

Glossary and Acronyms

SRS GLOSSARY AND ACRONYMS

Accuracy – the ability of an analytical method to measure the true concentration of a contaminant (*see bias, precision*).

Actinides – radioactive elements with atomic numbers equal to or greater than that of actinium (i.e., 88). The term refers to the heaviest elements, starting with actinium and continuing to the end of the periodic table. *Transuranic* elements are a subset of the actinide elements and include those with atomic numbers larger than uranium. Actinide elements are all radioactive.

Activation products – radionuclides that result from the absorption of neutrons by uranium, and other materials present in a nuclear reactor. An example is plutonium-239 produced following neutron absorption by uranium-238 and subsequent decays of uranium-239 to neptunium-239 and then to plutonium-239.

Activity – the mean number of decays per unit time of a radioactive nuclide expressed as *disintegrations* per second. Units: becquerel (Bq), formerly curie (Ci).

Aerodynamic diameter, AD – the physical diameter of a particle of unit density (1 gram per cubic centimeter) that has the same gravitational settling velocity as the particle of interest.

Aerosol – a suspension of solid and/or liquid *particles* in a gas (like air).

Air filter – a solid matrix used in an air sampler to collect *particulates* from the air, which is drawn by an air pump through the filter. Air filters are least efficient for particle sizes of about 0.3 *microns* and collect smaller and larger particles more efficiently.

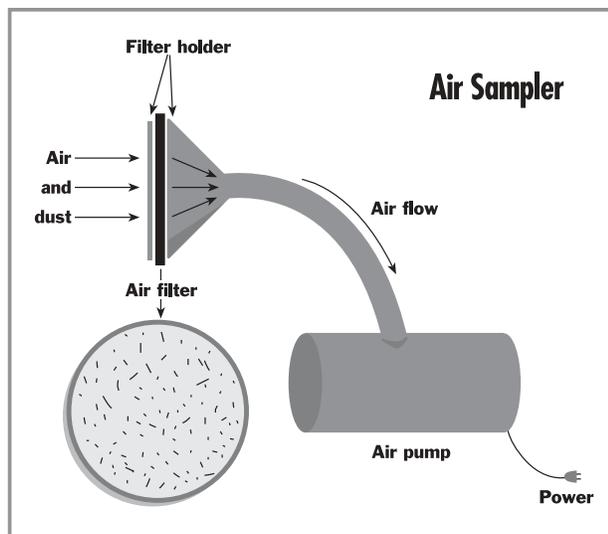
A-line – the facility in the F-Area where uranyl nitrate was converted to uranium oxide.

Aliquot – a fraction of a substance taken for sampling purposes.

Alpha particle (*ionizing radiation*) – two neutrons and two protons bound as a single particle (a helium nucleus) that is emitted from the nucleus of certain radioactive isotopes in the process of disintegration. It carries much more energy than *gamma* or *beta* radiation, and deposits that energy very quickly while passing through matter. When alpha particles are being measured in an environmental sample, they can be absorbed by the sample itself unless the sample has been prepared to be very thin. Corrections can be applied for this self-absorption of alpha particles in some samples (e.g. air filters). Plutonium-239 emits alpha particles.

Ambient air monitoring – *monitoring* of the air outside of buildings (*see effluent monitoring*).

Analytical method – a laboratory test used to detect the amount of a *contaminant*.



Anisokinetic sampling – a sampling condition that involves a mismatch between the air or fluid velocity in the sampling probe and that in the stack releasing airborne effluents. It is a source of bias in effluent sampling. In contrast, isokinetic sampling, in which the two velocities are equal, results in an unbiased sample of the stack effluent.

Atomic number – the number of protons in the nucleus of an atom.

Background radioactivity – radioactive elements in the natural environment including those in the crust of the earth (like radioactive potassium, uranium, and thorium isotopes) and those produced by cosmic rays. The term background is also sometimes used in this report to indicate radioactive elements present in the environment that are not a direct result of SRS activities (e.g. atmospheric weapons testing fallout, *see definition for fallout*). The term background can also refer to chemicals, such as heavy metals.

Beta particle (*ionizing radiation*) – a charged particle emitted from the nucleus of certain unstable atomic nuclei (radioactive isotopes), having the charge and mass of an electron. Energetic beta particles penetrate the dead skin layer. The beta particle is not stopped in matter as quickly as an alpha particle.

Bias – a systematic distortion of measurements that makes the results inaccurate. Accuracy is a measure of how close a value is to the true number, or a measure of the correctness of a measurement. Precision refers to the ability of an analytical method to reproduce the same result upon repeated trials.

Biota – living organisms.

B-line – the facility in which plutonium nitrate solution was purified and converted into plutonium metal.

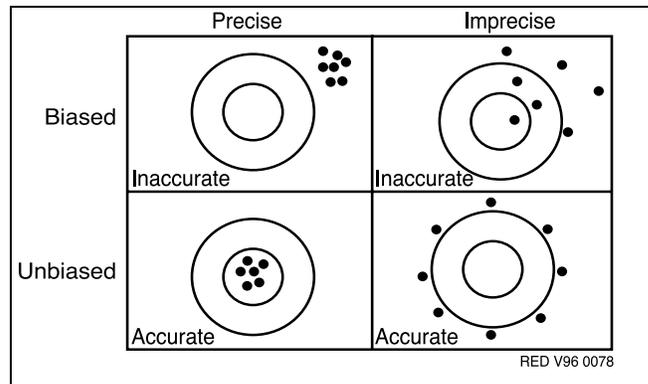
Blanks – samples containing extremely low concentrations of a *contaminant*, which are used to assess *contamination* from laboratory equipment and other steps in an analytical procedure.

Bq – an abbreviation for the SI unit of radioactivity, Becquerel. Equal to one *disintegration* per second. (See *curie*.)

Burial grounds – radioactive waste disposal areas located between the two separations areas, 200-F and 200-H. One disposal area was 76 acres used from 1953 until 1972; the other, 119-acre site, was used from 1972 until the 1990s.

Canyon – the long, narrow, and deep, thick-walled concrete structure in which fissionable materials that had been irradiated in the reactors were chemically separated from fission products and from each other. The hot canyon was the more heavily shielded canyon in which the majority of the fission products were removed and the desired products were separated. The less heavily shielded canyon was referred to as the warm canyon.

cfm – cubic feet per minute, a measure of the rate of flow of a liquid or gas.



Chemical symbols – abbreviations for different elements and compounds. Examples of symbols for elements include U for uranium, Pu for plutonium, O for oxygen, C for carbon and Cl for chlorine. Examples of symbols for compounds include CCl_4 for carbon tetrachloride and PuO_2 for plutonium dioxide.

CIIS (Chemical Information and Inventory System) Database – a database originally developed at SRS to comply with Community/Worker-Right-to-Know legislation and to help organize annual inventory data for EPA reporting requirements. The database inventory contains over 51,000 entries.

CMX – the code letters designating a facility that developed and tested various reactor components.

Collection efficiency – the percentage of the total amount of a *contaminant* present in ambient air, which is collected by an air sampler. Collection efficiency is strongly dependent upon the size of the particles that carry the contamination, as well as other factors, such as wind speed.

Compositing – a combining of samples before analysis, usually done to improve sensitivity and/or reduce analytical cost. A quarterly composite of air filters is comprised of all filters collected within a calendar quarter (3 months).

Concentration – the amount of a material of interest in a given volume or mass.

Contamination – unwanted radioactive or other material or the deposition of radioactive material in the environment or other place.

Control rod – a long, slender, cylindrical rod containing a strongly neutron-absorbing material such as lithium or cadmium. The control rods constituted the primary system in SRS reactors for controlling the number of neutrons (flux) and the rate of fissioning power (power level).

Coolant – the fluid that cools the reactor. The primary coolant passes directly through and around the fissioning fuel in a reactor and carries away heat to prevent melting. The secondary coolant carries the heat away from the reactor and releases it to the environment. In the SRS reactors, the secondary coolant was water from the Savannah River or PAR Pond. The heat passes from the primary coolant to the secondary in heat exchangers.

Cooling (radioactive) – the reduction of radioactivity and heat generation of irradiated fuel or target material by radioactive decay.

Counting error – the uncertainty in the measurement of an amount of radioactivity due to the random nature of radioactive decay and electronic noise in the detector (instrument background). Counting error decreases when the sample and background are counted for a long time and when instrument background is minimized.

Critical mass – the minimum mass of fissionable material which can achieve a nuclear chain reaction with a specified geometrical arrangement and material composition.

Curie (Ci) – a traditional unit used to describe an amount of radioactivity. The curie is equal to 3.7×10^{10} *disintegrations* per second (dps). The internationally recognized unit of radioactivity is the Becquerel (Bq), which is one dps. Due to its historical context, this report favors use of traditional units for radioactivity. For environmental samples, the microcurie (10^{-6} Ci), the picocurie (10^{-12} Ci), or the femtocurie (10^{-15} Ci) are often used.

Dana Plant – a facility in Dana, Indiana which produced heavy water by the *GS process*.

Degraded water – heavy water that became diluted with light or natural water.

Degreasers – large vats located in the M Area that contained heated and cooled solvents that were used to remove grease from reactor components.

Detection level – the lowest amount of a *contaminant* which can be detected with a certain degree of confidence by an analytical method. For radioactivity measurements, detection level is the same as minimum detectable activity (*See also minimum detectable concentration, MDC, and lower limit of detection, LLD*).

Deuterium – synonym for ^2H , an isotope of hydrogen of double mass (atomic mass = 2).

Disintegration – one decay of a radioactive atom. (*See dpm*).

Deuterium oxide (D_2O) – heavy water.

DOE – U.S. Department of Energy. The DOE is responsible for the sites in the U.S. at which weapons materials have been produced or handled, including the Savannah River Plant. Generally, private *contractors*, such as Du Pont have operated the weapons facilities for the DOE. (*See ERDA, AEC*.)

Domain - the area considered within the study. For this dose reconstruction the domain extends 50 miles in all directions from the SRS boundary; the domain also includes Columbia, SC and an area on either side of the Savannah River to the coast.

Dose – a general term denoting the quantity of *radiation* or energy that is absorbed by the body. There are technical terms with specific definitions, such as absorbed dose, equivalent dose, and effective dose.

Dose reconstruction – a study process in which historical information is used to estimate the amounts of toxic materials released from a facility, how the materials could have moved offsite, and the exposure of the public to those materials. Dose reconstruction involves past releases, not present, or future releases. The study period for this Savannah River Site dose reconstruction is 1951–1992.

dpm – abbreviation for *disintegrations per minute*, a rate of radioactive decay. There are 2.22 dpm per picocurie. (*See curie*.)

DW Process – a separation process which involved the separation of light and heavy water by fractional distillation. The DW (distillation) process uses the difference in volatility between hydrogen oxide (H_2O) and deuterium oxide (D_2O) in the water to separate them using five stages of distillation in bubble cap tray towers.

Du Pont – the Atomic Energy Commission appointed Du Pont to operate the site in 1950. They ran the site until March 30, 1989 when Westinghouse Savannah River Company took over the responsibility.

Effluent – a gas or liquid that flows from a process, building, or site into the surrounding environment.

Effluent monitoring – the measurement of a *contaminant* or other property (e.g. flow rate) in the effluent (air or liquid discharged) from a building or holding pond.

EML – Environmental Measurements Laboratory (*see HASL*).

Environmental monitoring – the measurement of a material in the environment at regular time intervals. Monitoring for *contaminants* often involves the collection of an environmental sample, (like stream water), preparation of the sample in the laboratory, and analysis of the prepared sample using an analytical instrument.

Environmental transport – the mechanisms by which substances can be carried from their source to other points in the environment. Surface water runoff and air dispersion by wind are examples of environmental transport mechanisms.

Exposure (to hazardous substances) – conditions or circumstances causing humans or other living things to come into contact with toxic materials.

Exposure pathways – the means by which humans are exposed to toxic substances. The key exposure pathways are air and water, with most exposures via inhalation, drinking water, crops, other foods, and direct radiation.

Fallout – airborne particles containing radioactive material that fall through the atmosphere and are deposited on the earth's surface following the detonation of nuclear explosives.

femto – a prefix that multiplies a basic unit by $1/1,000,000,000,000,000$ or 1×10^{-15} . For example, 1 femtocurie equals 1×10^{-15} curie.

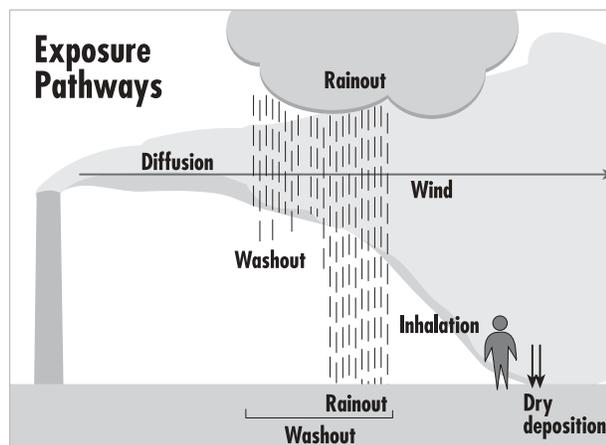
Fission products – radionuclides that result from the splitting or fissioning of heavy elements like uranium in a nuclear reactor. Examples are cesium-137, strontium-90, technetium, 99, and ruthenium-106.

Fuel assembly – a group of uranium pieces, either short cylinders (slugs) of uranium metal or long tubes of enriched uranium-aluminum alloy. The long tubes were frequently of different diameters, nested together, sometimes with lithium-aluminum alloy, or other, targets.

Fuel elements – aluminum clad uranium rods used in fuel assemblies in SRS reactors.

Fuel element failure – rupture of a fuel element, leading to the release of radionuclides to the cooling or storage water.

Gamma radiation (also gamma rays or *ionizing radiation*) – short wavelength electromagnetic radiation (photon) originating from the nucleus of a radionuclide. Gamma rays are similar to medical x-rays, but are emitted at very specific energies characteristic of their decaying atoms usually of higher energy than about 100 keV. They penetrate tissue more effectively than beta or alpha particles, leaving ions in their path to potentially cause cell damage. Gamma rays travel relatively long distances in air, and leave a low density of ionization damage in their track through tissue. Gamma-emitting radionuclides are hazards from outside the body because their radiation penetrates to living tissue, but they are of less concern than alpha-emitters when ingested or inhaled, because their ionizing energy is deposited less effectively in tissue.



Geometric Mean (GM) – a measure of the central point of a *skewed* distribution. The geometric mean of a set of positive numbers is the exponential of the arithmetic mean of their logarithms. It is typically used to describe *skewed* distributions (e.g. lognormal distributions).

Geometric Standard Deviation (GSD) – a measure of the spread of a *skewed* distribution. A large GSD indicates a wide range of measured or calculated values. The geometric standard deviation of a lognormal distribution is the exponential of the standard deviation of the associated normal distribution.

Grab samples – samples, usually of relatively small volume, which are taken at random or at pre-selected frequencies. These samples define the concentration of a *contaminant* at the specific time when they are collected and differ from continuous or proportional samples that reflect a time-averaged concentration.

Gross alpha – measurements that refer to the total (or gross) amount of *alpha particles* in an environmental sample. Besides materials released from the Savannah River Plant, like *plutonium* and *americium*, naturally occurring substances in the environment, like *uranium* and *thorium*, emit alpha particles and would contribute to the gross alpha measurement.

Gross beta – measurements that refer to the total (or gross) amount of *beta particles* in an environmental sample.

GS process – the method of extracting heavy water containing deuterium from naturally occurring water by the exchange of deuterium between water and hydrogen sulfide (H₂S) at different temperatures. The deuterium will migrate toward a water stream at lower temperatures and to H₂S at higher temperatures.

Half-life, radioactive – the time required for half the atoms of a radioactive substance to disintegrate. During one half-life, the number of radioactive atoms in a material is reduced by one-half. Each radionuclide has a unique half-life. Tritium decays with a half-life of 12.3 years, and plutonium-239 decays with a half-life of about 24,000 years. The term half-life can also be used to describe the time required for the amount of a radionuclide or chemical in a biological compartment (e.g., vegetation, sediment, water, human or other animal tissue) to be reduced by one-half.

Harp – the name of a container used to store a failed fuel element; the container was stored underwater in a reactor basin and vented to the reactor stack.

HASL – the Health and Safety Laboratory, in New York City, operated by the Department of Energy and its predecessors, is known for long-term global monitoring of radionuclides in the environment and for development of analytical techniques for measuring radioactivity in environmental *media*. Later became known as the Environmental Measurements Laboratory (EML).

Health physics – an interdisciplinary science focused on the radiation protection of humans and the environment. Health physics combines the elements of physics, biology, chemistry, statistics, and electronic instrumentation to protect individuals from the effects of radiation.

Heavy water – water in which nearly all of the hydrogen is the heavy isotope, deuterium; deuterium oxide (D₂O).

Heavy Water Plant – a facility in the D Area at SRS that began producing heavy water (deuterium oxide) in 1953 to moderate and cool the site’s reactors. The facility stopped production in 1981 because there was a sufficient supply of heavy water.

HEPA filter – a high-efficiency particulate air filter used to remove contaminants from exhaust gases prior to discharge.

HM process – an acronym for “H-Modified,” the HM process was a modified *Purex process*, used in the H Canyon to separate uranium from plutonium, neptunium, and other fission products. The Purex process was used in H Canyon prior to the May 1959 startup of the HM process.

Ingestion – radionuclides or chemicals taken into the body by eating or drinking are taken in by ingestion.

Inhalation – radionuclides or chemicals taken into the body by breathing are inhaled.

Inventory – the total amount of a *contaminant* in a defined space, e.g. the amount of *plutonium* in the *sediment* of a reservoir.

Ion exchange – a process for selective removal of a chemical constituent from a particular solution.

Ionizing radiation – radiation sufficiently energetic to dislodge electrons from an atom and thus leave the atom positively charged or “ionized.” Ionizing radiation includes x and gamma radiation, electrons (beta radiation), alpha particles (helium nuclei), and heavier charged atomic nuclei. Neutrons ionize indirectly by colliding with atomic nuclei. The creation of ions (ionized atoms, which are chemically active) inside living cells can damage key substances in cells, including the DNA containing the record of the cell's characteristics. Such damage can lead to cancer or other defects.

Isotopes – different forms of elements having the same atomic number (number of protons) but different numbers of neutrons. Different isotopes of a particular element generally have essentially identical chemical properties. Plutonium-239 and plutonium-240 are isotopes of plutonium that can not be distinguished from one another by typical *analytical methods*.

kilo – a prefix that multiplies a basic unit by 1000. For example, 1 kilogram = 1000 grams.

LLD – lower limit of detection. (*See detection level*).

Liter (L) – A metric unit of volume, equivalent to about 1.1 quarts.

Long-lived radionuclides – in this study, radionuclides with *half-lives* greater than 15 days.

MDA – minimum detectable activity. (*See MDC*).

MDC – minimum detectable concentration. (*See definition below*).

MDL – minimum detection limit. (*See detection level*).

Media – a type of environmental sample, such as air, soil, vegetation or water.

Median – the central point of a distribution. Half of the values are larger than the median value and half are smaller. (*See percentiles*.)

Micron (µm) – a micrometer or micron is a unit of length equal to one-millionth (10^{-6}) of a meter. A human hair, for reference, is about 100 microns thick.

Minimum detectable concentration (or activity) – the lowest concentration of a contaminant (or amount of radioactivity) that can be detected with a certain degree of confidence by an analytical method (*see detection level*).

Moderator – a material used in a reactor to slow down neutrons; when neutrons collide with nuclei, they lose speed, making them more likely to be captured by fuel or target materials.

Monitoring – obtaining measurements at regular time intervals.

Monte Carlo procedure – a method that uses computer-generated pseudo-random numbers to make calculations with statistical distributions. In this study, Monte Carlo methods have been used to estimate statistical distributions that represent uncertainties in estimated quantities, such as source term release estimates. This approach contrasts with a deterministic approach in which a calculation is based upon point estimates of the various parameters and yields a single result. The Monte Carlo calculation carries the underlying uncertainty in the parameters forward and displays it in the magnitude of the distribution of results. A statistical risk management computer program, called Crystal Ball™ (Decisioneering 1993) was used in this study for some of the uncertainty analyses.

Naturally occurring radionuclides – radionuclides that are naturally present in the environment and are two general types: primordial and cosmogenic. Most primordial radionuclides are isotopes of the heavy elements of the three radioactive series headed by uranium-238, thorium-232, and uranium-235. Cosmogenic radionuclides are produced by interactions in the atmosphere or in the earth; three of these [tritium (hydrogen-3), carbon-14, and sodium-22] are isotopes of major elements in the body.

Neutron – an uncharged subatomic particle capable of producing ionization in matter by collision with charged particles. Approximately the same mass as a proton it is a constituent of the nuclei of all atoms except hydrogen. The nucleus of deuterium (heavy hydrogen) has one proton and one neutron.

Noble gases – the name given to the following group of elements: He, Ne, Ar, Kr, Xe, and Rn, which all have closed-shell electronic structures that are completely stable.

Nonvolatile beta activity – activity resulting from the presence of radionuclides that do not escape during sample preparation, such as evaporation or wet-ashing (*see beta particle*)

Nuclear materials - materials used to produce a nuclear reaction such as uranium and plutonium.

Nuclide – a species of atom having a specific mass, atomic number, and nuclear energy state.

Outcrop – a place where groundwater is discharged to the surface. At SRS, groundwater outcrops in several places to enter site streams. Also referred to as seep line.

Percentiles – a method for making descriptive statements about a large data set. Percentiles are defined in such a way that a large set of data, arranged from its smallest to its largest value, is divided by its percentiles into 100 classes containing nearly equal numbers of data. The exact rules for defining the percentile numbers are complicated, but the effect is that approximately 5% of the data are less than or equal to the 5th percentile, and approximately 95% of the data are greater than or equal to the 5th percentile (similar statements hold for the other percentiles). The median is defined as the 50th percentile, which divides the data (approximately) into halves (if there are an odd number of data, the middle value is the median; if there are an even number, the

average of the two middle values is the median). In this document, uncertainty distributions are indicated by their 5th, 50th, and 95th percentiles. Observations above the 95th percentile have only a 5% probability of occurrence, as do observations below the 5th percentile. The 50th percentile is presented as the best estimate.

pico – a prefix that multiplies a basic unit by 1/1,000,000,000,000 or 1×10^{-12} . For example, 1 picocurie equals 1×10^{-12} curie, or one-trillionth of a *curie*.

Plume – the *concentration* profile of an airborne or waterborne release of material as it spreads from its source. A plume from a coal-fired power plant, for example, may be visible for some distance from its stack, with the concentration of its components decreasing with distance from the stack and from the centerline of the plume. After the plume becomes invisible because of dilution, it continues to be diluted with increasing time and distance. Atmospheric dispersion *models* of this process predict concentrations within a plume far downwind and far beyond the point at which a plume becomes invisible. Similar modeling for releases from nuclear facilities can estimate the impacts of releases long past by reconstructing *exposure* and *dose* estimates.

Plutonium (Pu) – silvery, white radioactive metal (atomic number 94) used in casting, rolling and forming, and machining and final assembly of nuclear weapons components. Its most important *isotope* is plutonium-239, produced by neutron irradiation of uranium-238. Plutonium-239 decays by emitting *alpha particles* and has a 24,065-year half-life.

Precision – the ability of an *analytical method* to reproduce the same result upon repeated trials. (*See bias.*)

Purex process – a process to separate uranium and plutonium from each other and from fission products by means of solvent extraction. The solvent used at the SRS was a solution of tributyl phosphate in “Ultrasene,” a high-grade kerosene. The process was used in the F Canyon. The HM process replaced the Purex process in 1959.

Purging – releasing the water from the reactor basins to the seepage basins, allowing the tritium to evaporate.

QA/QC – quality assurance/quality control programs are established to assure accurate and reproducible results from environmental *monitoring*.

RAC – *Radiological Assessments Corporation*, the contractor selected in October 1992 to conduct the Phase II Source Term Calculation and Ingestion Pathway Data Retrieval. *Radiological Assessments Corporation* changed its name to *Risk Assessment Corporation* in 1998.

Radiation – energy moving in the form of particles or waves. Familiar radiations are heat, light, radio waves, and microwaves. *Ionizing radiation* is a very high frequency form of electromagnetic radiation. It is invisible and cannot be sensed without the use of detecting equipment.

Radioactive contamination – *radioactive material* distributed over an area, equipment or an individual.

Radioactive decay – the disintegration of the nucleus of an unstable nuclide by the spontaneous emission of charged particles or photons of energy.

Radioactive material – material that contains unstable (radioactive) atoms that give off *radiation* as they decay.

Radioactivity – spontaneous transformation of an unstable atom, often resulting in the emission of *radiation*. This process is referred to as decay or *disintegration* of an atom.

Radiological – related to *radioactive materials* or *radiation*. The radiological sciences focus on the measurement and effects of radiation.

Radionuclide – a radioactive *isotope*, for example, plutonium-239 or tritium. Plutonium-239 emits *alpha particle* radiation when it decays; tritium emits low-energy beta particles. The isotope is an element that may make up part of another substance or chemical compound.

Reactor – the nuclear reactors in the 100 areas at the SRS.

Red-oil explosion – an explosion that can result from the presence of organic materials with nitric acid (NO_x) and high temperature; the rapid exothermic nitration of the organic material can lead to a “red-oil explosion.”

Sand filters – at SRS, these underground filters were rectangular concrete structures with beds made of layers of coarse stone and succeeding layers of finer and finer gravel and sand for a total filter depth of about 8.5 feet. They were designed to filter the air exhausted from the canyon buildings.

SCRAM – an acronym for Safety Control Rod Ax Man. A SCRAM entails dropping the safety rods in a reactor to shut down the reaction.

Seepage basins – unlined excavated bowl-shaped areas for receiving liquid wastes from numerous facilities onsite. They were designed to allow infiltration of the liquid into the ground, thus decreasing the total volume of liquid released to onsite streams. The first seepage basins were put into operation in 1954.

Seepline – see outcrop.

Sensitivity – ability of an analytical method to detect small *concentrations* of a *contaminant*.

Separation areas – the F-Area and H-Area where fissionable materials that had been irradiated in the reactors were chemically separated from fission products and from each other.

Septafoil – clusters of seven rods in the reactors.

Slugs – irradiated uranium in the form of solid or hollow cylinders, encased in aluminum cladding.

Source term – the quantity, chemical and physical form, and the time history of *contaminants* released to the environment from a facility.

Spatial trend (or spatial distribution) – a description of how a contaminant is distributed in the environment, for example with distance away from the facility. Two-dimensional trends in measurements are sometimes illustrated with *isopleths*.

Spiked samples – samples to which a known amount of the *contaminant* has been purposefully added to assess the accuracy of an *analytical method*.

Strike – a type of precipitation (head end) process in the separations area in which manganese nitrate and potassium permanganate were added to a treatment tank to form a manganese oxide precipitate.

Tank farm – series of interconnected underground tanks used at SRS for storage of high-level radioactive liquid wastes.

Time trend (or temporal trend) – a description of how the *concentration* of a *contaminant* changes over time at the same place.

Toxicity assessment – an evaluation of the types of health effects usually caused by specific substances, and the quantity (or *dose*) required to cause the effects.

Toxicologic review – an evaluation of the presence, use, and possible releases of toxic substances and the resulting potential for *exposure* or hazard to occur.

Transuranics – nuclides having an atomic number greater than uranium (i.e., greater than 92); all known transuranium elements are radioactive.

Tritium (T) – synonym for ^3H , a radioactive isotope of hydrogen of triple mass (atomic mass = 3).

Tritium reservoirs – small pressure vessels of various shapes that were filled with tritium gas under high pressure for use as components of a thermonuclear weapons. These are the only weapons components that were produced at the SRS.

Uncertainty – a general term used to describe the level of confidence in a given measurement or estimated quantity. Uncertainty depends on the amount and quality of the evidence (data) available. Uncertainties in the results of this study arise primarily from *bias* and imprecision in available measurements, absence of measurements at some times and places, lack of knowledge about some physical processes and operational procedures, and the approximate nature of mathematical models used to predict the transport of released materials.

Uranium (U) – a naturally occurring radioactive metal with atomic number 92, the heaviest natural element. Small amounts are present in soil, coal and rock materials, water, plants, and animals.

Validation – the process of comparing predicted *concentrations* of a material in the environment, based on *source term* reconstruction and environmental transport *models*, with historical measured concentrations to demonstrate that the models, within their domain of applicability, adequately represent the system they are intended to describe.

Water table – ground water that is held by a natural basin of clay overlain with sand or sandy clay and isolated from principal aquifers.

ACRONYMS

ACGIH – American Conference of Governmental Industrial Hygienists

AEC – Atomic Energy Commission

AIRS – Air Information Reporting System (database)

ATSDR – Agency for Toxic Substances and Disease Registry

BTU – British Thermal Unit

CAS – Chemical Abstract Service (number)

CCI – Company Chemical Inventory (Du Pont's)

CMP – Chemical, Metal and Pesticide (Pits)

CIIS – Chemical Information and Inventory System (Database)

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act

CMX – code letters designating a facility at SRS for the development and testing of various reactor components and auxiliaries.

cpm – counts per minute

DOE – Department of Energy

DP – Savannah River Laboratory research and development reports, originated by the Atomic Energy Division, Engineering Department, and or contractors

DPS – Savannah River Laboratory internal documents issued jointly by Technical Information Service (SRL) and Plant Records Division (SRP)

DPSOL – Du Pont Savannah River Plant Operating Log

DPSOP – Du Pont Savannah River Plant Operating Procedure

DPST – Savannah River Laboratory internal correspondence, memos, reports

DPSTL – Savannah River Laboratory Operating Log

DWPF – Defense Waste Processing Facility

EIS – Environmental Impact Statement

EPA – U.S. Environmental Protection Agency

EML – Environmental Measurements Laboratory (*see HASL*).

ERDA – Energy Research and Development Administration

FDA – Food and Drug Administration

FMF – (Naval) Fuel Manufacturing Facility

GIS – Geographic Information System

GM – Geometric Mean

GSD – Geometric Standard Deviation

GWQCB – Georgia Water Quality Control Board

HAW – high activity waste

HLW – high-level radioactive waste

HEPA – high-efficiency particulate air (filters)

HEAST – Health Effects Assessment Summary Tables

IARC – International Agency for Research on Cancer

ISCST – Industrial Source Complex Short Term (model)

K_{ow} – octanol-water partition coefficient

LAW – Low Activity Waste

LETf – Liquid Effluent Treatment Facility

LLD – Lower Limit of Detection

MCL – Maximum Contaminant Levels (Drinking Water Standards)

MSDS – Material (or Manufacturer) Safety Data Sheets

NAAQS – National Ambient Air Quality Standards

NCRP – National Council on Radiation Protection and Measurements

NESHAPs – National Emission Standards for Hazardous Air Pollutants

NPDES – National Pollution Discharge Elimination System

NIOSH – National Institute of Occupational Safety and Health

NTP – National Toxicology Program

ORNL – Oak Ridge National Laboratory

OSHA – Occupational Safety and Health Administration

PCBs – Polychlorinated biphenyls

PDWS – Primary Drinking Water Standards

PEL – permissible exposure limit

pCi – picocurie (*see curie, pico*)

Pu – plutonium

PVC – Polyvinyl chloride (pipe)

RBOF – Receiving Basin for Offsite Fuels

RCRA – Resource Conservation and Recovery Act

RfC – reference concentration

RfD – reference dose

RM – river mile

SARA – Superfund Amendments and Reauthorization Act of 1986

SCDHEC – South Carolina Department of Health and Environmental Control

SREL – Savannah River Ecology Laboratory

SRL – Savannah River Laboratory (named Savannah River Technology Center, SRTC in 1992)

SRP – Savannah River Plant (former designation for SRS and the production facilities)

SRS – Savannah River Site

SRTC – Savannah River Technology Center formerly called *Savannah River Laboratory*

SWDF – Solid Waste Disposal Facility

TBP – Tributyl phosphate or tri-n-butyl phosphate

TCDD – Trichlorodibenzodioxin

TLLa – total long-lived *alpha* activity

TLV – Threshold Limit Value

TNX – code name for the first pilot or semi-scale works facility at the SRS for the development and testing of equipment for the chemical separations processes

TRI – toxic release inventory

TRU – transuranic (refers to nuclides with atomic number greater than that of uranium)

TSCA – Toxic Substances Control Act

TWA – time weighted average

U – uranium

UNSCEAR – United Nations Scientific Committee on the Effects of Atomic Radiation

USGS – U.S. Geological Survey

WSRC – Westinghouse Savannah River Company; took over the site operations from Du Pont in March 1989.

MEASUREMENT ACRONYMS

g – gm

kg – kilogram

mg – milligram (10^{-3} g)

ppb – parts per billion

ppm – parts per million

ppt – parts per thousand

µg – micrograms (10^{-6} g)

y – year

d – day

m–meter

L–liter

Gal–gallon