

## **Appendix A**

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*Acronyms and Abbreviations, Glossary, Metric  
Conversion Table, and Data Qualifier Definitions*



**A-1.0 ACRONYMS AND ABBREVIATIONS**

amsl	above mean sea level
AOC	area of concern
ATSDR	Agency for Toxic Substances and Disease Registry
AUF	area use factor
bgs	below ground surface
BV	background value
CD	compact disc
COC	chain-of-custody
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
cpm	count per minute
CSM	conceptual site model
CVAA	cold vapor atomic absorption
<u>DAF</u>	<u>dilution attenuation factor</u>
DI	deionized
DOE	Department of Energy (U.S.)
DL	detection limit
DP	Delta Prime
dpm	disintegration per minute
Eh	oxidation/reduction
EP	Environmental Programs
EPA	Environmental Protection Agency (U.S.)
EPC	exposure point concentration
EQL	estimated quantitation limit
ESL	ecological screening level
FV	fallout value
ha	hectare
HI	hazard index
HQ	hazard quotient
HR	home range
IA	information architecture
ID	identification
IDW	investigation-derived waste

K <sub>d</sub>	soil-water partition coefficient
K <sub>oc</sub>	organic carbon-water partition coefficient
K <sub>ow</sub>	octanol-water partition coefficient
LAL	lower acceptance level
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LLW	low-level waste
LOAEL	lowest observed adverse effect level
MCL	maximum contaminant level
MDA	material disposal area
mrem	millirem
MS	matrix spike
NMED	New Mexico Environment Department
NMSA	New Mexico Statutes Annotated
NOAEL	no observed adverse effect level
PAUF	population area use factor
PCB	polychlorinated biphenyl
PID	photoionization detector
ppm	part per million
QA	quality assurance
QC	quality control
QP	quality procedure
RAIS	Risk Assessment Information System
RCT	radiological control technician
RfD	reference dose
RPF	Records Processing Facility
SAL	screening action level
SCL	sample collection log
SF	slope factor
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit

T&E	threatened and endangered
TA	technical area
TAL	target analyte list
TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
TD	total depth
TEF	toxicity equivalency factor
TEQ	toxicity equivalency quotient
TPU	total propagated uncertainty
VOC	volatile organic compound
WCSF	waste characterization strategy form
WPF	waste profile form

## A-2.0 GLOSSARY

**abandonment**—The plugging of a well or borehole in a manner that precludes the migration of surface runoff or groundwater along the length of the well or borehole.

**absorption**—The uptake of water, other fluids, or dissolved chemicals by a cell or organism (e.g., tree roots absorb dissolved nutrients in soil).

**action level**—(1) A numerical value that has been established by statistical analysis or has been set according to regulatory limits and is used as a criterion for action. Contamination found in a particular medium below an appropriate action level is not generally subject to remediation or further study. (2) A health- and environment-based concentration derived using chemical-specific toxicity information and standardized exposure assumptions. An action level can be developed on a facility-specific basis or can be taken from standardized lists.

**administrative authority**—For Los Alamos National Laboratory, one or more regulatory agencies, such as the New Mexico Environment Department, the U.S. Environmental Protection Agency, or the U.S. Department of Energy, as appropriate.

**alluvial**—Pertaining to geologic deposits or features formed by running water.

**alpha radiation**—A form of particle radiation that is highly ionizing and has low penetration. Alpha radiation consists of two protons and two neutrons bound together into a particle that is identical to a helium nucleus and can be written as  $\text{He}^{2+}$ .

**analysis**—A critical evaluation, usually made by breaking a subject (either material or intellectual) down into its constituent parts, then describing the parts and their relationship to the whole. Analyses may include physical analysis, chemical analysis, toxicological analysis, and knowledge-of-process determinations.

**analyte**—The element, nuclide, or ion a chemical analysis seeks to identify and/or quantify; the chemical constituent of interest.

**analytical method**—A procedure or technique for systematically performing an activity.

**area of concern (AOC)**—(1) A release that may warrant investigation or remediation and is not a solid waste management unit (SWMU). (2) An area at Los Alamos National Laboratory that may have had a release of a hazardous waste or a hazardous constituent but is not a SWMU.

**artificial fill**—A material that has been imported and typically consists of disturbed *soils* mixed with crushed Bandelier Tuff or other rock types.

**ash-flow tuff**—A tuff deposited by a hot, dense volcanic current. Ash-flow tuff can be either welded tuff or nonwelded tuff.

**assessment**—(1) The act of reviewing, inspecting, testing, checking, conducting surveillance, auditing, or otherwise determining and documenting whether items, processes, or services meet specified requirements. (2) An evaluation process used to measure the performance or effectiveness of a system and its elements. In this glossary, assessment is an all-inclusive term used to denote any one of the following: audit, performance evaluation, management system review, peer review, inspection, or surveillance.

**assessment endpoint**—In an ecological risk assessment, the expression of an environmental value to be protected (e.g., fish biomass or reproduction of avian populations).

**background concentration**—Naturally occurring concentrations of an inorganic chemical or radionuclide in soil, sediment, or tuff.

**background data**—Data that represent naturally occurring concentrations of inorganic and radionuclide constituents in a geologic medium. Los Alamos National Laboratory's (the Laboratory's) background data are derived from samples collected at locations that are either within, or adjacent to, the Laboratory. These locations (1) are representative of geological media found within Laboratory boundaries, and (2) have not been affected by Laboratory operations.

**background level**—(1) The concentration of a substance in an environmental medium (air, water, or soil) that occurs naturally or is not the result of human activities. (2) In exposure assessment, the concentration of a substance in a defined control area over a fixed period of time before, during, or after a data-gathering operation.

**background radiation**—The amount of radioactivity naturally present in the environment, including cosmic rays from space and natural radiation from soils and rock.

**background sample**—A sample collected from an area or site that is similar to the one being studied but known, or thought, to be free from constituents of concern.

**background value (BV)**—A statistically derived concentration (i.e., the upper tolerance limit [UTL]) of a chemical used to represent the background data set. If a UTL cannot be derived, either the detection limit or maximum reported value in the background data set is used.

**barrier**—Any material or structure that prevents, or substantially delays, the movement of solid-, liquid-, or gaseous-phase chemicals in environmental media.

**baseline risk assessment**—A site-specific analysis of the potential adverse effects of hazardous constituents that have been released from a site in the absence of any controls or mitigating actions. A baseline risk assessment consists of the following four steps: data collection and analysis, exposure assessment, toxicity assessment, and risk characterization.

**bentonite**—An absorbent aluminum silicate clay formed from volcanic ash and used in various adhesives, cements, and ceramic fillers. Because bentonite can absorb large quantities of water and expand to several times its normal volume, it is a common drilling mud additive.

**best management practices**—Methods that have been determined to be the most effective, practical means of preventing or reducing pollution from nonpoint sources.

**beta radiation**—High-energy electrons emitted by certain types of radioactive nuclei, such as potassium-40. The beta particles emitted are a form of ionizing radiation also known as beta rays.

**bias**—The systematic deviation from a true value that remains constant over replicated measurements within the statistical precision of the measurement process.

**blank**—A sample that is expected to have a negligible or unmeasurable amount of an analyte. Results of blank sample analyses indicate whether field samples might have been contaminated during the sample collection, transport, storage, preparation, or analysis processes.

**borehole**—(1) A hole drilled or bored into the ground, usually for exploratory or economic purposes.  
(2) A hole into which casing, screen, and other materials may be installed to construct a well.

**borehole logging**—The process of making remote measurements of physical, chemical, or other parameters at multiple depths in a borehole.

**calibration**—A process used to identify the relationship between the true analyte concentration or other variable and the response of a measurement instrument, chemical analysis method, or other measurement system.

**calibration blank**—A calibration standard prepared to contain negligible or unmeasurable amounts of analytes. A calibration blank is used to establish the zero concentration point for analytical measurement calibrations.

**calibration standard**—A sample prepared to contain known amounts of analytes of interest and other constituents required for an analysis.

**caliche (properly called pedogenic calcite, also known as calcrete)**—A layer of hard subsoil encrusted with calcium carbonate that occurs in arid or semiarid regions or precipitates out of groundwater (groundwater caliche). Typically found in near-surface soil.

**canyon**—A stream-cut chasm or gorge, the sides of which are composed of cliffs or a series of cliffs rising from the chasm's bed. Canyons are characteristic of arid or semiarid regions where downcutting by streams greatly exceeds weathering.

**chain of custody (COC)**—An unbroken, documented trail of accountability that is designed to ensure the uncompromised physical integrity of samples, data, and records.

**chemical**—Any naturally occurring or human-made substance characterized by a definite molecular composition.

**chemical analysis**—A process used to measure one or more attributes of a sample in a clearly defined, controlled, and systematic manner. Chemical analysis often requires treating a sample chemically or physically before measurement.

**chemical of potential concern (COPC)**—A detected chemical compound or element that has the potential to adversely affect human receptors as a result of its concentration, distribution, and toxicity.

**chemical of potential ecological concern (COPEC)**—A detected chemical compound or element that has the potential to adversely affect ecological receptors as a result of its concentration, distribution, and toxicity.

**cleanup**—A series of actions taken to deal with the release, or threat of a release, of a hazardous substance that could affect humans and/or the environment. The term cleanup is sometimes used interchangeably with the terms remedial action, removal action, or corrective action.

**cleanup levels**—Media-specific contaminant concentration levels that must be met by a selected corrective action. Cleanup levels are established by using criteria such as the protection of human

health and the environment; compliance with regulatory requirements; reduction of toxicity, mobility, or volume through treatment; long- and short-term effectiveness; implementability; and cost.

**Code of Federal Regulations (CFR)**—A document that codifies all rules of the executive departments and agencies of the federal government. The code is divided into 50 volumes, known as titles. Title 40 of the CFR (referenced as 40 CFR) covers environmental regulations.

**Compliance Order on Consent (Consent Order)**—For the Environmental Remediation and Surveillance Program, an enforcement document signed by the New Mexico Environment Department, the U.S. Department of Energy, and the Regents of the University of California on March 1, 2005, which prescribes the requirements for corrective action at Los Alamos National Laboratory. The purposes of the Consent Order are (1) to define the nature and extent of releases of contaminants at, or from, the facility; (2) to identify and evaluate, where needed, alternatives for corrective measures to clean up contaminants in the environment and prevent or mitigate the migration of contaminants at, or from, the facility; and (3) to implement such corrective measures. The Consent Order supersedes the corrective action requirements previously specified in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

**Consent Order**—See Compliance Order on Consent.

**consolidated unit**—A group of solid waste management units (SWMUs), or SWMUs and areas of concern, which generally are geographically proximate and have been combined for the purposes of investigation, reporting, or remediation.

**contaminant**—(1) Chemicals and radionuclides present in environmental media or on debris above background levels. (2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any hazardous waste listed or identified as characteristic in 40 Code of Federal Regulations (CFR) 261 (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]); any hazardous constituent listed in 40 CFR 261 Appendix VIII (incorporated by 20.4.1.200 NMAC) or 40 CFR 264 Appendix IX (incorporated by 20.4.1.500 NMAC); any groundwater contaminant listed in the Water Quality Control Commission (WQCC) Regulations at 20.6.3.3103 NMAC; any toxic pollutant listed in the WQCC Regulations at 20.6.2.7 NMAC; explosive compounds; nitrate; and perchlorate. (Note: Under the Consent Order, the term “contaminant” does not include radionuclides or the radioactive portion of mixed waste.)

**contract analytical laboratory**—An analytical laboratory under contract to the University of California to analyze samples from work performed at Los Alamos National Laboratory.

**corrective action**—(1) In the Resource Conservation and Recovery Act, an action taken to rectify conditions potentially adverse to human health or the environment. (2) In the quality assurance field, the process of rectifying and preventing nonconformances.

**daily calibration**—The combination of a calibration blank and calibration standard used to determine if the instrument response to an analyte concentration is within acceptable bounds relative to the initial calibration. A daily calibration establishes the instrument response factors on which quantitations are based, thus verifying the satisfactory performance of an instrument on a day-to-day basis.

**data package**—The hard copy deliverable for each sample delivery group produced by a contract analytical laboratory in accordance with the statement of work for analytical services.

**data-quality assessment**—The statistical and/or scientific evaluation of a data set that establishes whether the data set is adequate for its intended use.

**data-quality objectives**—Qualitative and quantitative statements of the overall level of uncertainty that a decision maker will accept regarding results or decisions based on environmental data. The



objectives provide the statistical framework for planning and managing environmental data operations that will meet user needs.

**data validation**—A systematic process that applies a defined set of performance-based criteria to a body of data and that may result in the qualification of the data. The data-validation process is performed independently of the analytical laboratory that generates the data set and occurs before conclusions are drawn from the data. The process may include a standardized data review (routine data validation) and/or a problem-specific data review (focused data validation).

**decommissioning**—The permanent removal of facilities and their components from service after the discontinued use of structures or buildings that are deemed no longer useful. Decommissioning must take place in accordance with regulatory requirements and applicable environmental policies.

**decontamination**—The removal of unwanted material from the surface of, or from within, another material.

**detect (detection)**—An analytical result, as reported by an analytical laboratory, that denotes a chemical or radionuclide to be present in a sample at a given concentration.

**detection limit (DL)**—The minimum concentration that can be determined by a single measurement of an instrument. A detection limit implies a specified statistical confidence that the analytical concentration is greater than zero.

**discharge**—The accidental or intentional spilling, leaking, pumping, pouring, emitting, emptying, or dumping of hazardous waste into, or on, any land or water.

**disposal**—The discharge, deposit, injection, dumping, spilling, leaking, or placing of any solid waste or hazardous waste into, or on, any land or water so that such solid waste or hazardous waste or any constituent thereof may enter the environment or be emitted into the air or discharged into any waters, including groundwaters.

**dose (dosage)**—(1) The actual quantity of a chemical that is administered to an organism or to which it is exposed. (2) The amount of a substance that reaches a specific tissue (e.g., the liver). (3) The amount of a substance that is available for interaction with metabolic processes after it has crossed an organism's outer boundary.

**dose equivalent**—The product of the absorbed dose from ionizing radiation and factors that account for biological differences as a result of the radiation type and its distribution in the body.

**drill bit**—The cutting tool attached to the bottom of a drill stem.

**drill rod (drill pipe)**—Special pipe used to transmit rotation and energy from the drill rig to the bit. This conduit conveys circulation fluids such as air, water, or other mixtures to cool the bit and evacuate the borehole cuttings.

**duplicate analysis**—An analysis performed on one member of a pair of identically prepared subsamples taken from the same sample.

**ecological screening levels**—Soil, sediment, or water concentrations that are used to screen for potential ecological effects. The concentrations are based on a chemical's no-observed-adverse-effect level for a receptor, below which no risk is indicated.

**Environmental Restoration (ER) Project**—A Los Alamos National Laboratory project established in 1989 as part of a U.S. Department of Energy nationwide program, and precursor of today's Environmental Remediation and Surveillance (ERS) Program. This program is designed (1) to investigate hazardous and/or radioactive materials that may be present in the environment as a result of past Laboratory operations, (2) to determine if the materials currently pose an unacceptable

risk to human health or the environment, and (3) to remediate (clean up, stabilize, or restore) those sites where unacceptable risk is still present.

**environmental samples**—Air, soil, water, or other media samples that have been collected from streams, wells, and soils, or other locations, and that are not expected to exhibit properties classified as hazardous by the U.S. Department of Transportation.

**equipment blank (rinstate blank)**—A sample used to rinse sample-collection equipment and expected to have negligible or unmeasurable amounts of analytes. The equipment blank is collected after the equipment decontamination is completed but before the collection of another field sample.

**ER data**—Data derived from samples that have been collected and paid for through Environmental Remediation and Surveillance Program funding.

**ER database (ERDB)**—A database housing analytical and other programmatic information for the Environmental Remediation and Surveillance Program. The ERDB currently contains about 3 million analyses in 300 tables.

**ER identification (ER ID) number**—A unique identifier assigned by the Environmental Remediation and Surveillance Program's Records Processing Facility to each document when it is submitted as a final record.

**exposure pathway**—Any path from the sources of contaminants to humans and other species or settings through air, soil, water, or food.

**facility**—All contiguous land (and structures, other appurtenances, and improvements on the land) used for treating, storing, or disposing of hazardous waste. A facility may consist of several treatment, storage, or disposal operational units. For the purpose of implementing a corrective action, a facility is all the contiguous property that is under the control of the owner or operator seeking a permit under Subtitle C of the Resource Conservation and Recovery Act.

**fault**—A fracture, or zone of fractures, in rock along which vertical or horizontal movement has taken place and adjacent rock layers or bodies have been displaced.

**Federal Register (FR)**—The official daily publication for Rules, Proposed Rules, and Notices from federal agencies and organizations, as well as Executive Orders and other presidential documents.

**field blank (field reagent blank)**—A blank sample prepared in the field or carried to the sampling site, exposed to sampling conditions (e.g., by removing bottle caps), and returned to a laboratory to be analyzed in the same manner in which environmental samples are being analyzed. Field blanks are used to identify the presence of any contamination that may have been added during the sampling and analysis process.

**field duplicate (replicate) samples**—Two separate, independent samples taken from the same source, which are collected as collocated samples (i.e., equally representative of a sample matrix at a given location and time).

**field matrix spike**—A known amount of a field sample to which a known amount of a target analyte has been added and used to compute the proportion of the added analyte that is recovered upon analysis.

**field notebook**—A record of activities performed in the field or a compilation of field data.

**field reagent blank**—See field blank.

**field sample**—See sample.

**focused data validation**—A technically based analyte-, sample-, and data-use-specific process that extends the qualification of data beyond the method or contractual compliance and provides a higher level of confidence that an analyte is present or absent. If an analyte is present, the quality of the quantitation may be obtained through focused validation.

**gamma radiation**—A form of electromagnetic, high-energy ionizing radiation emitted from a nucleus. Gamma rays are essentially the same as x-rays (though at higher energy) and require heavy shielding, such as concrete or steel, to be blocked.

**grab sample**—A specimen collected by a single application of a field sampling procedure to a target population (e.g., the surface soil from a single hole collected after the spade-and-scoop sampling procedure, or a single air filter left in the field for three months).

**gravimetric moisture content**—See water content.

**ground cover**—Natural or human-made materials (e.g., grasses, pine needles, asphalt, or concrete) which overlay soils.

**groundwater**—Interstitial water that occurs in saturated earth material and is capable of entering a well in sufficient amounts to be used as a water supply.

**grout**—Cement or bentonite mixtures used for sealing boreholes and wells and for zone isolation. Only Portland Type I or II cement is approved for use at investigative sites.

**half-life**—(1) The time required for a pollutant to lose one-half of its original concentration (for example, the biochemical half-life of DDT [dichlorodiphenyltrichloroethane] in the environment is 15 yr). (2) The time required for one half of the atoms in a radioactive element to undergo self-transmutation or decay (the half-life of radium is 1620 yr). (3) The time required for the elimination of one half of a total dose from the body.

**hazard index (HI)**—The sum of hazard quotients for multiple contaminants to which a receptor may have been exposed.

**Hazardous and Solid Waste Amendments (HSWA)**—Public Law No. 98-616, 98 Stat. 3221, enacted in 1984, which amended the Resource Conservation and Recovery Act of 1976 (42 United States Code § 6901 et seq).

**hazardous constituent (hazardous waste constituent)**—According to the March 1, 2005, Compliance Order of Consent (Consent Order), any constituent identified in Appendix VIII of Part 261, Title 40 Code of Federal Regulations (CFR) (incorporated by 20.4.1.200 New Mexico Administrative Code [NMAC]) or any constituent identified in 40 CFR 264, Appendix IX (incorporated by 20.4.1.500 NMAC).

**hazardous waste**—(1) Solid waste that is listed as a hazardous waste, or exhibits any of the characteristics of hazardous waste (i.e., ignitability, corrosivity, reactivity, or toxicity, as provided in 40 CFR, Subpart C). (2) According to the March 1, 2005, Compliance Order of Consent (Consent Order), any solid waste or combination of solid wastes that, because of its quantity, concentration, or physical, chemical, or infectious characteristics, meets the description set forth in New Mexico Statutes Annotated 1978, § 74-4-3(K) and is listed as a hazardous waste or exhibits a hazardous waste characteristic under 40 CFR 261 (incorporated by 20.4.1.200 New Mexico Administrative Code).

**Hazardous Waste Bureau**—The New Mexico Environment Department bureau charged with providing regulatory oversight and technical guidance to New Mexico hazardous waste generators and to treatment, storage, and disposal facilities, as required by the New Mexico Hazardous Waste Act.

**Hazardous Waste Facility Permit**—The authorization issued to Los Alamos National Laboratory (the Laboratory) by the New Mexico Environment Department that allows the Laboratory to operate as a hazardous waste treatment, storage, and disposal facility.

**hazard quotient (HQ)**—The ratio of the estimated site-specific exposure concentration of a single chemical from a site to the estimated daily exposure level at which no adverse health effects are likely to occur.

**holding time**—The maximum elapsed time a sample can be stored without unacceptable changes in analyte concentrations. Holding times apply under prescribed conditions, and deviations from these conditions may affect the holding times. Extraction holding time refers to the time lapsed between sample collection and sample preparation. Analytical holding time refers to the time lapsed between sample preparation and analysis.

**HSWA module**—See Module VIII.

**hydrogen-ion activity (pH)**—The effective concentration (activity) of dissociated hydrogen ions (H<sup>+</sup>); a measure of the acidity or alkalinity of a solution that is numerically equal to 7 for neutral solutions, increases with alkalinity, and decreases as acidity increases.

**initial calibration**—The process used to establish the relationship between instrument response and analyte concentration at several analyte concentration values in order to demonstrate that an instrument is capable of acceptable analytical performance.

**institutional controls**—Controls that prohibit or limit access to contaminated media. Institutional controls may include use restrictions, permitting requirements, standard operating procedures, laboratory implementation requirements, laboratory implementation guidance, and laboratory performance requirements.

**instrument detection limit (IDL)**—A measure of instrument sensitivity without any consideration for contributions to the signal from reagents. The IDL is calculated as follows: Three times the average of the standard deviations obtained on three nonconsecutive days from the analysis of a standard solution, with seven consecutive measurements of that solution per day. The standard solution must be prepared at a concentration of three to five times the instrument manufacturer's estimated IDL.

**internal standards**—Compounds added to a sample after the sample has been prepared for qualitative and quantitative instrument analysis. The compounds serve as a standard of retention time and response that is invariant from run to run.

**investigation-derived waste (IDW)**—Solid waste or hazardous waste that was generated as a result of corrective action investigation or remediation field activities. Investigation-derived waste may include drilling muds, cuttings, and purge water from the installation of test pits or wells; purge water, soil, and other materials from the collection of samples; residues from the testing of treatment technologies and pump-and-treat systems; contaminated personal protective equipment; and solutions (aqueous or otherwise) used to decontaminate nondisposable protective clothing and equipment.

**laboratory control sample (LCS)**—A known matrix that has been spiked with compound(s) representative of target analytes. LCSs are used to document laboratory performance, and the acceptance criteria for LCSs are method-specific.

**LANL (Los Alamos National Laboratory) data validation qualifiers**—The Los Alamos National Laboratory data qualifiers which are defined by, and used, in the Environmental Remediation and Surveillance (ERS) Program validation process. The qualifiers describe the general usability (or

quality) of data. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate ERS standard operating procedure.

**LANL (Los Alamos National Laboratory) data validation reason codes**—The Los Alamos National Laboratory designations applied to sample data by data validators who are independent of the contract laboratory that performed a given sample analysis. Reason codes provide an analysis-specific explanation for applying a qualifier, with some description of the qualifier's potential impact on data use. For a complete list of data qualifiers applicable to any particular analytical suite, consult the appropriate Environmental Remediation and Surveillance Program standard operating procedure.

**logbook**—A notebook used to record tabulated data (e.g., the history of calibrations, sample tracking, numerical data, or other technical data).

**lower acceptance limit (LAL)**—The lowest limit that is acceptable according to quality control (QC) criteria for a specific QC sample and for a specific method. Any results lower than the LAL are qualified following the routine validation procedure.

**material disposal area (MDA)**—A subset of the solid waste management units at Los Alamos National Laboratory (the Laboratory) that include disposal units such as trenches, pits, and shafts. Historically, various disposal areas (but not all) were designated by the Laboratory as MDAs.

**matrix**—Relatively fine material in which coarser fragments or crystals are embedded; also called “ground mass” in the case of igneous rocks.

**matrix spike (MS)**—An aliquot of a sample to which a known concentration of target analyte has been added. Matrix spike samples are used to measure the ability to recover prescribed analytes from a native sample matrix. The spiking typically occurs before sample preparation and analysis.

**matrix spike duplicate**—An intralaboratory duplicate sample to which a known amount of target analyte has been added. Spiking typically occurs before sample preparation and analysis.

**measuring and test equipment**—Devices or systems used to calibrate, measure, gauge, test, or inspect entities to control or acquire data and verify conformance to specified requirements.

**medium (environmental)**—Any material capable of absorbing or transporting constituents. Examples of media include tuffs, soils and sediments derived from these tuffs, surface water, soil water, groundwater, air, structural surfaces, and debris.

**medium (geological)**—The solid part of the hydrogeological system; may be unsaturated or saturated.

**method blank**—An analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing, and which is prepared and analyzed in the same manner as the corresponding environmental samples. The method blank is used to assess the potential for sample contamination during preparation and analysis.

**method detection limit (MDL)**—The minimum concentration of a substance that can be measured and reported with a known statistical confidence that the analyte concentration is greater than zero. After subjecting samples to the usual preparation, the MDL is determined by analyzing those samples of a given matrix type that contain the analyte. The MDL is used to establish detection status.

**migration**—The movement of inorganic and organic chemical species through unsaturated or saturated materials.

**migration pathway**—A route (e.g., a stream or subsurface flow path) for the potential movement of contaminants to environmental receptors (plants, humans, or other animals).

**minimum detectable activity**—For the analysis of radionuclides, the lowest detectable radioactivity for a given analytical technique. The following equation is used to calculate the MDA unless otherwise noted or approved by Los Alamos National Laboratory. (Note: “MDA” here should not to be confused with material disposal area):

$$\text{MDA} = \frac{4.65(\text{BKG})^{0.5} + 2.71}{2.22 \times \text{EFF} \times V \times T_s \times Y} ,$$

where    BKG = the total background counts,  
          EFF = the fraction detector efficiency,  
          V    = the volume or unit weight,  
          T<sub>s</sub>   = the sample count duration, and  
          Y    = the fractional chemical recovery obtained from the tracer recovery.

Depending on the type of analysis, other terms may also be required in the denominator (e.g., gamma abundance).

**mixed waste**—Waste containing both hazardous and source, special nuclear, or byproduct materials subject to the Atomic Energy Act of 1954.

**model**—A schematic description of a physical, biological, or social system, theory, or phenomenon that accounts for its known or inferred properties and may be used for the further study of its characteristics.

**Module VIII**—Module VIII of the Los Alamos National Laboratory (the Laboratory) Hazardous Waste Facility Permit. This permit allows the Laboratory to operate as a hazardous-waste treatment, storage, and disposal facility. From 1990 to 2005, Module VIII included requirements from the Hazardous and Solid Waste Amendments. These requirements have been superseded by the March 1, 2005, Compliance Order on Consent (Consent Order).

**nondetect**—A result that is less than the method detection limit.

**notices of approval, of approval with modification, or of disapproval**—Notices issued by the New Mexico Environment Department (NMED). Upon receipt of a work plan, schedule, report, or other deliverable document, NMED reviews the document and approves the document as submitted, modifies the document and approves it as modified, or disapproves the document. A notice of approval means that the document is approved as submitted. A notice of approval with modifications means that the document is approved but with modifications specified by NMED. A notice of disapproval means that the document is disapproved and it states the deficiencies and other reasons for disapproval.

**operable units (OUs)**—At Los Alamos National Laboratory, 24 areas originally established for administering the Environmental Remediation and Surveillance Program. Set up as groups of potential release sites, the OUs were aggregated according to geographic proximity for the purposes of planning and conducting Resource Conservation and Recovery Act (RCRA) facility assessments and RCRA facility investigations. As the project matured, it became apparent that there were too many areas to allow efficient communication and to ensure consistency in approach. In 1994, the 24 OUs were reduced to 6 administrative field units.

**outfall**—A place where effluent is discharged into receiving waters.

**percent recovery (%R)**—The amount of material detected in a sample (less any amount already in the sample) divided by the amount added to the sample, expressed as a percentage.

**perched water**—A zone of unpressurized water held above the water table by impermeable rock or sediment.

**polychlorinated biphenyls (PCBs)**—Any chemical substance limited to the biphenyl molecule that has been chlorinated to varying degrees, or any combination that contains such substances. PCBs are colorless, odorless compounds that are chemically, electrically, and thermally stable and have proven to be toxic to both humans and other animals.

**porosity**—The degree to which soil, gravel, sediment, or rock is permeated with pores or cavities through which water or air can move.

**precision**—The degree of mutual agreement among a series of individual measurements, values, or results.

**quality assurance/quality control (QA/QC)**—A system of procedures, checks, audits, and corrective actions set up to ensure that all U.S. Environmental Protection Agency research design and performance, environmental monitoring and sampling, and other technical and reporting activities are of the highest achievable quality.

**quality-control sample**—A specimen that, upon analysis, is intended to provide information that is useful for adjusting, controlling, or verifying the continuing acceptability of sampling and/or analysis activities in progress.

**radiation**—A stream of particles or electromagnetic waves emitted by atoms and molecules of a radioactive substance as a result of nuclear decay. The particles or waves emitted can consist of neutrons, positrons, alpha particles, beta particles, or gamma radiation.

**radioactive material**—For purposes of complying with U.S. Department of Transportation regulations, any material having a specific activity (activity per unit mass of the material) greater than 2 nanocuries per gram (nCi/g) and in which the radioactivity is evenly distributed.

**radioactive waste**—Waste that, by either monitoring and analysis, or acceptable knowledge, or both, has been determined to contain added (or concentrated and naturally occurring) radioactive material or activation products, or that does not meet radiological release criteria.

**radioactivity (radioactive decay; radioactive disintegration)**—The spontaneous change in an atom by the emission of charged particles and/or gamma rays.

**radionuclide**—Radioactive particle (human-made or natural) with a distinct atomic weight number.

**RCRA facility investigation (RFI)**—A Resource Conservation and Recovery Act (RCRA) investigation that determines if a release has occurred and characterizes the nature and extent of contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) process.

**reference set**—A hard-copy compilation of reference items cited in Environmental Remediation and Surveillance Program documents.

**regional aquifer**—Geologic material(s) or unit(s) of regional extent whose saturated portion yields significant quantities of water to wells, contains the regional zone of saturation, and is characterized by the regional water table or potentiometric surface.

**request number**—An identifying number assigned by the Environmental Remediation and Surveillance Program to a group of samples submitted for analysis.

**residential scenario**—The land use condition under which individuals may be exposed to contaminants as a result of living on or near contaminated sites.

**Resource Conservation and Recovery Act (RCRA)**—The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976 (Public Law [PL] 94-580, as amended by PL 95-609 and PL 96-482, United States Code 6901 et seq.).

**rinstate blank**—See equipment blank.

**risk**—A measure of the probability that damage to life, health, property, and/or the environment will occur as a result of a given hazard.

**risk assessment**—See baseline risk assessment.

**routine data validation**—The process of reviewing analytical data relative to quantitative routine acceptance criteria. The objective of routine data validation is two-fold—

- to estimate the technical quality of the data relative to minimum national standards adopted by the Environmental Remediation and Surveillance Program, and
- to indicate to data users the technical data quality at a gross level by assigning laboratory qualifiers to environmental data whose quality indicators do not meet acceptance criteria.

**runoff**—The portion of the precipitation on a drainage area that is discharged from the area.

**run-on**—Surface water that flows onto an area as a result of runoff occurring higher up on a slope.

**sample**—A portion of a material (e.g., rock, soil, water, or air), which, alone or in combination with other portions, is expected to be representative of the material or area from which it is taken. Samples are typically either sent to a laboratory for analysis or inspection or are analyzed in the field. When referring to samples of environmental media, the term field sample may be used.

**sample matrix**—In chemical analysis, that portion of a sample that is exclusive of the analytes of interest. Together, the matrix and the analytes of interest form the sample.

**screening action level (SAL)**—A radionuclide's medium-specific concentration level; it is calculated by using conservative criteria below which it is generally assumed that no potential exists for a dose that is unacceptable to human health. The derivation of a SAL is based on conservative exposure and on land-use assumptions. However, if an applicable regulatory standard exists that is less than the value derived, it is used in place of the SAL.

**screening risk assessment**—A risk assessment that is performed with few data and many assumptions in order to identify exposures that should be evaluated more carefully for potential risk.

**site characterization**—Defining the pathways and methods of migration of hazardous waste or constituents, including the media affected; the extent, direction and speed of the contaminants; complicating factors influencing movement; or concentration profiles.

**soil**—(1) A material that overlies bedrock and has been subject to soil-forming processes. (2) A sample media group that includes naturally occurring and artificial fill materials.

**soil moisture**—The water contained in the pore space of the unsaturated zone.

**soil screening level (SSL)**—The concentration of a chemical (inorganic or organic) below which no potential for unacceptable risk to human health exists. The derivation of an SSL is based on conservative exposure and land-use assumptions, and on target levels of either a hazard quotient of 1.0 for a noncarcinogenic chemical or a cancer risk of  $10^{-5}$  for a carcinogenic chemical.

**solid waste management unit (SWMU)**—(1) Any discernible site at which solid wastes have been placed at any time, whether or not the site use was intended to be the management of solid or hazardous waste. SWMUs include any site at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated sites (i.e., landfills, surface impoundments,



waste piles, and land treatment sites), but does not include passive leakage or one-time spills from production areas and sites in which wastes have not been managed (e.g., product storage areas).

(2) According to the March 1, 2005, Compliance Order on Consent (Consent Order), any discernible site at which solid waste has been placed at any time, and from which the New Mexico Environment Department determines there may be a risk of a release of hazardous waste or hazardous waste constituents (hazardous constituents), whether or not the site use was intended to be the management of solid or hazardous waste. Such sites include any area in Los Alamos National Laboratory at which solid wastes have been routinely and systematically released; they do not include one-time spills.

**split sample**—A sample that has been divided into two or more portions that are expected to be of the same composition; used to characterize within-sample heterogeneity, sample handling, and measurement variability.

**split-spoon sampler**—A hollow, tubular sampling device below a drill stem that is driven by a weight to retrieve soil samples. The core barrel can be opened to remove samples. This is a sampling method commonly used with auger drilling. The split-spoon sampler can be driven into the ground or can be advanced inside hollow-stem augers.

**standard operating procedure (SOP)**—A document that details the officially approved method(s) for an operation, analysis, or action, with thoroughly prescribed techniques and steps.

**surface sample**—A sample taken at a collection depth that is (or was) representative of the medium's surface during the period of investigative interest. A typical depth interval for a surface sample is 0 to 6 in. for mesa-top locations, but may be up to several feet in sediment-deposition areas within canyons.

**target analyte**—A chemical or parameter, the concentration, mass, or magnitude of which is designed to be quantified by a particular test method.

**technical area (TA)**—At Los Alamos National Laboratory, an administrative unit of operational organization (e.g., TA-21).

**topography**—The physical or natural features of an object or entity and their structural relationships.

**trip blank**—A sample of analyte-free medium taken from a sampling site and returned to an analytical laboratory unopened, along with samples taken in the field; used to monitor cross contamination of samples during handling and storage both in the field and in the analytical laboratory.

**tuff**—Consolidated volcanic ash, composed largely of fragments produced by volcanic eruptions.

**U.S. Department of Energy (DOE)**—The federal agency that sponsors energy research and regulates nuclear materials for weapons production.

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

**vadose zone**—The zone between the land surface and the water table within which the moisture content is less than saturation (except in the capillary fringe) and pressure is less than atmospheric. Soil pore space also typically contains air or other gases. The capillary fringe is included in the vadose zone.

**water content**—The amount of water in an unsaturated medium, expressed as the ratio of the weight of water in a sample to the weight of the oven-dried sample (often expressed as a percentage).

**welded tuff**—A volcanic deposit hardened by the action of heat, pressures from overlying material, and hot gases.

**work plan**—A document that specifies the activities to be performed when implementing an investigation or remedy. At a minimum, the work plan should identify the scope of the work to be performed, specify the procedures to be used to perform the work, and present a schedule for performing the work. The work plan may also present the technical basis for performing the work.

### A-3.0 METRIC TO ENGLISH CONVERSIONS

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns ( $\mu\text{m}$ )	0.0000394	inches (in.)
square kilometers ( $\text{km}^2$ )	0.3861	square miles ( $\text{mi}^2$ )
hectares (ha)	2.5	acres
square meters ( $\text{m}^2$ )	10.764	square feet ( $\text{ft}^2$ )
cubic meters ( $\text{m}^3$ )	35.31	cubic feet ( $\text{ft}^3$ )
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter ( $\text{g}/\text{cm}^3$ )	62.422	pounds per cubic foot ( $\text{lb}/\text{ft}^3$ )
milligrams per kilogram ( $\text{mg}/\text{kg}$ )	1	parts per million (ppm)
micrograms per gram ( $\mu\text{g}/\text{g}$ )	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter ( $\text{mg}/\text{L}$ )	1	parts per million (ppm)
degrees Celsius ( $^{\circ}\text{C}$ )	$9/5 + 32$	degrees Fahrenheit ( $^{\circ}\text{F}$ )

### A-4.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control (QA/QC) parameters.