GLOSSARY

A-weighted decibel (dBA) - A unit of weighted sound pressure level, measured by the use of a metering characteristic and the "A" weighting specified by American National Standard Institute S1.4-1971(R176). (See decibel).

Absorbed dose - The energy deposited per unit mass by ionizing radiation. The unit of absorbed dose is the rad.

Accident - One or more unplanned events involving materials that have the potential to endanger the health and safety of workers and the public. An accident can involve a combined release of energy and hazardous materials (radiological or chemical) that might cause prompt or latent adverse health effects.

Accident sequence - With regard to nuclear facilities, an initiating event followed by system failures or operator errors, which can result in significant core damage, confinement system failure, and/or radionuclide releases.

Actinide - Any of a series of chemically similar, mostly synthetic, radioactive elements with atomic numbers ranging from actinium at 89 through lawrencium at 103.

Activation products - Nuclei, usually radioactive, formed by the bombardment and absorption of material with neutrons, protons, or other nuclear particles.

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. The period of acute exposure is generally assumed to end 1 week after the inception of a radiological accident.

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

Alpha activity - The emission of alpha particles by radioactive materials.

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).

Alpha radiation - The least penetrating of the four common types of radiation (alpha, beta, gamma, and neutron). It consists of a positively charged particle with two protons and two neutrons that is emitted from the nucleus of certain nuclides during decay.

Alpha wastes - Wastes containing radioactive isotopes that decay by producing alpha particles.

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.

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 ensure the quantity of radioactivity released to the environment and the radiation exposure of onsite workers in routine operations, including "anticipated operational occurrences," is maintained as low as reasonably achievable. 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.

Atomic Energy Act of 1954, as amended - The statute that established U.S. requirements with respect to nuclear energy and nuclear materials. This Act, as amended, provides the statutory framework for government control of the possession, use, and production of atomic energy, special nuclear material, and other radioactive material, whether owned by the government or others.

Average daily traffic (ADT) - The number of vehicles that pass a defined point on a defined roadway over a 24-hour period.

AXAIRQ - A computer model that analyzes doses from airborne radionuclide releases.

Background radiation - Ionizing radiation present in the environment from cosmic rays and natural sources in the Earth; background radiation varies considerably with location.

Badged worker - A worker who has the potential to be exposed to radiation and is equipped with a dosimeter to measure his/her dose.

Barrier - Any material or structure that prevents or substantially delays movement of radionuclides toward the accessible environment.

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 progress of a project can be measured. For this environmental impact statement, the environmental baseline is the site environmental conditions as they exist or have been estimated to exist in the absence of the proposed action.

Baseload - The minimum amount of electric power or natural gas delivered or required over a given period of time at a steady rate. The minimum continuous load or demand in a power system over a given period of time usually not temperature sensitive.

Baseload capacity - The generating equipment normally operated to serve loads on an around-the-clock basis.

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

Best Management Practices (BMP) - A practice or combination or practices that is determined by a state (or other planning agency) after problem assessment, examination of alternative practices, and appropriate public participation to be the most effective, practicable means of

preventing or reducing the amount of pollution generated by nonpoint sources to a level compatible with air or water quality goals.

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."

Beta radiation - Consists of an elementary particle emitted from a nucleus during radioactive decay; it is negatively charged, is identical to an electron, and is easily stopped by a thin sheet of metal.

Biodiversity - The diversity of life in all its forms and all its levels of organization. Also termed "biological diversity."

Block groups - U.S. Bureau of the Census term describing a cluster of blocks generally selected to include 250 to 550 housing units.

Blowdown - A maintenance procedure to remove sediment in power plant components.

Boiling water reactor - A type of nuclear reactor that uses fission heat to generate steam in the reactor core or vessel to drive turbines and generate electricity.

Boron-10 - An isotope of the element boron that has a high-capture cross-section for neutrons. It is used in reactor absorber rods for reactor control.

Bounding accident - An accident whose calculated consequences encompass all other possible accident consequences for that facility. For example, a bounding accident for the release of hazardous material from a storage tank would postulate the release of the entire tank contents. The consequences from this accident would be greater than the consequences of all other tank release accidents.

Burnable absorber - A material, such as boron or lithium, which captures neutrons and transmutes or changes to another isotope.

Burnable poison rod - A nuclear reactor rod used to capture or absorb neutrons created in the core by the fission reactions during the early core life.

Burnup - The total energy released through fission by a given amount of nuclear fuel; generally measured in megawatt-days.

Cancer - The name given to a group of diseases characterized by uncontrolled cellular growth with cells having invasive characteristics such that the disease can transfer from one organ to another.

Canister - A stainless-steel container in which nuclear material is sealed.

Capable geology - Describes a geological fault that has moved at or near the ground surface within the past 35,000 years.

Capacity factor - A power production performance measure that compares the amount of power actually produced per year to the maximum power output possible. This measure is

typically expressed as a fraction or percentage of the megawatt hours (MWh) produced relative to the possible MWh that would have been produced had the unit or system operated every hour of the year.

Carcinogenic - Capable of inducing cancer.

Cesium - A silver-white alkali metal. A radioactive isotope of cesium, cesium-137, is a common fission product.

Chain reaction - A reaction that initiates its own repetition. In a fission chain reaction, a fissionable nucleus absorbs a neutron and fissions spontaneously, releasing additional neutrons. These, in turn, can be absorbed by other fissionable nuclei, releasing still more neutrons. A fission chain reaction is self-sustaining when the number of neutrons is constant or increases over a period of time.

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 time period due to residual contamination.

Cladding - The metal tube that forms the outer jacket of a nuclear fuel rod or burnable absorber rod. It prevents the release of radioactive material into the coolant. Stainless steel and zirconium alloys *are* common cladding materials.

Capacity factor - The ratio of the annual average power production of a power plant to its rated capacity.

Cold standby - Maintenance of a protected reactor condition in which the fuel is removed, the moderator is stored in tanks, and equipment and system lay-up is performed to prevent deterioration, such that future refueling and restart are possible.

Collective committed effective dose equivalent - The committed effective dose equivalent of radiation for a population.

Committed effective dose equivalent - The sum of the committed dose equivalents to various tissues in the body multiplied by their appropriate tissue weighting factor. Equivalent in effect to a uniform external dose of the same value.

Consumptive water use - The difference in the volume of water withdrawn from a body of water and the amount released back into the body of water.

Container - With regard to radioactive wastes, the metal envelope in the waste package that provides the primary containment function of the waste package and is designed to meet the containment requirements of 10 CFR 60.

Containment design-basis - For a nuclear reactor, those bounding conditions for the design of the containment, including temperature, pressure, and leakage rate. Because the containment is provided as an additional barrier to mitigate the consequences of accidents involving the release of radioactive materials, the containment design-basis may include an additional

specified margin above those conditions expected to result from the plant design-basis accidents to ensure that the containment design can mitigate unlikely or unforeseen events.

Control rod - A rod containing material such as boron that is used to control the power of a nuclear reactor. By absorbing excess neutrons, a control rod prevents the neutrons from causing further fissions; i.e., increasing power.

Cooling water - Water pumped into a nuclear reactor or accelerator to cool components and prevents damage from the intense heat generated when the reactor or accelerator is operating.

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

Criticality - A reactor state in which a self-sustaining nuclear chain reaction is achieved.

Crop - A process that cuts off or otherwise removes the hardware on the fuel assemblies, leaving primarily the active fuel for subsequent processes.

Cultural resources - Archaeological sites, historical sites, architectural features, traditional use areas, and Native American sacred sites.

Cumulative impacts - In an environmental impact statement, 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 nonfederal), private industry, or individual(s) 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*)*.

Curie (Ci) - A unit of radioactivity equal to 37 billion disintegrations per second; also a quantity of any nuclide or mixture of nuclides having I Curie radioactivity.

Daughter - A nuclide formed by the radioactive decay of another nuclide, which is the "parent."

Day-night average sound level - The 24-hour A-weighted equivalent sound level expressed in decibels, with a 10-decibel penalty added to sound levels between 10:00 p.m. and 7:00 a.m. to account for increased annoyance due to noise during nighttime hours.

Decay heat (radioactivity) - The heat produced by the decay of certain radionuclides.

Decay (radioactive) - The decrease in the amount of any radioactive material with the passage of time due to the spontaneous transformation of an unstable nuclide into a different nuclide or into a different energy state of the same nuclide; the emission of nuclear radiation (alpha, beta, or gamma radiation) is part of the process.

Decibel (dB) - A logarithmic unit of sound measurement which describes the magnitude of a particular quantity of sound pressure power with respect to a standard reference value, in general, a sound doubles in loudness for every increase of 10 decibels.

Decibel, A-weighted (dBA) - A unit of frequency weighted sound pressure level, measured by the use of a metering characteristic and the "A" weighting specified by the American National Standards institution ANSI Si .4-1983 (RI 594), that accounts for the frequency response of the human ear.

Decommissioning - The removal from service of facilities such as processing plants, waste tanks, and burial grounds, and the reduction or stabilization of radioactive contamination. Decommissioning includes decontamination, dismantling, and return of the area to original condition without restrictions or partial decontamination, isolation of remaining residues, and continuation of surveillance and restrictions.

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.

Decoupler - That part of an accelerator between the high-energy neutron source and the moderating blanket that contains feedstock material that will absorb low-energy neutrons and help protect the neutron source.

Demographic - Related to the statistical study of human populations, including size, density, distribution, and such vital statistics as age, gender, and ethnicity.

Depleted uranium - A mixture of uranium isotopes where uranium-235 represents less than 0.7 percent of the uranium by mass.

De-rate – Reduction in operating power production level.

Derived Concentration Guide (DCG) - The concentration of a radionuclide in air or water that, under conditions of continuous exposure for one year by one exposure mode (i.e., ingestion of water, submersion in air, or inhalation), would result in an effective dose equivalent of 100 mrem (0.1 rem = 1 mSv [milliSievert]).

Design-basis accident - For nuclear facilities, information that identifies the specific functions to be performed by a structure, system, or component and the specific values (or ranges of values) chosen for controlling parameters for reference bounds for design. These values may be: (1) restraints derived from generally accepted state-of-the-art practices for achieving functional goals; (2) requirements derived from analysis (based on calculation and/or experiments) of the effects of a postulated accident for which a structure, system, or component must meet its functional goals; or (3) requirements derived from Federal safety objectives, principles, goals, or requirements.

Design-basis events - Postulated disturbances in process variables that can potentially lead to design-basis accidents.

Deuterium - A nonradioactive isotope of the element hydrogen with one neutron and one proton in the atomic nucleus.

Distribution (electrical) - The system of lines, transformers, and switches that connect between the transmission network and customer load. The transport of electricity to ultimate use

points such as homes and businesses. The portion of an electric system that is dedicated to delivering electric energy to an end user at relatively low voltages.

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 (by ingestion or inhalation) of one or more radionuclides from a defined release, frequently over a year's time.

Dose conversion factor - Factor used to calculate the dose received from exposure to radiation.

Dose equivalent - The product of absorbed dose in rad (or Gray) and a quality factor, which quantifies the effect of this type of radiation in fissue. Dose equivalent is expressed in units of rem or Sievert, where 1 rem equals 0.01 Sievert.

Dose rate - The radiation dose delivered per unit time (e.g., rem per year).

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

Drift - Effluent mist or spray carried into the atmosphere from cooling towers.

Drinking water standards - The level of constituents or characteristics in a drinking water supply specified in regulations under the Safe Drinking Water Act as the maximum permissible.

Effective dose equivalent - The sum 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 to 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 effective dose equivalent includes the committed effective dose equivalent from internal deposition of radionuclides, and the effective dose equivalent due to penetrating radiation from sources external to the body. Effective dose equivalent is expressed in units of rem or Sievert.

Effluent - A gas or fluid discharged into the environment.

Effluent monitoring - The collection and analysis of samples or measurements of liquid and gaseous effluents to characterize and quantify contaminants, assess radiation exposure to members of the public, and demonstrate compliance with applicable standards; occurs at the point of discharge, such as an air stack or drainage pipe.

Electromagnetic fields - Two types of energy fields which are emitted from any device that generates, transmits, or uses electricity.

Electron - An elementary particle with a mass of 9.107×10^{-28} gram (or 1/1837 of a proton) and a negative charge. Electrons surround the positively charged nucleus and determine the chemical properties of the atom.

Element - One of the 109 known chemical substances that cannot be divided into simpler substances by chemical means. All isotopes of an element have the same atomic number (number of protons) but have different numbers of neutrons.

Emergency Response Planning Guideline (ERPG) Values - These values, which are specific for each chemical, are established for three general severity levels: exposure to concentrations greater than ERPG-1 values for a period of time greater than 1 hour results in an unacceptable likelihood that a person would experience mild transient adverse health effects, or perception of a clearly objectionable odor; exposure to concentrations greater than ERPG-2 values for a period of time greater than 1 hour results in an unacceptable likelihood that a person would experience or develop irreversible or other serious health effects, or symptoms that could impair one's ability to take protective action; exposure to concentrations greater than ERPG-3 values for a period of time greater than 1 hour results in an unacceptable likelihood that a person would experience or develop life-threatening health effects.

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

Endangered species - Any species which is in danger of extinction throughout all or significant portions of its range. The Endangered Species Act of 1973, as amended, establishes procedures for placing species on the Federal lists of endangered or threatened species.

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

Engineered safety features - For a nuclear facility, features that prevent, limit, or mitigate the release of radioactive material from its primary containment.

Enriched uranium - Uranium in which the abundance of the isotope uranium-235 is increased above the normal (naturally occurring) level of 0.711 weight percent.

Enrichment - A process in which the fraction of the uranium-235 isotopes has been artificially increased above the natural abundance level of 0.72 percent.

Entrainment - The involuntary capture and inclusion of organisms in Streams of flowing water; a term often applied to the cooling water systems of power plants/reactors. The organisms involved may include phyto-and zooplankton, fish eggs and larvae (ichthyoplankton), shellfish larvae, and other forms of aquatic life.

Environment - The sum of all external conditions and influences affecting the life, development, and ultimately the survival of an organism.

Environment, safety, and health program - In the context of the U.S. Department of Energy (DOE), encompasses those DOE requirements, activities, and functions in the conduct of all DOE and DOE-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 the operating personnel and the

general public; and protecting property against accidental loss or 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, process and facilities safety, nuclear safety, emergency preparedness, quality assurance, and radioactive and hazardous waste management.

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 influence.

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.

Equivalent sound (pressure) level - The equivalent steady sound level that, if continuous during a specified time period, would contain the same total energy as the actual time varying sound. For example, L_{eq}(1-h) and L_{eq} (24-h) are the 1-hour and 24-hour equivalent sound levels, respectively.

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:

(1) Reference dose is the chronic exposure dose (milligrams or kilograms per day) for a given hazardous chemical at which or below which adverse human noncancer health effects are not expected to occur.

(2) Reference concentration is the chronic exposure concentration (milligrams per cubic meter) for a given hazardous chemical at which or below which adverse human non cancer health effects are not expected to occur.

Exposure to radiation - The incidence of radiation on living or inanimate material by accident or intent. Background exposure is the exposure to natural background ionizing radiation. Occupational exposure is the exposure to ionizing radiation that occurs at a person's workplace. Population exposure is the exposure to a number of persons who inhabit an area.

Exposure pathway - The course a chemical or physical agent takes from the source to the exposed organism. The pathway describes a unique mechanism by which an individual or population is exposed to chemicals or physical agents at or originating from the site. Each exposure pathway includes a source or release from a source, an exposure point, and an exposure route. If the exposure point differs from the source, a transport/exposure medium (e.g., air) is included.

Fertile - Describing radionuclides that can be converted into fissile material (e.g., thorium-232 and uranium-238 can be converted through neutron capture to uranium-233 and plutonium-239, respectively).

Fissile materials - Although sometimes used as a synonym for fissionable material, this term has acquired a more restricted meaning, namely, any material fissionable by thermal (slow) neutrons. The three primary fissile materials are uranium-233, uranium-235, and plutonium-239.

Fission (fissioning) - The splitting of a nucleus into at least two other nuclei and the release of a relatively large amount of energy. Two or three neutrons are usually released during this type of transformation.

Fission chain reaction - Nuclear reaction in which atomic nuclei in reactor fuel respond to collisions with neutrons by splitting into two or three major fragments and additional neutrons accompanied by the emission of gamma radiation.

Fission fragments - The parts into which atomic nuclei in reactor fuel split during a fission chain reaction.

Fission products - Nuclei formed by the fission of heavy elements (primary fission products); also, the nuclei formed by the decay of the primary fission products, many of which are radioactive.

Fissionable material - Material that could undergo fission by fast neutrons.

Floodplain - The lowlands adjoining inland and coastal waters and relatively flat areas.

Fluvial - Deposits produced by the action of a stream/river.

Flux - Rate of flow through a unit area; in reactor operation, the apparent flow of neutrons in a defined energy range (see neutron flux).

Fuel assembly - A cluster of fuel rods (or plates). Also called a fuel element. Approximately 200 fuel assemblies make up a reactor core.

Fuel rod - Nuclear reactor component that includes the fissile material.

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, piles of stored material, and exposed soil.

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

Global warming - The theory that increasing concentrations of certain gases such as carbon dioxide, methane, and chlorofluorocarbons in the Earth's atmosphere are effectively reducing radioative cooling, thus elevating the Earth's ambient temperatures.

Greater-than-Class-C waste - Radioactive waste that contains long-lived radionuclides and requires special disposal considerations.

Grid - A transmission and distribution system for electric power.

Groundshine - The radiation dose received from an area on the ground where radioactivity has been deposited by a radioactive plume or cloud.

Habitat - The environment occupied by individuals of a particular species, population, or community.

Half-life - The time in which half the atoms of a radioactive isotope decay to another nuclear form. Half-lives vary from millionths of a second to billions of years.

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 substance - Any substance that when released to the environment in an uncontrolled fashion could be harmful to the biota or human health and when released in an unpermitted fashion becomes subject to the reporting and possible response provisions of the Clean Water Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

Hazardous/toxic air pollutants - Air pollutants known or suspected to cause serious health problems such *as* cancer, poisoning, or sickness, and may have immunological, neurological, reproductive, developmental, or respiratory effects.

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 CPR 261 or by the Toxic Substances Control Act.

Heat exchanger - A device that transfers heat from one fluid (liquid or gas) to another.

High Efficiency Particulate Air Filter (HEPA) - A filter used to remove very small 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.

High(ly) enriched uranium - Uranium that is equal to or greater than 20 percent uranium-235 weight. Many of the fuels discussed in this EIS are based primarily on highly enriched uranium.

High-level radioactive waste - Highly radioactive material from the reprocessing of spent nuclear fuel that contains a combination of transuranic waste and fission products in

concentration that require permanent isolation. It includes both liquid waste produced by reprocessing and solid waste derived from that liquid.

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.

Icthyoplankton - The early life stages of fish (eggs and larvae) that spend part of their life cycle as free-floating plankton.

Impingement - The process by which aquatic organisms too large to pass through the screens of a water intake structure become caught on the screens and are unable to escape.

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.

Interium storage - Safe and secure storage for spent nuclear fuel and radioactive wastes until the materials are dispositioned (treatment and/or disposal).

Internal initiators - Events that normally originate in and around the facility but are always a result of facility operations (equipment or structural failures, human errors, internal flooding). In accident scenarios, initiators start the events that culminate in a release of hazardous or radioactive materials.

Ion - An atom that has too many or too few electrons, causing it to be electrically charged; an electron that is not associated (in orbit) with a nucleus.

Ion exchange - A unit physiochemical process that removes anions and cations, including radionuclides, from liquid streams (usually water) for the purpose of purification or decontamination.

Ion-exchange medium - A substance (see resin) that preferentially removes certain ions from a solution.

Ionizing radiation - Alpha particles, beta particles, gamma 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.

Irradiation - Exposure to radiation.

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. Isotopes are identified by the name of the element and the total number of protons and neutrons in the nucleus. For example, plutonium-239 is a plutonium atom with 239 protons and neutrons.

Isotope dilution - Mixing a less-enriched radioisotope with a highly enriched radioisotope to yield an isotope with lower nuclear enrichment.

Joule - A metric unit of energy, work, or heat, equivalent to 1 watt-second, 0.737 foot-pound, or 0.239 calories.

Latent cancer fatalities - Fatalities associated with acute and chronic environmental exposures to chemical or radiation that occur within 30 years of exposure.

Laydown - Area of construction site used to sort and store construction materials.

Licensee amendment - Changes to an existing reactor's operating license that are approved by the U.S. Nuclear Regulatory Commission.

Light water - The common form of water (a molecule with two hydrogen atoms and one oxygen atom, H_20) in which the hydrogen atom consists completely of the normal hydrogen isotope (one proton).

Light water reactor - A nuclear reactor in which circulating light water is used to cool the reactor core and to moderate (reduce the energy of) the neutrons created in the core by the fission reactions.

Loss-of-coolant accident - An accident that results from the loss of reactor coolant because of a break in the reactor coolant system.

Low-enriched uranium (LEU) - Uranium with uranium-235 enriched above the natural concentration (0.72 percent) but below 20 percent; highly enriched uranium (HEU) is enriched 20 percent or higher.

Low-level waste - Waste that contains radioactivity, but is not classified as high-level waste, transuranic waste, spent nuclear fuel, or by-product material as defined by Section lie (2) of the Atomic Energy Act of 1954, as amended. 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 of the nature of the generating process and/or constituents, because the waste would tell too much about the process.

Makeup water - Replacement for water lost through drift, blowdown, or evaporation (as in a cooling tower).

MAXIGASP - A computer program used to calculate doses of airborne releases of radioactivity to the maximally exposed member of the public.

Maximum Contaminant Levels (MCLs) - The maximum permissible level of a contaminant in water delivered to any user of a public drinking water system. Maximum contaminant levels are enforceable standards under the Safe Drinking Water Act.

Maximally exposed off site individual - A hypothetical person who could potentially receive the maximum dose of radiation or hazardous chemicals.

Megawatt (MW) - A unit of power equal to 1 million watts. "Megawatt-thermal" is commonly used to define heat produced, while "megawatt-electric" defines electricity produced.

Millirem - One thousandth of a rem. (See rem)

Minority communities - A population classified by the Bureau of the Census as Black, Hispanic, Asian and Pacific Islander, American Indian, Eskimo, Aleut, and other nonwhite persons, the composition of which is at least equal to or greater than the state minority average of a defined area of jurisdiction.

Mixed waste - Waste that contains both "nonradioactive hazardous waste" and "radioactive waste" as defined in this glossary.

National Ambient Air Quality Standards (NAAQS) - Uniform, national air quality standards established by the Environmental Protection Agency under the authority of the Clean Air Act that restrict ambient levels of criteria pollutants to protect public health (primary standards) or public welfare (secondary standards), including plant and animal life, visibility, and materials. Standards have been set for ozone, carbon monoxide, particulates, sulfur dioxide, nitrogen dioxide, and lead.

National Emission Standards for Hazardous Air Pollutants - A set of national emission standards for listed hazardous pollutants emitted from specific classes or categories of new and existing sources.

National Historic Preservation Act - 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 water pollution effluents under the Clean Water Act, as amended.

National Register of Historic Places - 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 under Section 2(b) of the Historic Sites Act of 1935(16 U.S.C. 462) and Section 101(a) (1) (A) of the National Historic Preservation Act of 1966, as amended.

Natural phenomena initiators - Natural occurrences that are independent of facility operations and events at nearby facilities or operations (earthquakes, high winds, floods, lightning, snow). Although these initiators are independent of external facilities, they can affect such facilities and compound the progression of the accident.

National radiation or natural radioactivity - Background radiation. Radiation arising from cosmic and terrestrial naturally-occurring radionuclide sources.

Neutron - An uncharged elementary particle with a mass slightly greater than that of the proton, found in the nucleus of every atom heavier than hydrogen-1. A free neutron is unstable and decays with a half-life of about 13 minutes into an electron and a proton; used in the fission process.

Neutron flux - The product of neutron number density and velocity (energy), giving an apparent number of neutrons flowing through a unit area per unit time.

Neutron poison - A chemical solution (e.g., a boron or component sheet or a burnable absorber rod) inserted into a nuclear reactor or spent fuel pool to absorb neutrons and end criticality. Any material with a strong affinity for absorbing neutrons without generating new neutrons that can be used to control the nuclear chain reaction.

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

Nuclear material - Composite term applied to: (1) special nuclear material; (2) source material such as uranium, thorium, or ores containing uranium or thorium; and (3) by-product material, which is any radioactive material that is made radioactive by exposure to a radiation incident or to the process of producing or using special nuclear material.

Nuclear radiation - Particles (alpha, beta, neutrons) or photons (gamma) emitted from the nucleus of unstable radioactive atoms as a result of radioactive decay.

Nuclear reaction - A reaction in which an atomic nucleus is transformed into another isotope of that respective nuclide, or into another element altogether; it is always accompanied by the liberation of either particles or energy.

Nuclear reactor - A device that sustains a controlled nuclear fission chain reaction that releases energy in the form of heat.

Nuclear Regulatory Commission (NRC) - The Federal agency that regulates the civilian nuclear power industry in the United States.

Nuclide - A species of atom characterized by the constitution of its nucleus and, hence, by the number of protons, the number of neutrons, and the energy content.

Occupational Safety and Health Administration - Oversees and regulates workplace health and safety, created by the Occupational Safety and Health Act of 1970.

Off-normal event - An unexplained event that exceeds the range of normal operating parameters, but that usually does not have a significant impact (inside or beyond the SRS boundary).

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

Peaking capacity - The capacity of facilities or equipment normally used to supply incremental gas or electricity under extreme demand conditions. Peaking capacity is generally available for a limited number of days at a maximum rate.

Peak load - The maximum load consumed or produced by a unit or group of units in a stated period of time.

Pellets - One configuration of the reactive material in a target rod.

Permeator - A device that selectively allows the passage of hydrogen atoms and prevents the passage of other elements. Used to separate hydrogen and tritium from helium.

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

Plume - A flowing, often somewhat conical, trail of emissions from a continuous point source.

Plume immersion - With regard to radiation, the situation in which an individual is enveloped by a cloud of radiation gaseous effluent and receives an external radiation dose.

Plutonium (Pu) - 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.

Poison - A material that has an affinity for absorbing neutrons. Poisons are added to nuclear materials with a potential critically concern to lessen the likelihood of an uncontrolled nuclear reaction.

Pressurized water reactor - A light water reactor in which heat is transferred from the core to an exchanger by water kept under pressure in the primary system. Steam is generated in a secondary circuit. Many reactors producing electric power are pressurized water reactors.

Primary system - With regard to nuclear reactors, the system that circulates a coolant (e.g., water) through the reactor core to remove the heat of reaction.

Prime farmland - Land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oil-seed, 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 Act of 1981, 7 CPR 7, paragraph *658).*

Probabilistic risk assessment - A comprehensive, logical, and structured methodology to identify and quantitatively evaluate significant accident sequences and their consequences.

Probable maximum flood - The hypothetical flood (peak discharge, volume, and hydrograph shape) that is considered to be the most severe reasonably possible, based on comprehensive hydrometeorological application of Probable Maximum Precipitation, and other hydrologic factors favorable for maximum flood runoff, such as sequential storms and snowmelt. (Reference: FSAR)

Probable Maximum Precipitation - The theoretically greatest depth of precipitation for a given duration that is physically possible over a particular drainage area at a certain time of year. (Reference: American Meteorological Society, 1959)

Processing (of spent nuclear fuel) - Applying a chemical or physical process designed to alter the characteristics of the spent fuel matrix.

Proton - An elementary nuclear particle with a positive charge equal in magnitude to the negative charge of the electron; it is a constituent of all atomic nuclei, and the atomic number of an element indicates the number of protons in the nucleus of each atom of that element.

Pyrophoric - The tendency to spontaneously ignite in air. Some uranium and thorium metal fuels may be pyrophoric.

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

Radiation - The emitted particles or photons 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 (rad) - The basic unit of absorbed dose equal to the absorption of 0.01 Joule per kilogram of absorbing material.

Radiation shielding - Radiation-absorbing material that is interposed between a source of radiation and organisms that would be harmed by the radiation (e.g., people).

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.

Radiological - Related to radiology, the science that deals with the use of ionizing radiation to diagnose and treat disease.

Radiolysis - Decomposition of a material by ionizing radiation.

Radionuclide - A radioactive element characterized according to its atomic mass and atomic number which can be man-made or naturally occurring.

Radon - Gaseous, radioactive element with the atomic number 86 resulting from the radioactive decay or radium. Radon occurs naturally in the environment, and can collect in unventilated enclosed areas, such as basements. Large concentrations of radon can cause lung cancer in humans.

RADTRAN - A computer code that combines 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.

Reactor - A device or apparatus in which a chain reactor of fissionable material is initiated and controlled; a nuclear reactor.

Reactor accident - See "design basis accident; severe accident."

Reactor coolant system - The system used to transfer energy from the reactor core either directly or indirectly to the heat rejection system.

Reactor core - In a heavy water reactor: the fuel assemblies including the fuel and target rods, control assemblies, blanket assemblies, safety rods, and coolant/moderator. In a light water reactor: the fuel assemblies including the fuel and target rods, control rods, and coolant/moderator. In a modular high-temperature gas-cooled reactor: the graphite elements including the fuel and target elements, control rods, and other reactor shutdown mechanisms, and the graphite reflectors.

Reactor facility - Unless it is modified by words such as containment, vessel, or core, the term reactor facility includes the housing, equipment, and associated areas devoted to the operation and maintenance of one or more reactor cones. Any apparatus that is designed or used to sustain nuclear chain reactions in a controlled manner, including critical and pulsed assemblies and research, tests, and power reactors, is defined as a reactor. All assemblies designed to perform subcritical experiments that could potentially reach criticality are also to be considered reactors.

Record of Decision (ROD) - A document prepared in accordance with the requirements of the Council on Environmental Quality and National Environmental Policy Act regulations 40 CFR 1505.2, that provides a concise public record of the decision on a proposed Federal action for which an environmental impact statement was prepared. A Record of Decision identifies the alternatives considered in reaching the decision, the environmentally preferable alternative(s), factors balanced in making the decision, whether all practicable means to avoid or minimize environmental harm have been adopted, and if not, why they were not.

Refueling outage - The period of time that a reactor is shut down for refueling operations. A refueling outage usually lasts four to eight weeks.

Repository - A place for the disposal of immobilized high-level waste and spent nuclear fuel in isolation from the environment.

Reprocessing (of spent nuclear fuel) - Processing of reactor-irradiated nuclear material (primarily spent nuclear fuel) to recover fissile and fertile material, in order to recycle such materials primarily for defense programs or generation of electricity. Historically, reprocessing has involved aqueous chemical separations of elements (typically uranium or plutonium) from undesired elements in the fuel.

Resin - An ion-exchange medium; organic polymer used for the preferential removal of certain ions from a solution.

Risk - In accident analysis, the probability-weighted consequence of an accident, defined as the accident frequently per year multiplied by the dose. The term “risk” also is used commonly in other applications to describe the probability of an event occurring.

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) - A measure of radiation dose (i.e., the average background radiation dose is 0.3 rem per year). The unit of biological dose 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; and other modifying factors.

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

Safety analysis report - A safety document that provides a complete description and safety analysis of a reactor design, normal and emergency operations, hypothetical accidents and their predicted consequences, and the means proposed to prevent such accidents or mitigate their consequences.

Safety evaluation report - A document prepared by the U.S. Nuclear Regulatory Commission that evaluates documentation (i.e., technical specifications, safety analysis reports, and special safety reviews and studies) submitted by a reactor licensee for its approval. This ensures that all of the safety aspects of part or all of the activities conducted at a reactor are formally and thoroughly analyzed, evaluated, and recorded.

Scoping - The solicitation of comments from interested persons, groups, and agencies at public meetings, public workshops, in writing, electronically, or via fax to assist in defining the proposed action, identifying alternatives, and developing preliminary issues to be addressed in an environmental impact statement.

Secondary system - The system that circulates a coolant (water) through a heat exchanger to remove heat from the primary system.

Seismicity - The tendency for earthquakes to occur.

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; (6) Zone 4: areas within Zone 3 determined by proximity to certain major fault systems.

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, off site consequences, or both. Also called “beyond design-basis reactor accidents" for this environmental impact statement.

Shielding - With regard to radiation, any material of obstruction (bulkheads, walls, or other construction) that absorbs radiation in order to protect personnel or equipment.

Short-lived activation products - An element formed from neutron interaction that has a relatively short half-life and which is not produced from the fission reaction (e.g., a cobalt isotope formed from impurities in the metal of the reactor piping).

Short-lived nuclides - Radioactive isotopes with half-lives no greater than about 30 years (e.g., cesium-137 and strontium-90).

Shutdown - For a U.S. Department of Energy (DOE) reactor, that condition in which the reactor has ceased operation and DOE has declared officially that it does not intend to operate it further (see DOE Order 5480.6, - Safely of Department of Energy-Owned Nuclear Reactors).

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

Special nuclear materials - As defined in Section 11 of the Atomic Energy Act of *1954,* special nuclear A material means: (1) plutonium, uranium enriched in the isotope 233 or in the isotope *235,* and any other material which the U.S. Nuclear Regulatory Commission determines to be special nuclear material; or (2) any material artificially enriched by any of the above. Tritium is NOT a special nuclear material.

Spent nuclear fuel - Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not be separated.

Stabilization - The action of making a nuclear material more chemically or physically stable by converting its physical or chemical form or placing it in a more stable environment.

Standby (cold standby) - Condition under which a facility is maintained in a protected condition to prevent deterioration such that it can be brought back into operation.

Strontium - Naturally occurring element with 38 protons in its nucleus. Some manmade isotopes of strontium are radioactive (e.g., strontium-89, strontium-90).

Technical specifications - With regard to U.S. Nuclear Regulatory Commission (NRC) regulations, part of A an NRC license authorizing the operation of a nuclear reactor facility. A technical specification establishes requirements for items such as safety limits, limiting safety system settings, limiting control settings limiting conditions for operation, surveillance requirements, design features, and administrative controls.

Thermophilic - Related to plants and animals that thrive in heated water.

Threatened species - Any species designated under the Endangered Species Act as likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Threshold limit values - The recommended highest concentrations of contaminants to which workers may be exposed according to the American Conference of Governmental Industrial Hygienists.

Tier - To link to another in a hierarchical chain. An upper-tier document might be programmatic to the entire DOE complex of sites; a lower-tier document might be specific to one site or process.

Tritium - A radioactive isotope of the element hydrogen with two neutrons and one proton. Common symbols for the isotope are "H-3" and "T." Tritium has a half-life of 12.3 years.

Uranium - A heavy, silvery-white metallic element (atomic number 92) with several radioactive isotopes that is used as fuel in nuclear reactors.

Vault - A reinforced concrete structure for storing strategic nuclear materials used in national defense or other programmatic purposes or for disposing of radioactive or hazardous waste.

Wetlands - Land or areas exhibiting the following: hydric soil conditions, saturated or inundated soil during some portion of the year, and plant species tolerant of such conditions; also, areas that are inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Whole-body dose - With regard to radiation, the dose resulting from the uniform exposure of all organs and tissues in a human body. (Also see effective dose equivalent.)

X/Q (Chi/Q) - The relative calculated air concentration due to a specific air release and atmospheric dispersion; units are (seconds per cubic meter). For example (Curies per cubic meter)/(Curies per second)= (seconds per cubic meter) or (grams per cubic meter)/(grams per second) = (seconds per cubic meter).