

CHAPTER 11: GLOSSARY

Absorbed dose: The energy imparted to matter by ionizing radiation per unit mass of irradiated material at the place of interest in that material. Expressed in units of radiation absorbed dose or grays, where one radiation absorbed dose equals 0.01 gray. Also, see “radiation absorbed dose.”

Acute exposure: The exposure incurred during and shortly after a radiological release. Generally, the period of acute exposure ends when long-term interdiction is established, as necessary. For convenience, the period of acute exposure is normally assumed to end 1 week after the inception of a radiological accident.

Air pollutant: Any substance in air which could, if in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of matter capable of being airborne.

Air Quality Control Region (AQCR): Geographic subdivisions of the United States, designed to deal with pollution on a regional or local level. Some regions span more than one state.

Air quality standards: The level of pollutants in the air prescribed by regulations that may not be exceeded during a specified time in a defined area.

Alpha activity: The emission of alpha particles by fissionable materials (uranium or plutonium).

Alpha particle: A positively charged particle, consisting of two protons and two neutrons, that is emitted during radioactive decay from the nucleus of certain nuclides. It is the least penetrating of the three common types of radiation (alpha, beta, and gamma).

Ambient air: The surrounding atmosphere as it exists around people, plants, and structures. Air quality standards are used to provide a measure of the health-related and visual characteristics of the air.

Aquifer: A saturated geologic unit through which significant quantities of water can migrate under natural hydraulic gradients.

Archaeological sites (resources): Any location where humans have altered the terrain or discarded artifacts during either prehistoric or historic times.

Artifact: An object produced or shaped by human workmanship of archaeological or historical interest.

As low as reasonably achievable (ALARA): A concept applied to the quantity of radioactivity released in routine operation of a nuclear system or facility, including “anticipated operational occurrences.” It takes into account the state of technology, economics of improvements in relation to benefits to public health and safety, and other societal and economic considerations in relation to the use of nuclear energy in the public interest.

Atmospheric dispersion: The process of air pollutants being dispersed in the atmosphere. This occurs by the wind that carries the pollutants away from their source and by turbulent air motion that results from solar heating of the Earth’s surface and air movement over rough terrain and surfaces.

Atomic Energy Act of 1954: This act was originally enacted in 1946 and amended in 1954. For the purpose of this Programmatic Environmental Impact Statement “...a program for Government control of the possession, use, and production of atomic energy and special nuclear material whether owned by the

Government or others, so directed as to make the maximum contribution to the common defense and security and the national welfare, and to provide continued assurance of the Government's ability to enter into and enforce agreements with nations or groups of nations for the control of special nuclear materials and atomic weapons..." (Section 3(c)).

Atomic Energy Commission: A five-member commission, established by the *Atomic Energy Act* of 1946, to supervise nuclear weapons design, development, manufacturing, maintenance, modification, and dismantlement. In 1974, the Atomic Energy Commission was abolished and all functions were transferred to the Nuclear Regulatory Commission and the Administrator of the Energy Research and Development Administration. The Energy Research and Development Administration was later terminated and its functions vested by law in the Administrator were transferred to the Secretary of Energy.

Background radiation: Ionizing radiation present in the environment from cosmic rays and natural sources in the Earth; background radiation varies considerably with location. Also, see "natural radiation."

Badged worker: A worker equipped with an individual dosimeter who has the potential to be exposed to radiation.

Baseline: A quantitative expression of conditions, costs, schedule, or technical progress to serve as a base or standard for measurement during the performance of an effort; the established plan against which the status of resources and the progress of a project can be measured.

BEIR V: Biological Effects of Ionizing Radiation; referring to the fifth in a series of committee reports from the National Research Council.

Beryllium: An extremely lightweight, strong metal used in weapons systems.

Benthic: Plants and animals dwelling at the bottom of oceans, lakes, rivers, and other surface waters.

Best Available Control Technology: A term used in the Federal *Clean Air Act* that means the most stringent level of air pollutant control considering economics for a specific type of source based on demonstrated technology.

Beta particle: A charged particle emitted from the nucleus of an atom during radioactive decay. A negatively charged beta particle is identical to an electron. A positively charged beta particle is called a positron.

Beyond Evaluation Basis Accident: An accident, generally with more severe impacts to on-site personnel and the public than a Evaluation Basis Accident or Design Basis Accident (DBA), initiated by operational or external causes with an estimated probability of occurrence less than 10^{-6} per year and used for estimating the impacts of a planned new or modified facility and/or process. For those cases where a DBA is defined, these accidents are often referred to as Beyond Design Basis Accidents or Severe Accidents.

Cask (radioactive materials): A container that meets all applicable regulatory requirements for shipping spent nuclear fuel or high-level waste.

Category I, II, III, IV: Designated categories of nuclear material used in the implementation of Department of Energy's graded safeguards program. The material category of a Special Nuclear Materials location (e.g., material balance area, material access area, protected area, facility) is used to determine and establish the required protection level. Determination of category involves grouping materials by Special Nuclear Material type, attractiveness level, and quantity. Material quantities are element weights for plutonium and ^{233}U and isotope weights for ^{235}U . The table shows category levels for ^{235}U and attractiveness level.

	Attractiveness Level	Contained U-235 Category (quantities in kgs)			
		I	II	III	IV ^a
WEAPONS Assembled weapons and test devices	A	All	N/A	N/A	N/A
PURE PRODUCTS Pits, major components, button ingots, recastable metal, directly convertible materials	B	\$5	\$1<5	\$0.4<1	<0.4
HIGH-GRADE MATERIALS	C	\$20	\$6<20	\$2<6	<2
LOW-GRADE MATERIALS	D	N/A	\$50	\$8<50	<8

^a. The lower limit for Category IV is equal to reportable quantities.

Chemical oxygen demand: A measure of the quantity of chemically oxidizable components present in water.

Chronic exposure: Low-level radiation exposure incurred over a long period of time.

Clean Air Act: This Act mandates and enforces air pollutant emissions standards for stationary sources and motor vehicles.

Clean Air Act Amendments of 1990: Expands the Environmental Protection Agency's enforcement powers and adds restrictions on air toxics, ozone depleting chemicals, stationary and mobile emissions sources, and emissions implicated in rain and global warming.

Clean Water Act of 1972, 1987: This Act regulates the discharge of pollutants from a point source into navigable waters of the United States in compliance with an National Pollution Discharge Elimination System permit as well as regulates discharges to or dredging of wetlands.

Climatology: The science that deals with climates and investigates their phenomena and causes.

Code of Federal Regulations (CFR): All Federal regulations in force are published in codified form in the *Code of Federal Regulations*.

Collective committed effective dose equivalent (CEDE): The CEDE of radiation for a population.

Committed dose equivalent: The predicted total dose equivalent to a tissue or organ over a 50-year period after an intake of radionuclide into the body. It does not include external dose contributions. Committed dose equivalent is expressed in units of rem or Sievert. The committed effective dose equivalent is the sum of the committed dose equivalents to various tissues of the body, each multiplied by the appropriate weighting factor.

Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA or Superfund): This act provides regulatory framework for remediation of past contamination from hazardous waste. If a site meets the act's requirements for designation, it is ranked along with other "Superfund" sites and is listed on the National Priorities List. This ranking is the Environmental Protection Agency's way of determining which sites have the highest priority for cleanup.

Comprehensive Test Ban Treaty (CTBT): A proposed treaty prohibiting nuclear tests of all magnitudes.

Conceptual design: Efforts to develop a project scope that will satisfy program needs; ensure project feasibility and attainable performance levels of the project for congressional consideration; develop project criteria and design parameters for all engineering disciplines; and identify applicable codes and standards, quality assurance requirements, environmental studies, construction materials, space allowances, energy conservation features, health, safety, safeguards, and security requirements and any other features or requirements necessary to describe the project.

Credible accident: An accident that has a probability of occurrence greater than or equal to one in a million years.

Criteria pollutants: Six air pollutants for which national ambient air quality standards are established by the Environmental Protection Agency under Title I of the Federal *Clean Air Act*: sulfur dioxide, nitrogen oxides, carbon monoxide, ozone, particulate matter (smaller than 10 microns in diameter), and lead.

Critical habitat: Defined in the *Endangered Species Act* of 1973 as "specific areas within the geographical area occupied by [an endangered or threatened] species..., essential to the conservation of the species and which may require special management considerations or protection; and specific areas outside the geographical area occupied by the species... that are essential for the conservation of the species."

Criticality: The condition in which nuclear fuel sustains a chain reaction. It occurs when the number of neutrons present in one generation cycle equals the number generated in the previous cycle.

Cultural resources: Archaeological sites, architectural features, traditional use areas, and Native American sacred sites or special use areas.

Cumulative impacts: In an EIS, the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal), private industry, or individuals undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time (40 CFR 1508.7).

Decommissioning: The process of withdrawing a building, equipment, or a facility from active service.

Decontamination: The actions taken to reduce or remove substances that pose a substantial present or potential hazard to human health or the environment, such as radioactive or chemical contamination from facilities, equipment, or soils by washing, heating, chemical or electrochemical action, mechanical cleaning, or other techniques.

Depleted uranium: Uranium whose content of the isotope uranium-235 is less than 0.7 percent, which is the uranium-235 content of naturally occurring uranium.

Direct economic effects: The initial increases in output from different sectors of the economy resulting from some new activity within a predefined geographic region.

Direct Effect Multiplier: The total change in regional earnings and employment in all related industries as a result of a one-dollar change in earnings and a one-job change in a given industry.

Direct jobs: The number of workers required at a site to implement an alternative.

Disposition: The ultimate “fate” or end use of a surplus Department of Energy facility following the transfer of the facility to the Office of the Assistant Secretary for Environmental Waste Management.

Dose: The energy imparted to matter by ionizing radiation. The unit of absorbed dose is the rad.

Dose commitment: The dose an organ or tissue would receive during a specified period of time (e.g., 50 to 100 years) as a result of intake (as by ingestion or inhalation) of one or more radionuclides from a defined release, frequently over a year’s time.

Dose equivalent: The product of absorbed dose in rad (or gray) and the effect of this type of radiation in tissue, and a quality factor. Dose equivalent is expressed in units of rem or Sievert, where 1 rem equals 0.01 Sievert. The dose equivalent to an organ, tissue, or the whole body will be that received from the direct exposure plus the 50-year committed dose equivalent received from the radionuclides taken into the body during the year.

Dosimeter: A small device (instrument) carried by a radiation worker that measures cumulative radiation dose (e.g., TLD - thermoluminescent badge or ionization chamber).

Drinking-water standards: The prescribed level of constituents or characteristics in a drinking water supply that cannot be exceeded legally.

Dual use/dual benefit: Projects that have uses in or benefits for the defense sector and the private industry or civilian sector.

Effective dose equivalent (EDE): The summation of the products of the dose equivalent received by specified tissues of the body and a tissue-specific weighting factor. This sum is a risk-equivalent value and can be used to estimate the health effects risk of the exposed individual. The tissue-specific weighting factor represents the fraction of the total health risk resulting from uniform whole-body irradiation that would be contributed by that particular tissue. The EDE includes the CEDE from internal deposition of radionuclides, and the effective dose equivalent due to penetrating radiation from sources external to the body. EDE is expressed in units of rem (or Sievert).

Effluent: A gas or fluid discharged into the environment.

Emission standards: Legally enforceable limits on the quantities and/or kinds of air contaminants that can be emitted into the atmosphere.

Endangered species: Defined in the *Endangered Species Act* of 1973 as “any species which is in danger of extinction throughout all or a significant portion of its range.”

Endangered Species Act of 1973: This act requires Federal agencies, with the consultation and assistance of the Secretaries of the Interior and Commerce, to ensure that their actions will not likely jeopardize the continued existence of any endangered or threatened species or adversely affect the habitat of such species.

Enduring stockpile: Weapons types expected to be retained in the smaller stockpile for the foreseeable future.

Environment, safety and health (ES&H) program: In the context of the Department of Energy, encompasses those Department of Energy requirements, activities, and functions in the conduct of all Department of Energy and Department of Energy-controlled operations that are concerned with: impacts to the biosphere; compliance with environmental laws, regulations, and standards controlling air, water, and soil pollution; limiting the risks to the well-being of both operating personnel and the general public to acceptably low levels; and protecting property adequately against accidental loss and damage. Typical activities and functions related to this program include, but are not limited to, environmental protection, occupational safety, fire protection, industrial hygiene, health physics, occupational medicine, and process and facilities safety, nuclear safety, emergency preparedness, quality assurance, and radioactive and hazardous waste management.

Environmental assessment (EA): A written environmental analysis that is prepared pursuant to the *National Environmental Policy Act* to determine whether a Federal action would significantly affect the environment and thus require preparation of a more detailed environmental impact statement. If the action would not significantly affect the environment, then a finding of no significant impact is prepared.

Environmental impact statement (EIS): A document required of Federal agencies by the *National Environmental Policy Act* for major proposals significantly affecting the environment. A tool for decision-making, it describes the positive and negative effects of the undertaking and alternative actions.

Environmental justice: The fair treatment of people of all races, cultures, incomes, and educational levels with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies. Fair treatment implies that no population of people should be forced to shoulder a disproportionate share of the negative environmental impacts of pollution or environmental hazards due to a lack of political or economic strength.

Environmental survey: A documented, multidisciplinary assessment (with sampling and analysis) of a facility to determine environmental conditions and to identify environmental problems requiring corrective action.

Epicenter: The point on the Earth's surface directly above the focus of an earthquake.

Epidemiology: The science concerned with the study of events that determine and influence the frequency and distribution of disease, injury, and other health-related events and their causes in a defined human population.

ES&H vulnerabilities: Conditions or weaknesses at facilities that could lead to unnecessary or increased exposure of workers or the public to radiation or to HEU associated chemical hazards, or to the release of radioactive materials to the environment.

Evaluation Basis Accident: An accident, generally with small impacts to the public, initiated by operational or external causes with an estimated probability of occurrence greater than 10^{-6} per year and used for estimating the impacts of a planned new or modified facility and/or process when a Safety Analysis Report, that would define a DBA, has not been prepared. A DBA is used to establish the performance requirements of structures, systems, and components that are necessary to maintain them in a safe shutdown condition indefinitely or to prevent or mitigate the consequences of the DBA so that the public and onsite personnel are not exposed to radiation in excess of appropriate guideline values.

Exposure limit: The level of exposure to a hazardous chemical (set by law or a standard) at which or below which adverse human health effects are not expected to occur:

- Reference dose is the chronic exposure dose (mg or kg per day) for a given hazardous chemical at which or below which adverse human non-cancer health effects are not expected to occur.
- Reference concentration is the chronic exposure concentration (mg/M³) for a given hazardous chemical at which or below which adverse human non-cancer health effects are not expected to occur.

Fault: A fracture or a zone of fractures within a rock formation along which vertical, horizontal, or transverse slippage has occurred. A normal fault occurs when the hanging wall has been depressed in relation to the footwall. A reverse fault occurs when the hanging wall has been raised in relation to the footwall.

Finding of No Significant Impact (FONSI): A document by a Federal agency briefly presenting the reasons why an action, not otherwise excluded, will not have a significant effect on the human environment and will not require an environmental impact statement.

Fissile material: Any material capable of supporting a self-sustaining neutron chain reaction to include uranium-233, enriched uranium, plutonium-239, plutonium-241, americium-242, curium-243, curium-245,-247, californium-249,-251.

Floodplain: The lowlands adjoining inland and coastal waters and relatively flat areas including at a minimum that area inundated by a 1-percent or greater chance flood in any given year. The base floodplain is defined as the 100-year (1.0 percent) floodplain. The critical action floodplain is defined as the 500-year (0.2 percent) floodplain.

Formation: In geology, the primary unit of formal stratigraphic mapping or description. Most formations possess certain distinctive features.

Fugitive emissions: Emissions to the atmosphere from pumps, valves, flanges, seals, and other process points not vented through a stack. Also includes emissions from area sources such as ponds, lagoons, landfills, and piles of stored material.

Gamma rays: High-energy, short-wavelength, electromagnetic radiation accompanying fission and emitted from the nucleus of an atom. Gamma rays are very penetrating and can be stopped only by dense materials (such as lead) or a thick layer of shielding materials.

Gaussian plume: The distribution of material (a plume) in the atmosphere resulting from the release of pollutants from a stack or other source. The distribution of concentrations about the centerline of the plume, which is assumed to decrease as a function of its distance from the source and centerline (Gaussian distribution), depends on the mean wind speed and atmospheric stability.

Genetic effects: The outcome resulting from exposure to mutagenic chemicals or radiation which results in genetic changes in germ line or somatic cells.

- Effects on genetic material in germ line (sex cells) cause trait modifications that can be passed from parents to offspring.
- Effects on genetic material in somatic cells result in tissue or organ modifications (e.g. liver tumors) that do not pass from parents to offspring.

Glove box: An airtight box used to work with hazardous material, vented to a closed filtering system, having gloves attached inside of the box to protect the worker.

Hazard chemical: Under 29 CFR 1910, Subpart Z, “hazardous chemicals” are defined as “any chemical which is a physical hazard or a health hazard.” Physical hazards include combustible liquids, compressed gases, explosives, flammables, organic peroxides, oxidizers, pyrophorics, and reactives. A health hazard is any chemical for which there is good evidence that acute or chronic health effects occur in exposed employees. Hazardous chemicals include carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, agents that act on the hematopoietic system, and agents that damage the lungs, skin, eyes or mucous membranes.

Hazard Index (HI): A summation of the hazard quotient for all chemicals now being used at a site and those proposed to be added to yield cumulative levels for a site. A HI value of 1.0 or less means that no adverse human health effects (non-cancer) are expected to occur.

Hazard quotient (HQ): The ratio of the estimated exposure (e.g., daily intake rate) to be expected to have no adverse effects. It is independent of a cancer risk, which is calculated only for those chemicals identified as carcinogens.

Hazardous material: A material, including a hazardous substance, as defined by 49 CFR 171.8 which poses a risk to health, safety, and property when transported or handled.

Hazardous/toxic waste: Any solid waste (can also be semisolid or liquid, or contain gaseous material) having the characteristics of ignitability, corrosivity, toxicity, or reactivity, defined by the *Resource Conservation and Recovery Act* and identified or listed in 40 CFR 261 or by the *Toxic Substances Control Act*.

Heavy metals: Metallic or semimetallic elements of high molecular weight, such as mercury, chromium, cadmium, lead, and arsenic, that are toxic to plants and animals at known concentrations.

High-efficiency particulate air (HEPA) filter: A filter used to remove particulates from dry gaseous effluent streams.

High-level waste: The highly radioactive waste material that results from the reprocessing of spent nuclear fuel, including liquid waste produced directly in reprocessing and any solid waste derived from the liquid. High-level waste contains a combination of transuranic waste and fission products in concentrations requiring permanent isolation.

Highly enriched uranium (HEU): Uranium in which the abundance of the isotope ^{235}U is increased well above normal (naturally occurring) levels.

Historic resources: Archaeological sites, architectural structures, and objects produced after the advent of written history dating to the time of the first Euro-American contact in an area.

Hydrology: The science dealing with the properties, distribution, and circulation of natural water systems.

Incident-free risk: The radiological or chemical impacts resulting from packages aboard vehicles in normal transport. This includes the radiation or hazardous chemical exposure of specific population groups such as crew, passengers, and bystanders.

Indirect economic effects: Indirect effects result from the need to supply industries experiencing direct economic effects with additional outputs to allow them to increase their production. The additional output from each directly affected industry requires inputs from other industries within a region (i.e., purchases of goods and services). This results in a multiplier effect to show the change in total economic activity resulting from a new activity in a region.

Induced economic effects: The spending of households resulting from direct and indirect economic effects. Increases in output from a new economic activity lead to an increase in household spending throughout the economy as firms increase their labor inputs.

Indirect jobs: Within a regional economic area, jobs generated or lost in related industries as a result of a change in direct employment.

Interim (permit) status: Period during which treatment, storage, and disposal facilities coming under the *Resource Conservation and Recovery Act* of 1980 are temporarily permitted to operate while awaiting denial or issuance of a permanent permit.

Ionizing radiation: Alpha particles, beta particles, gamma rays, x rays, neutrons, high speed electrons, high speed protons, and other particles or electromagnetic radiation that can displace electrons from atoms or molecules, thereby producing ions.

Isotope: An atom of a chemical element with a specific atomic number and atomic mass. Isotopes of the same element have the same number of protons but different numbers of neutrons and different atomic masses.

Lacustrine wetland: Lakes, ponds, and other enclosed open waters at least 8 ha (20 acres) in extent and not dominated by trees, shrubs, and emergent vegetation.

Large release: A release of radioactive material that would result in doses greater than 25 rem to the whole body or 300 rem to the thyroid at 1.6 km from the control perimeter (security fence) of a reactor facility.

Laser: A device that produces a beam of monochromatic (single-color) “light” in which the waves of light are all in phase. This condition creates a beam that has relatively little scattering and has a high concentration of energy per unit area.

Latent fatalities: Fatalities associated with acute and chronic environmental exposures to chemicals or radiation.

Low-level waste: Waste that contains radioactivity but is not classified as high-level waste, transuranic waste, spent nuclear fuel, or “1e(2) by-product material” as defined by DOE Order 5820.2A, *Radioactive Waste Management*. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as low-level waste, provided the concentration of transuranic waste is less than 100 nanocuries per gram. Some low-level waste is considered classified because (1) the nature of the generating process and/or constituents, and (2) the waste would reveal too much about the generating process.

Manufacturing: see “production.”

Maximum contaminant level: The maximum permissible level of a contaminant in water delivered to any user of a public water system. Maximum contaminant levels are enforceable standards.

Maximally exposed individual (MEI): A hypothetical person who could potentially receive the maximum dose of radiation or hazardous chemicals.

Meteorology: The science dealing with the atmosphere and its phenomena, especially as relating to weather.

Migration: The natural movement of a material through the air, soil, or groundwater; also, seasonal movement of animals from one area to another.

Mixed waste: Waste that contains both “hazardous waste” and “radioactive waste” as defined in this glossary.

Modified Mercalli intensity: A level on the modified Mercalli scale. A measure of the perceived intensity of earthquake ground shaking with 12 divisions, from I (not felt by people) to XII (damage nearly total).

National Ambient Air Quality Standards (NAAQS): Air quality standards established by the *Clean Air Act*, as amended. The primary NAAQS are intended to protect the public health with an adequate margin of safety, and the secondary NAAQS are intended to protect the public welfare from any known or anticipated adverse effects of a pollutant.

National Emission Standards for Hazardous Air Pollutants (NESHAP): A set of NESHAP emitted from specific classes or categories of new and existing sources. These were implemented in the *Clean Air Act* Amendments of 1977.

National Environmental Policy Act of 1969 (NEPA): This Act is the basic national charter for the protection of the environment. It requires the preparation of an environmental impact statement for every major Federal action that may significantly affect the quality of the human or natural environment. Its main purpose is to provide environmental information to decision makers and the public so that actions are based on an understanding of the potential environmental consequences of a proposed action and its reasonable alternatives.

National Environmental Research Park (NERP): An outdoor laboratory set aside for ecological research to study the environmental impacts of energy developments. NERPs were established by the Department of Energy to provide protected land areas for research and education in the environmental sciences and to demonstrate the environmental compatibility of energy technology development and use.

National Historic Preservation Act of 1966, as amended (NHPA): This Act provides that property resources with significant national historic value be placed on the National Register of Historic Places. It does not require any permits but, pursuant to Federal code, if a proposed action might impact an historic property resource, it mandates consultation with the proper agencies.

National Pollutant Discharge Elimination System (NPDES): Federal permitting system required for hazardous effluents regulated through the *Clean Water Act*, as amended.

National Register of Historic Places (NRHP): A list maintained by the Secretary of the Interior of districts, sites, buildings, structures, and objects of prehistoric or historic local, state, or national significance. The list is expanded as authorized by Section 2(b) of the *Historic Sites Act* of 1935 (16 U.S.C. 462) and Section 101(a)(1)(A) of the NHPA of 1966, as amended.

Nitrogen oxides (NOX): Refers to the oxides of nitrogen, primarily NO (nitrogen oxide) and NO₂ (nitrogen dioxide). These are produced in the combustion of fossil fuels and can constitute an air pollution problem. When nitrogen dioxide combines with volatile organic compounds, such as ammonia or carbon monoxide, ozone is produced.

Nonattainment area: An air quality control region (or portion thereof) in which the Environmental Protection Agency has determined that ambient air concentrations exceed NAAQS for one or more criteria pollutants.

Nonproliferation Treaty: A treaty with the aim of controlling the spread of nuclear weapons technologies, limiting the number of nuclear weapons states and pursuing, in good faith, effective measures relating to the

cessation of the nuclear arms race. The treaty does not invoke stockpile reductions by nuclear states, and it does not address actions of nuclear states in maintaining their stockpiles.

Nuclear facility: A facility whose operations involve radioactive materials in such form and quantity that a nuclear hazard potentially exists to the employees or the general public. Included are facilities that produce, process, or store radioactive liquid or solid waste, fissionable materials, or tritium; conduct separations operations; conduct irradiated materials inspection, fuel fabrication, decontamination, or recovery operations. Incidental use of radioactive materials in a facility operation (e.g., check sources, radioactive sources, and X-ray machines) does not necessarily require a facility to be included in this definition.

Nuclear grade: Material of a quality adequate for use in a nuclear application.

Nuclear production: Production operations for components of nuclear weapons that are fabricated from nuclear materials, including plutonium and uranium.

Nuclear weapon: The general name given to any weapon in which the explosion results from the energy released by reactions involving atomic nuclei, either fission, fusion, or both.

Nuclear Weapons Complex: The sites supporting the research, development, design, manufacture, testing, assessment, certification and maintenance of the Nation's nuclear weapons and the subsequent dismantlement of retired weapons.

Occupational Safety and Health Administration (OSHA): Oversees and regulates workplace health and safety, created by the *Occupational Safety and Health Act* of 1970.

Off-site: As used in this EIS, the term denotes a location, facility, or activity occurring outside the boundary of the entire Oak Ridge Reservation site.

On-site: As used in this EIS, the term denotes a location or activity occurring somewhere within the boundary of the Oak Ridge Reservation.

On-site population: Department of Energy and contractor employees who are on duty, and badged on-site visitors.

Operable unit: A discrete action that comprises an incremental step toward comprehensively addressing site problems. This discrete portion of a remedial response manages migration or eliminates or mitigates a release, threat of release, or pathway of exposure. The cleanup of a site can be divided into a number of operable units.

Outfall: The discharge point of a drain, sewer, or pipe as it empties into a body of water.

Ozone: The triatomic form of oxygen; in the stratosphere, ozone protects the Earth from the sun's ultraviolet rays, but in lower levels of the atmosphere ozone is considered an air pollutant.

Packaging: The assembly of components necessary to ensure compliance with Federal regulations. It may consist of one or more receptacles, absorbent materials, spacing structures, thermal insulation, radiation shielding, and devices for cooling or absorbing mechanical shocks. The vehicle tie-down system and auxiliary equipment may be designated as part of the packaging.

Palustrine wetland: Nontidal wetlands dominated by trees, shrubs, and emergent vegetation.

Perched groundwater: A body of groundwater of small lateral dimensions lying above a more extensive aquifer.

Performance Categories (PC): Defined in DOE O 420.1, performance categories classify the performance goals of a facility in terms of facility's structural ability to withstand natural phenomena hazards (i.e., earthquakes, winds, and floods). Ranging from 0 to 4, each PC has a qualitative and quantitative description of the performance goal for its category. Both the qualitative description of acceptable performance and the quantitative probability for each PC are equally significant in establishing the design and evaluation criteria. In general, facilities that are classified as (1) PC 0 do not consider safety, mission, or cost considerations, (2) PC 1 must maintain occupant safety, (3) PC 2 must maintain occupant safety and continued operations with minimum interruption, (4) PC 3 must maintain occupant safety, continued operations, and hazard materials confinement, and (5) PC 4 must meet occupant safety, continued operations, and confidence of hazard confinement.

Person-rem: The unit of collective radiation dose commitment to a given population; the sum of the individual doses received by a population segment.

Physical setting: The land and water form, vegetation, and structures that compose the landscape.

Plume: The elongated pattern of contaminated air or water originating at a point source, such as a smokestack or a hazardous waste disposal site.

Plutonium: A heavy, radioactive, metallic element with the atomic number 94. It is produced artificially in a reactor by bombardment of uranium with neutrons and is used in the production of nuclear weapons.

Prehistoric: Predating written history, in North America, also predating contact with Europeans.

Prevention of Significant Deterioration: Regulations established by the 1977 *Clean Air Act* Amendments to limit increases in criteria air pollutant concentrations above baseline.

Prime farmland: Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor without intolerable soil erosion, as determined by the Secretary of Agriculture (*Farmland Protection Policy Act* of 1981, 7 CFR 7, paragraph 658).

Probable maximum flood: Flood levels predicted for a scenario having hydrological conditions that maximize the flow of surface waters.

Production: Encompasses the fabrication, processing, assembly, and acceptance testing of nuclear weapons and nuclear weapon components, and is interchangeable with the term manufacturing.

Programmatic Environmental Impact Statement (PEIS): A legal document prepared in accordance with the requirements of 102(2)(C) of NEPA which evaluates the environmental impacts of proposed Federal actions that involve multiple decisions potentially affecting the environment at one or more sites.

Project-specific EIS: A legal document prepared in accordance with the requirements of 102(2)(C) of NEPA which evaluates the environmental impacts of a single action at a single site.

Proliferation: The spread of nuclear weapons and the materials and technologies used to produce them.

Protected area: An area encompassed by physical barriers, subject to access controls, surrounding material access areas, and meeting the standards of DOE Order 5632.1C, *Protection and Control of Safeguards and Security Interests*.

Quality factor: The principal modifying factor that is employed to derive dose equivalent from absorbed dose.

Rad: See “radiation absorbed dose.”

Radiation: The particles or electromagnetic energy emitted from the nuclei of radioactive atoms. Some elements are naturally radioactive; others are induced to become radioactive by bombardment in a reactor. Naturally occurring radiation is indistinguishable from induced radiation.

Radiation absorbed dose: The basic unit of absorbed dose equal to the absorption of 0.01 joule per kilogram of absorbing material.

Radioactive waste: Materials from nuclear operations that are radioactive or are contaminated with radioactive materials, and for which use, reuse, or recovery are impractical.

Radioactivity: The spontaneous decay or disintegration of unstable atomic nuclei, accompanied by the emission of radiation.

Radioisotopes: Radioactive nuclides of the same element (same number of protons in their nuclei) that differ in the number of neutrons.

Radionuclide: A radioactive element characterized according to its atomic mass and atomic number which can be man-made or naturally occurring. Radionuclides can have a long life as soil or water pollutants, and are believed to have potentially mutagenic or carcinogenic effects on the human body.

RADTRAN: A computer code combining user-determined meteorological, demographic, transportation, packaging, and material factors with health physics data to calculate the expected radiological consequences and accident risk of transporting radioactive material.

Reasonably Available Control Technology : The lowest emissions limit that a particular source is capable of meeting by the application of control technology that is reasonably available as well as technologically and economically feasible.

Receiving waters: Rivers, lakes, oceans, or other bodies of water into which wastewaters are discharged.

Recharge: Replenishment of water to an aquifer.

Record of Decision (ROD): A document prepared in accordance with the requirements of 40 CFR 1505.2 that provides a concise public record of Department of Energy’s decision on a proposed action for which an EIS was prepared. A ROD identifies the alternatives considered in reaching the decision, the environmentally preferable alternative(s), factors balanced by Department of Energy in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not.

Regional economic area: A geographic area consisting of an economic node and the surrounding counties that are economically related and include the places of work and residences of the labor force. Each regional economic area is defined by the U.S. Bureau of Economic Analysis.

Region of influence (ROI): A site-specific geographic area that includes the counties where approximately 90 percent of the current Department of Energy and/or contractor employees reside.

Rem: See “roentgen equivalent man.”

Remediation: The process, or a phase in the process, of rendering radioactive, hazardous, or mixed waste environmentally safe, whether through processing, entombment, or other methods.

Replacement Secondary Fabrication: This function includes the fabrication, surveillance, and storage of the secondary uranium and lithium portion of a nuclear weapon.

Resource Conservation and Recovery Act (RCRA), as amended: This Act provides “cradle to grave” regulatory program for hazardous waste which established, among other things, a system for managing hazardous waste from its generation until its ultimate disposal.

Riparian wetlands: Wetlands on or around rivers and streams.

Risk: A quantitative or qualitative expression of possible loss that considers both the probability that a hazard will cause harm and the consequences of that event.

Risk assessment (chemical or radiological): The qualitative and quantitative evaluation performed in an effort to define the risk posed to human health and/or the environment by the presence or potential presence and/or use of specific chemical or radiological materials.

Roentgen: A unit of exposure to ionizing X- or gamma radiation equal to or producing 1 electrostatic unit of charge per cubic centimeter of air. It is approximately equal to 1 rad.

Roentgen equivalent man (REM): The unit of radiation dose for biological absorption equal to the product of the absorbed dose, in rads, a quality factor which accounts for the variation in biological effectiveness of different types of radiation. Also known as “rem”.

Runoff: The portion of rainfall, melted snow, or irrigation water that flows across the ground surface and eventually enters streams.

Safe Drinking Water Act, as amended: This Act protects the quality of public water supplies, water supply and distribution systems, and all sources of drinking water.

Safe secure trailer (SST): A specially designed semitrailer, pulled by an armored tractor, which is used for the safe, secure transportation of cargo containing nuclear weapons or special nuclear material.

Safety Analysis Report: A safety document providing a concise but complete description and safety evaluation of a site, design, normal and emergency operation, potential accidents, predicted consequences of such accidents, and the means proposed to prevent such accidents or mitigate their consequences. A safety analysis report is designated as final when it is based on final design information. Otherwise, it is designated as preliminary.

Sanitary wastes: Wastes generated by normal housekeeping activities, liquid or solid (includes sludge), which are not hazardous or radioactive.

Scope: In a document prepared pursuant to the NEPA of 1969, the range of actions, alternatives, and impacts to be considered.

Scoping: Involves the solicitation of comments from interested persons, groups, and agencies at public meetings, public workshops, in writing, electronically, or via fax to assist Department of Energy in defining the proposed action, identifying alternatives, and developing preliminary issues to be addressed in an EIS.

Secondary: See “weapon secondary.”

Security: Minimizing the likelihood of unauthorized access to or loss of custody of a nuclear weapon or weapon system, and ensuring that the weapon can be recovered should unauthorized access or loss of custody occur.

Seismic: Pertaining to any earth vibration, especially an earthquake.

Seismic zone: An area defined by the Uniform Building Code (1991), designating the amount of damage to be expected as the result of earthquakes. The United States is divided into six zones: (1) Zone 0 - no damage; (2) Zone 1 - minor damage; corresponds to intensities V and VI of the modified Mercalli intensity scale; (3) Zone 2A - moderate damage; corresponds to intensity VII of the modified Mercalli intensity scale (eastern U.S.); (4) Zone 2B - slightly more damage than 2A (western U.S.); (5) Zone 3 - major damage; corresponds to intensity VII and higher of the modified Mercalli intensity scale; and (6) Zone 4 - areas within Zone 3 determined by proximity to certain major fault systems.

Seismicity: The tendency for the occurrence of earthquakes.

Severe accident: An accident with a frequency rate of less than 10^{-6} per year that would have more severe consequences than a design-basis accident, in terms of damage to the facility, offsite consequences, or both.

Shielding: Any material of obstruction (bulkheads, walls, or other constructions) that absorbs radiation in order to protect personnel or equipment.

Short-lived nuclides: Radioactive isotopes with half-lives no greater than about 30 years (e.g., cesium¹³⁷ and strontium⁹⁰).

Shrink-swell potential: Refers to the potential for soils to contract while drying and expand after wetting.

Silt: A sedimentary material consisting of fine mineral particles intermediate in size between sand and clay.

Siltstone: A sedimentary rock composed of fine textured minerals.

Site-Wide EIS (SWEIS): A legal document prepared in accordance with the requirements of 102(2)(C) of NEPA which evaluates the environmental impacts of many actions at one large, multiple-facility Department of Energy site. Site-wide EISs are used to support programmatic and specific decisions.

Source term: The estimated quantities of radionuclides or chemical pollutants released to the environment.

Special nuclear materials (SNM): As defined in Section 11 of the *Atomic Energy Act* of 1954, special nuclear material means (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the Nuclear Regulatory Commission determines to be special nuclear material, or (2) any material artificially enriched by any of the foregoing.

Standardization (Epidemiology): Techniques used to control the effects of differences (e.g., age) between populations when comparing disease experience. The two main methods are:

- Direct method, in which specific disease rates in the study population are averaged, using as weights the distribution of the comparison population.
- Indirect method, in which the specific disease rates in the comparison population are averaged, using as weights the distribution of the study population.

Strategic Arms Reduction Talks (START) I and II: Terms which refer to negotiations between the U.S. and Russia (the former Soviet Union during START I negotiations) aimed at limiting and reducing nuclear arms. START I discussions began in 1982 and eventually led to a ratified treaty in 1988. The START II protocol, which in December 2000, will attempt to further reduce the acceptable levels of nuclear weapons ratified in START I.

Strategic reserve: That quantity of plutonium and highly enriched uranium reserved for future weapons use. For the purposes of this SWEIS, strategic reserves of plutonium will be in the form of pits, and strategic reserves of highly enriched uranium will be in the form of canned secondary assemblies. Strategic reserves also include limited quantities of plutonium and highly enriched uranium metal maintained as working inventory at Department of Energy laboratories.

Superfund Amendments and Reauthorization Act (SARA) of 1986: Public Law 99-499 passed in 1986 which amends the CERCLA of 1980. SARA more stringently defines hazardous waste cleanup standards and emphasizes remedies that permanently and significantly reduce the mobility, toxicity, or volume of wastes. Title III of SARA, the Emergency Planning and Community Right-to-Know Act, mandates establishment of community emergency planning programs, emergency notification, reporting of chemicals, and emission inventories.

Surface water: Water on the Earth's surface, as distinguished from water in the ground (groundwater).

Threatened species: Any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Threshold limit values: The recommended concentrations of contaminants workers may be exposed to according to the American Council of Governmental Industrial Hygienists.

Toxic Substances Control Act of 1976 (TSCA): This act authorizes the Environmental Protection Agency to secure information on all new and existing chemical substances and to control any of these substances determined to cause an unreasonable risk to public health or the environment. This law requires that the health and environmental effects of all new chemicals be reviewed by the Environmental Protection Agency before they are manufactured for commercial purposes.

Transuranic waste: Waste contaminated with alpha-emitting radionuclides with half-lives greater than 20 years and concentrations greater than 100 nanocuries/gram at time of assay.

Unclassified Controlled Nuclear Information (UCNI): Certain unclassified but sensitive Government information concerning nuclear material, weapons, and components whose dissemination is controlled under section 148 of the *Atomic Energy Act*.

Unusual occurrence: Any unusual or unplanned event that adversely affects or potentially affects the performance, reliability, or safety of a facility.

Uranium: A naturally occurring heavy, silvery-white metallic element (atomic number 92) with many radioactive isotopes. Uranium-235 is most commonly used as a fuel for nuclear fission. Another isotope,

uranium-238, can be transformed into fissionable plutonium-239 following its capture of a neutron in a nuclear reactor.

Volatile organic compound: A broad range of organic compounds, often halogenated, that vaporize at ambient or relatively low temperatures, such as benzene, chloroform, and methyl alcohol.

Visual Resource Management (VRM) Class: Part of BLM's visual resource inventory process that provides a means for determining visual values, consisting of scenic quality evaluation, sensitivity level analysis, and delineation of distance zones. Classes are established through a resource management planning (RMP) process and are ultimately based on management decisions made in the RMPs. Classes range from VRM Class I (highly scenic) to VRM Class IV (industrialized, low scenic quality). Management objectives for these classes are: Class I, preserve existing character of landscape; Class II, retain existing character of landscape with little change that respects basic elements of landscape; Class III, partially retain existing character of landscape with moderate changes that do not dominate view of casual observer; and Class IV, major modifications of existing character of landscape that dominate viewer's attention.

War Reserve: Operational weapons and materials designated as essential for national security needs.

Waste Isolation Pilot Plant (WIPP): A facility in southeastern New Mexico developed as the disposal site for transuranic waste.

Waste minimization and pollution prevention: An action that economically avoids or reduces the generation of waste and pollution by source reduction, reducing the toxicity of hazardous waste and pollution, improving energy use, or recycling. These actions will be consistent with the general goal of minimizing present and future threats to human health, safety, and the environment.

Weapon secondary: Provides additional explosive energy release; composed of lithium deuteride and other materials. As the secondary implodes, the lithium in the isotope form lithium-6 is converted to tritium by neutron interactions, and the tritium product in turn undergoes fusion with the deuterium to create the thermonuclear explosion.

Weapons-grade: Fissionable material in which the abundance of fissionable isotopes is high enough that the material is suitable for use in thermonuclear weapons.

Weighting factor: Represents the fraction of the total health risk resulting from uniform whole-body irradiation that could be contributed to that particular tissue.

Wetland: Land or areas exhibiting hydric soil conditions, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions.

Whole-body dose: Dose resulting from the uniform exposure of all organs and tissues in a human body. (Also, see "effective dose equivalent.")

Wind rose: A depiction of wind speed and direction frequency for a given period of time.

Worker year: Measurement of labor requirement equal to 1 full-time worker employed for 1 year.