dose. Amount of energy imparted to matter by ionizing radiation per unit mass of irradiated material, in which the absorbed dose is expressed in units of rad or gray (1 rad = 0.01 gray).

Accuracy. Closeness of the result of a measurement to the true value of the quantity measured.

Action level. Defined by regulatory agencies, the level of pollutants which, if exceeded, requires regulatory action.

Aerosol. Gaseous suspension of very small particles of liquid or solid.

Alameda County Flood Control and Water Conservation District Zone 7. Also known as the Zone 7, the water agency for the Livermore-Amador Valley with responsibility for regional flood control and drinking water supply.

Alluvium. Sediment deposited by flowing water.

Alpha particle. Positively charged particle emitted from the nucleus of an atom, having mass and charge equal to those of a helium nucleus (two protons and two neutrons).

Ambient air. Surrounding atmosphere, usually the outside air, as it exists around people, plants, and structures; not considered in monitoring purposes when immediately adjacent to emission sources.

Analysis of variance. *T*-test of whether two or more sample means are statistically different.

Analyte. Specific component measured in a chemical analysis.

Anion. Negatively charged ion, such as Cl⁻.

Aquifer. Saturated layer of rock or soil below the ground surface that can supply usable quantities of groundwater to wells and springs, and be a source of water for domestic, agricultural, and industrial uses.

Aquitard. Low-permeability geologic formation that bounds an aquifer.

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

Barcad. Device that samples water in a well in which water, collected in a discrete water-bearing zone, is forced to the surface by pressurized nitrogen.

Bay Area Air Quality Management District (BAAQMD). Local agency responsible for regulating stationary air emission sources (including the LLNL Livermore site) in the San Francisco Bay Area.

Becquerel (Bq). SI unit of activity of a radionuclide, equal to the activity of a radionuclide having one spontaneous nuclear transition per second.

Beta particle. Negatively charged particle emitted from the nucleus of an atom, having charge, mass, and other properties of an electron.

Biochemical (biological) oxygen demand (BOD). Measure of the amount of dissolved oxygen that microorganisms need to break down organic matter in water, used as an indicator of water quality.

Blowdown. Water discharged from cooling towers in order to control total dissolved solids concentrations by allowing make-up water to replenish cooling apparatus.

California Code of Regulations (CCR). Codification of regulations promulgated by the State of California.

California Environmental Quality Act of 1970 (CEQA). Statute that requires that all California state, local, and regional agencies document, consider, and disclose to the public the environmental implications of their actions.

CAP88-PC. Computer code required by the EPA for modeling air emissions of radionuclides.

Categorical discharge. Discharge from a process regulated by EPA rules for specific industrial categories.

Central Valley Regional Water Quality Control Board (CVRWQCB). Local agency responsible for regulating ground and surface water quality in the Central Valley.

Chain-of-custody. Method for documenting the history and possession of a sample from the time of its collection, through its analysis and data reporting, to its final disposition.

Chemistry and Materials Science Environmental Services. LLNL laboratory that analyzes environmental samples.

Class 1 permit modification. Minor change to the Hazardous Waste Facility Permit (HWFP). May be implemented 30 days after the California Environmental Protection Agency Department of Toxic Substances Control (DTSC) has been notified of and concurs with the proposed change. Requires documented public and DTSC notification within 90 days after the modification has been put into effect.

Class 1* permit modification. Change to HWFP that requires prior written approval from DTSC before implementation. Within seven days after DTSC has been notified, persons on the facility's mailing list must be notified of the proposed change by publishing the change in a major newspaper with general circulation. Proof of notification must be submitted to DTSC.

Class 2 permit modification. Change to HWFP that requires notification of persons of the facility's mailing list within seven days before or after notifying DTSC of the proposed change by publishing the proposed change in a major newspaper with general circulation and allowing a 60-day comment period. The permittee shall hold a public meeting 15 days after the start and no later than 15 days prior to the end of the comment period. Documented

proof of notification and the public meeting must be submitted to DTSC. DTSC may require a California Environmental Quality Act (CEQA) review or issue a Notice of Exemption from the CEQA review at the time of approval.

Code of Federal Regulations (CFR). Codification of all regulations promulgated by federal government agencies.

Collective dose equivalent and collective effective dose equivalent. Sums of the dose equivalents or effective dose equivalents to all individuals in an exposed population within 80 km (50 miles) of the radiation source. These are evaluated by multiplying the dose received by an individual at each location by the number of individuals receiving that dose, and summing over all such products for locations within 80 km of the source. They are expressed in units of person-rem or person-sievert. The collective EDE is also referred to as the “population dose.”

Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). Administered by EPA, this program, also known as Superfund, requires private parties to notify the EPA after the release of hazardous substances or conditions that threaten to release hazardous substances, and undertake short-term removal and long-term remediation.

Congener. Any particular member of a class of chemical substances, such as dioxins. A specific congener is denoted by a unique chemical structure, for example 2,3,7,8-TCDD.

Cosmic radiation. Radiation with very high energies originating outside the earth’s atmosphere; it is one source contributing to natural background radiation.

Curie (Ci). Unit of measurement of radioactivity, defined as the amount of radioactive material in which the decay rate is 3.7×10^{10} disintegrations per second or 2.22×10^{12} disintegrations per minute; one Ci is approximately equal to the decay rate of 1 gram of pure radium.

Daughter nuclide. Nuclide formed by the radioactive decay of another nuclide, which is called the parent.

De minimis. Shortened form of “de minimis non curat lex,” which means, “The law does not care for, or take notice of, very small or trifling matters,” meaning a level that is so inconsequential that it cannot be cause for concern.

Depleted uranium. Uranium having a lower proportion of the isotope uranium-238 than is found in naturally occurring uranium. The masses of the three uranium isotopes with atomic weights 238, 235, and 234 occur in depleted uranium in the weight-percentages 99.8, 0.2, and 5×10^{-4} , respectively. Depleted uranium is sometimes referred to as D-38 or DU.

Derived Concentration Guide (DCG). Concentrations of radionuclides in water and air that could be continuously consumed or inhaled for one year and not exceed the DOE primary radiation standard to the public (100 mrem/y EDE).

Dose. Energy imparted to matter by ionizing radiation; the unit of absorbed dose is the rad, equal to 0.01 joules per kilogram for irradiated material in any medium.

Dose commitment. Dose that an organ or tissue would receive during a specified period of time (e.g., 50 or 70 years) as a result of one year’s intake of one or more radionuclides.

Dose equivalent. Product of absorbed dose in rad (or gray) in tissue and a quality factor representing the relative damage caused to living tissue by different kinds of radiation, and perhaps other modifying factors representing the distribution of radiation, etc. expressed in units of rem or sievert (1 rem = 0.01 sievert).

Dosimeter. Portable detection device for measuring the total accumulated exposure to ionizing radiation.

Dosimetry. Theory and application of the principles and techniques of measuring and recording radiation doses.

Downgradient. In the direction of groundwater flow from a designated area; analogous to downstream.

Drainage Retention Basin (now Lake Haussmann). Man-made, lined pond used to capture storm water runoff and treated water at the Livermore site.

Effective dose equivalent (EDE). Estimate of the total risk of potential effects from radiation exposure, it is the summation of the products of the dose equivalent and weighting factor for each tissue. The weighting factor is the

decimal fraction of the risk arising from irradiation of a selected tissue to the total risk when the whole body is irradiated uniformly to the same dose equivalent. These factors permit dose equivalents from nonuniform exposure of the body to be expressed in terms of an effective dose equivalent that is numerically equal to the dose from a uniform exposure of the whole body that entails the same risk as the internal exposure (ICRP 1980). The effective dose equivalent includes the committed effective dose equivalent from internal deposition of radionuclides and the effective dose equivalent caused by penetrating radiation from sources external to the body, and is expressed in units of rem (or sievert).

Effluent. Liquid or gaseous waste discharged to the environment.

Emergency Planning and Community Right-to-Know Act of 1986 (EPCRA). Act that requires facilities that produce, use, or store hazardous substances to report releases of reportable quantities or hazardous substances to the environment.

Environmental impact report (EIR). Detailed report prepared pursuant to CEQA on the environmental impacts from any action carried out, approved, or funded by a California state, regional, or local agency.

Environmental impact statement (EIS). Detailed report, required by the National Environmental Policy Act, on the environmental impacts from a federally approved or funded project. An EIS must be prepared by a federal agency when a "major" federal action that will have "significant" environmental impacts is planned.

EPA synthetic moderately hard water. Water solutions prepared according to U.S. EPA standards used as a reference water sample for control comparisons in whole effluent toxicity testing. Synthetic waters are prepared in accordance with *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*, EPA-821-R-02-013 (U.S. EPA 2002).

Evapotranspiration. Process by which water is transferred from the soil to the air by plants that take the water up through their roots and release it through their leaves and other aboveground tissue.

Federal facility. Facility that is owned or operated by the federal government, subject to the same requirements as other responsible parties when placed on the Superfund National Priorities List.

Federal facility agreement (FFA). Negotiated agreement that specifies required actions at a federal facility as agreed upon by various agencies (e.g., EPA, RWQCB, DOE).

Federal Register. Document published daily by the federal government containing notification of government agency actions, including notification of EPA and DOE decisions concerning permit applications and rule-making.

Fiscal year. LLNL's fiscal year is from October 1 through September 30.

Flushometer. Toilet valve that automatically shuts off after it meters a certain amount of water flow.

Freon-11. Trichlorofluoromethane.

Freon-113. 1,1,2-trichloro-1,2,2-trifluoroethane; also known as CFC 113.

Gabion. Galvanized wire box filled with stones used to form retaining walls along a stream or bridge.

Gamma ray. High-energy, short-wavelength, electromagnetic radiation emitted from the nucleus of an atom, frequently accompanying the emission of alpha or beta particles.

Gram (g). Standard metric measure of weight approximately equal to 0.035 ounce.

Gray (Gy). SI unit of measure for absorbed dose; the quantity of energy imparted by ionizing radiation to a unit mass of matter, such as tissue. 1 gray = 100 rads, or 1 joule per kilogram.

Groundwater. All subsurface water.

Half-life (radiological). Time required for one-half the radioactive atoms in a given amount of material to decay; for example, after one half-life, half of the atoms will have decayed; after two half-lives, three-fourths; after three half-lives, seven-eighths; and so on, exponentially.

Hazardous waste. Waste that exhibits ignitability, corrosivity, reactivity, and/or EP-toxicity (yielding toxic constituents in a leaching test), and waste that does not exhibit these characteristics but has been determined to be hazardous

by EPA. Although the legal definition of hazardous waste is complex, according to EPA the term generally refers to any waste that, if managed improperly, could pose a threat to human health and the environment.

(California) Hazardous Waste Control Act (HWCA). Legislation specifying requirements for hazardous waste management in California.

High-efficiency particulate air (HEPA) filter. Throwaway, extended-media, dry type filter used to capture particulates in an air stream; HEPA collection efficiencies are at least 99.97% for 0.3 micrometer diameter particles.

Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX). High-explosive compound.

High explosives (HE). Materials that release large amounts of chemical energy when detonated.

Hydraulic gradient. In an aquifer, the rate of change of total head (water-level elevation) per unit distance of flow at a given point and in a given direction.

Hydrology. Science dealing with the properties, distribution, and circulation of natural water systems.

Inorganic compounds. Compounds that either do not contain carbon or do not contain hydrogen along with carbon, including metals, salts, and various carbon oxides (e.g., carbon monoxide and carbon dioxide).

In situ. Refers to the treatment of contaminated areas in place without excavation or removal, as in the in situ treatment of on-site soils through biodegradation of contaminants.

Interim status. Legal classification allowing hazardous waste incinerators or other hazardous waste management facilities to operate while EPA considers their permit applications, provided that they were under construction or in operation by November 19, 1980 and can meet other interim status requirements.

International Commission on Radiological Protection (ICRP). International organization that studies radiation, including its measurement and effects.

Interquartile range (IQR). Distance between the top of the lower quartile and the bottom of the upper quartile, which provides a measure of the spread of data.

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

Lake Haussmann (formerly Drainage Retention Basin). Man-made, lined pond used to capture storm water runoff and treated water at the Livermore site.

Less than detection limits. Phrase indicating that a chemical constituent was either not present in a sample, or is present in such a small concentration that it cannot be measured by a laboratory's analytical procedure, and therefore is not identified or not quantified at the lowest level of sensitivity.

Livermore Water Reclamation Plant (LWRP). City of Livermore's municipal wastewater treatment plant, which accepts discharges from the LLNL Livermore site.

Low-level waste. Waste defined by DOE Order 5820.2A, which contains transuranic nuclide concentrations less than 100 nCi/g.

Lower limit of detection. Smallest concentration or amount of analyte that can be detected in a sample at a 95% confidence level.

Maximally exposed individual (MEI). Hypothetical member of the public at a fixed location who, over an entire year, receives the maximum effective dose equivalent (summed over all pathways) from a given source of radionuclide releases to air. Generally, the MEI is different for each source at a site.

Maximum Contaminant Level (MCL). Highest level of a contaminant in drinking water that is allowed by the U.S. Environmental Protection Agency or California Department of Health Services.

Metric units. Except for temperature for which specific equations apply, U.S. customary units can be determined from metric units by multiplying the metric units by the U.S. customary equivalent. Similarly, metric units can be determined from U.S. customary equivalent units by multiplying the U.S. customary units by the metric equivalent.

Mixed waste. Waste that has the properties of both hazardous and radioactive waste.

National Environmental Policy Act (NEPA). Federal legislation enacted in 1969 that requires all federal agencies to document and consider environmental impacts for federally funded or approved projects and the legislation under which DOE is responsible for NEPA compliance at LLNL.

National Institute for Standards and Technology (NIST). Federal agency, formerly known as the National Bureau of Standards, responsible for reference materials against which laboratory materials are calibrated.

National Pollutant Discharge Elimination System (NPDES). Federal regulation under the Clean Water Act that requires permits for discharges into surface waterways.

NEWTRIT. Model used to calculate doses from environmental measurements.

Nuclear Regulatory Commission (NRC). Federal agency charged with oversight of nuclear power and nuclear machinery and applications not regulated by DOE or the Department of Defense.

Nuclide. Species of atom characterized by the constitution of its nucleus. The nuclear constitution is specified by the number of protons, number of neutrons, and energy content; or, alternatively, by the atomic number, mass number, and atomic mass. To be regarded as a distinct nuclide, the atom must be capable of existing for a measurable length of time.

Off site. Outside the boundaries of the LLNL Livermore site or Site 300 properties.

On site. Within the boundaries of the LLNL Livermore site or Site 300 properties.

Ophiolite. Any of a group of igneous and metamorphic rocks found within the continental crust, thought to be formed by the uplift of oceanic crust

Part B permit. Second, narrative section submitted by generators in the RCRA permitting process that covers in detail the procedures followed at a facility to protect human health and the environment.

Parts per billion (ppb). Unit of measure for the concentration of a substance in its surrounding medium; for example, one billion grams of water containing one gram of salt has a salt concentration of one part per billion.

Parts per million (ppm). Unit of measure for the concentration of a substance in its surrounding medium; for example, one million grams of water containing one gram of salt has a salt concentration of one part per million.

Perched aquifer. Aquifer that is separated from another water-bearing stratum by an impermeable layer.

pH. Measure of hydrogen ion concentration in an aqueous solution. Acidic solutions have a pH from 0 to 6; basic solutions have a pH greater than 7; and neutral solutions have a pH of 7.

Piezometer. Instrument for measuring fluid pressure used to measure the elevation of the water table in a small, nonpumping well.

Pliocene. Geological epoch of the Tertiary period, starting about 12 million years ago.

PM-10. Fine particulate matter with an aerodynamic diameter equal to or less than 10 microns.

Point source. Any confined and discrete conveyance (e.g., pipe, ditch, well, or stack).

Practical quantitation limit (PQL). Level at which the laboratory can report a value with reasonably low uncertainty (typically 10–20% uncertainty).

Pretreatment. Any process used to reduce a pollutant load before it enters the sewer system.

Pretreatment regulations. National wastewater pretreatment regulations, adopted by EPA in compliance with the 1977 amendments to the Clean Water Act, which required that EPA establish pretreatment standards for existing and new industrial sources.

Quality assurance (QA). System of activities whose purpose is to provide the assurance that standards of quality are attained with a stated level of confidence.

Quality control (QC). Procedures used to verify that prescribed standards of performance are attained.

Quality factor. 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, usually used because some types of radiation, such as alpha particles, are biologically more damaging than others. Quality factors for alpha, beta, and gamma radiation are in the ratio 20:1:1.

Quaternary. Geologic era encompassing the last 2–3 million years.

Rad. Unit of absorbed dose and the quantity of energy imparted by ionizing radiation to a unit mass of matter such as tissue, and equal to 0.01 joule per kilogram, or 0.01 gray.

Radioactive decay. Spontaneous transformation of one radionuclide into a different nuclide (which may or may not be radioactive), or de-excitation to a lower energy state of the nucleus by emission of nuclear radiation, primarily alpha or beta particles, or gamma rays (photons).

Radioactivity. Spontaneous emission of nuclear radiation, generally alpha or beta particles, or gamma rays, from the nucleus of an unstable isotope.

Radionuclide. Unstable nuclide. See nuclide and radioactivity.

Regional Water Quality Control Board (RWQCB). California regional agency responsible for water quality standards and the enforcement of state water quality laws within its jurisdiction. California is divided into nine RWQCBs; the Livermore site is in the San Francisco Bay Region, and Site 300 is in the Central Valley Region.

Rem. Unit of radiation dose equivalent and effective dose equivalent describing the effectiveness of a type of radiation to produce biological effects; coined from the phrase “roentgen equivalent man,” and the product of the absorbed dose (rad), a quality factor (Q), a distribution factor, and other necessary modifying factors.
1 rem = 0.01 sievert.

Resource Conservation and Recovery Act of 1976 (RCRA). Program of federal laws and regulations that govern the management of hazardous wastes, and applicable to all entities that manage hazardous wastes.

Revetment. Facing (as of stone or concrete) to sustain an embankment

Risk assessment. Qualitative and quantitative evaluation of the risk posed to human health and/or the environment by the actual or potential presence and/or use of specific pollutants.

Roentgen (R). Unit of measurement used to express radiation exposure in terms of the amount of ionization produced in a volume of air.

San Francisco Bay Regional Water Quality Control Board (SFBRWQCB). Local agency responsible for regulating ground and surface water quality in the San Francisco Bay Area.

San Joaquin County Health District (SJCHD). Local agency that enforces under-ground-tank regulations in San Joaquin County, including Site 300.

San Joaquin Valley Air Pollution Control District (SJVAPCD). Local agency responsible for regulating stationary air emission sources (including Site 300) in San Joaquin County.

Sanitary waste. Most simply, waste generated by routine operations that is not regulated as hazardous or radioactive by state or federal agencies.

Saturated zone. Subsurface zone below which all rock pore-space is filled with water; also called the phreatic zone.

Secondary MCL. Nonmandatory water quality standard set by the EPA California Department of Health Services to assist public water systems in managing their drinking water for aesthetic considerations, such as taste, color, and odor

Sensitivity. Capability of methodology or instrumentation to discriminate between samples having differing concentrations or containing varying amounts of analyte.

Sievert (Sv). SI unit of radiation dose equivalent and effective dose equivalent, that is the product of the absorbed dose (gray), quality factor (Q), distribution factor, and other necessary modifying factors. 1 sievert = 100 rem.

Site-wide Maximally Exposed Individual (SW-MEI). Hypothetical person who receives, at the location of a given publicly accessible facility (such as a church, school, business, or residence), the greatest LLNL-induced effective dose equivalent (summed over all pathways) from all sources of radionuclide releases to air at a site. Doses at this receptor location caused by each emission source are summed, and yield a larger value than for the location of any other similar public facility. This individual is assumed to continuously reside at this location 24 hours per day, 365 days per year.

Specific conductance. Measure of the ability of a material to conduct electricity; also called conductivity.

Superfund. Common name used for the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). California has also established a "State Superfund" under provisions of the California Hazardous Waste Control Act.

Superfund Amendments and Reauthorization Act (SARA). Act enacted in 1986, which amended and reauthorized CERCLA for five years at a total funding level of \$8.5 billion.

Surface impoundment. A facility or part of a facility that is a natural topographic depression, man-made excavation, or diked area formed primarily of earthen materials, although it may be lined with man-made materials. The impoundment is designed to hold an accumulation of liquid wastes, or wastes containing free liquids, and is not an injection well.

Swale. Manmade or natural low-lying or depressed area of land used to convey storm water runoff.

Système International d'Unités (SI). International system of physical units which include meter (length), kilogram (mass), kelvin (temperature), becquerel (radioactivity), gray (radioactive dose), and sievert (dose equivalent).

Thermoluminescent dosimeter (TLD). Device used to measure external beta or gamma radiation levels, and which contains a material that, after exposure to beta or gamma radiation, emits light when processed and heated.

Total dissolved solids (TDS). Portion of solid material in a waste stream that is dissolved and passed through a filter.

Total organic carbon (TOC). Sum of the organic material present in a sample.

Total organic halides (TOX). Sum of the organic halides present in a sample.

Total suspended solids (TSS). Total mass of particulate matter per unit volume suspended in water and wastewater discharges that is large enough to be collected by a 0.45 micron filter.

Tritium. Radioactive isotope of hydrogen, containing one proton and two neutrons in its nucleus, which decays at a half-life of 12.3 years by emitting a low-energy beta particle.

Transuranic waste (TRU). Material contaminated with alpha-emitting transuranium nuclides, which have an atomic number greater than 92 (e.g., plutonium-239), half-lives longer than 20 years, and are present in concentrations greater than 100 nCi/g of waste.

Unsaturated zone. Portion of the subsurface in which the pores are only partially filled with water and the direction of water flow is vertical; is also referred to as the vadose zone.

U.S. Department of Energy (DOE). Federal agency responsible for conducting energy research and regulating nuclear materials used for weapons production.

U.S. Environmental Protection Agency (EPA). Federal agency responsible for enforcing federal environmental laws. Although some of this responsibility may be delegated to state and local regulatory agencies, EPA retains oversight authority to ensure protection of human health and the environment.

Vadose zone. Partially saturated or unsaturated region above the water table that does not yield water to wells.

Volatile organic compound (VOC). Liquid or solid organic compounds that have a high vapor pressure at normal pressures and temperatures and thus tend to spontaneously pass into the vapor state.

Waste accumulation area (WAA). Officially designated area that meets current environmental standards and guidelines for temporary (less than 90 days) storage of hazardous waste before pickup by the Radioactive and Hazardous Waste Management Division for off-site disposal.

Wastewater treatment system. Collection of treatment processes and facilities designed and built to reduce the amount of suspended solids, bacteria, oxygen-demanding materials, and chemical constituents in wastewater.

Water table. Water-level surface below the ground at which the unsaturated zone ends and the saturated zone begins, and the level to which a well that is screened in the unconfined aquifer would fill with water.

Weighting factor. Tissue-specific value used to calculate dose equivalents which represents the fraction of the total health risk resulting from uniform, whole-body irradiation that could be contributed to that particular tissue.

Wind rose. Diagram that shows the frequency and intensity of wind from different directions at a specific location.

Zone 7. Common name for the Alameda County Flood Control and Water Conservation District, Zone 7.