

## Radiological Terms

A	
A1	The maximum activity of special form radioactive material permitted in a Type A package. This value is listed in Table A-1 of 10 CFR 71 and 49 CFR 173.431-435.
A2	The maximum activity of radioactive material, other than special form radioactive material, permitted in a Type A package. This value is listed in Table A-1 of 10 CFR 71 and 49 CFR 173.431-435.
Absorbed dose (D)	Energy absorbed by matter from ionizing radiation per unit mass of irradiated material at the place of interest in that material. The absorbed dose is expressed in metric units of. gray or customary units of rad (1 rad = 0.01 gray).
Accident Response Group ARG:	A group of technical and scientific experts composed of U.S. Depart. of Energy (DOE) and DOE contractor personnel assigned responsibility for providing DOE assistance to a peacetime accident and significant incidents involving nuclear weapons anywhere in the world.
Activity:	The rate of decay of radioactive material, expressed as the average number of nuclear disintegrations per second. (See Becquerel and Curie)
Acute does:	An acute dose means a person received a radiation dose over a short period of time.
Acute effect:	Symptom of exposure to a hazardous material; normally the result of a short-term exposure which comes quickly to a crisis.
Acute exposure:	A single, brief exposure to a toxic substance or the term used to denote radiation exposure of short duration. Generally taken to be the total dose absorbed within 24 hours.
Advance notification	The process whereby a specific party is notified in advance of a shipment. For spent nuclear fuel or high-level radioactive waste, that party is the governor of the state of entry or his/her designee. There are no Nuclear Regulatory Commission provisions to notify Indian Tribes of Nuclear Waste Policy Act Shipments.
Agreement state	A state that has entered into an agreement under the Atomic Energy Act of 1954, as amended, in which the Nuclear Regulatory Commission has relinquished to such states the majority of its regulatory authority over source material, by-product, and special nuclear material in quantities not sufficient to form a critical mass.
Alert	An emergency class within the Operational and Energy categories of emergency. Within the Operational Emergency category, an Alert represents events in progress or having occurred which involve an actual or potential substantial reduction of the level of facility safety or protection. Any environmental releases of hazardous materials are expected to be limited to small fractions of the appropriate Protection Action Guideline (PAG) or Emergency Response Planning Guideline (ERPG) onsite. During an Energy Emergency, an Alert represents an event which has occurred or is in progress that is noteworthy; the potential impacts are not expected to be serious; and a negligible long-term supply impact is anticipated.
Alpha	Radiation emitted from radionuclides that travel short distances in air before being absorbed. Alpha particles are easily shielded with materials such as paper.
Alpha particle	A positively (+) charged particle emitted by certain radioactive materials. It is made up of two neutrons and two protons bound together and, hence, is identical to the nucleus of a helium atom. It has low-penetrating power and short range. The most energetic alpha particle will generally fail to penetrate the skin. If however, an alpha particle is inhaled or ingested, it will cause highly concentrated local damage. Symbol: $\alpha$
Anemia	A deficiency of blood as a whole, deficiency in the number of the red corpuscles, or the hemoglobin.
Anode:	Positive electrode: Electrode to which negative ions are attracted.
Annual limit on intake (ALI):	The derived limit for the amount of radioactive material taken into the body of an adult worker by inhalation or ingestion in a year. ALI is the smaller value of intake of a given radionuclide in a year by the reference man (International Commission Radiological Protections Publication 23) that would result in a committed effective dose equivalent of 0.05 sievert (5 rems) or a committed dose equivalent of 0.5 sievert (50 rems) to any individual organ or tissue.

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As low as reasonably achievable (ALARA):	Principle which means keeping radiation exposure as low as is reasonably achievable, taking into account the state of technology, the economics of improvements in relation to the benefits to public health and safety, other societal and socioeconomic considerations, and the utilization of atomic energy in the public interest.(10 CFR 72.3)
Assessment	See consequence assessment.
Assessment Actions:	Those actions taken during or immediately after an incident or emergency to gather and process the information necessary to make decisions and to implement specific emergency measures.
Atom	The smallest particle of an element having the chemical properties of that element and which cannot be divided or broken up by chemical means; the fundamental building block of matter. It consists of a central core called the nucleus, which contains protons and neutrons. Electrons revolve in orbits around the nucleus.
Atomic number	The number of protons in the nucleus of an atom, and also its positive charge. Each chemical element has its characteristic atomic number, and the atomic numbers of the known elements form a complete series from 1 (hydrogen) to 118 (Ununoctium). Symbol: Z.
Atrophy	Wasting away or diminution in the size of cell, tissue, organ, or part from defect, failure or nutrition, or disuse.
<b>B</b>	
Background Radiation	The radiation in man's natural environment, including cosmic rays and radiation from the naturally radioactive elements, both outside and inside the bodies of humans and animals. It is also called natural radiation. Manmade sources of radioactivity contribute to total background radiation levels. Approximately 90 percent of background radiation from man-made sources is related to the use of ionizing radiation in medicine and dentistry.
Baseline Risk Assessment (BRA):	Baseline risk assessment, the study and estimation of risk from taking no activity. Involves estimates of probability and consequences.
Becquerel (Bq):	The Becquerel is a unit used to measure radioactivity. One Becquerel is that quantity of a radioactive material that will have 1 transformation in one second. Often radioactivity is expressed in larger units like: thousands (kBq), one millions MBq) or even billions (GBq) of a Becquerel. As a result of having one Becquerel being equal to one transformation per second, there are $3.7 \times 10^{10}$ Bq in one curie. The basic (metric) unit used to express the measurement of a quantity of radioactivity. One Bequerel (Bq) equals one disintegration per second.
Beta particle	A charged particle emitted from a nucleus during radioactive decay having a single electrical charge and a mass equal to $1/1837$ that of a proton. A negatively (-) charged beta particle is identical to an electron. A positively (+) charged beta particle is called a positron. Large amounts of beta radiation may cause skin burns, and beta emitters are harmful if they enter the body. Beta particles can penetrate the skin a fraction of an inch. Beta particles are easily stopped by a thin sheet of metal or plastic. Symbol: $\beta$
Biological effects	The early or delayed results of biological damage caused by nuclear radiation (alpha, beta, gamma).
Boiling water reactor (BWR):	A light-water reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam can be used directly to drive a turbine.
By-product material	Any radioactive material (except special nuclear material) yielded in or made radioactive by exposure to the radiation incident to the process of producing or utilizing special nuclear material.
<b>C</b>	
Carcinogen	A cancer causing agent.
Canister	The metal receptacle surrounding the waste form that facilitates handling, storage, transportation, and/or disposal.
Carcinoma	Malignant neoplasm composed of epithelial cells, regardless of their derivation.
Cask	A container for shipping or storing radioactive material of greater than A1 or A2 quantities.
Certificate of Compliance (CoC):	A certificate approving for use, with identified limitations, a specific packaging for quantities of radioactive materials exceeding A1 and A2 quantities as defined in 10 CFR 71 and 49 CFR 173. A CoC may be issued by the Nuclear Regulatory Commission, Department of Transportation, or the Department of Energy.
Charged particle	An ion; an elementary particle that carries a positive or negative electrical charge.

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Chemical Transportation Emergency Center (CHEMTREC):	A clearinghouse maintained by the chemical industry for information and assistance on hazardous materials characteristics. When the material has radioactive properties, the Center activates the Department of Energy regional coordinating office having jurisdiction.
Chronic dose	A chronic dose means a person received a radiation dose over a long period of time.
Chronic effect	Effect of exposure to a hazardous material that develops slowly after many exposures or that recurs often.
Chronic exposure	Repeated exposure or contact with a toxic substance over a long period of time. OR term used to denote radiation exposure over a long duration, by fractionation or protraction. Generally any dosage absorbed over a period of 24 hours or longer
Clean-up	The general term for environmental restoration, the process designed to ensure that risks to the environment and to human health and safety from waste sites, nuclear facilities, and accident/incident sites are eliminated or reduced to prescribed, safe levels.
Commercial motor vehicle:	Any self-propelled or towed vehicle used on public highways in interstate commerce to transport passengers or property where the vehicle has a gross vehicle weight rating or gross combination weight rating of 10,001 or more pounds; or the vehicle is designated to transport more than 15 passengers, including the driver; or the vehicle is used in the transportation of hazardous materials in a quantity requiring placarding under regulations issued by the Secretary of Transportation under the Hazardous Materials Transportation Act (49 CFR 390.5).
Common carrier	The most accepted characteristics: availability of service to anyone seeking a transportation movement, publication of rates, provision of the service on schedule, service to designated points or designated area, and service of a given class of movement and commodity.
Comprehensive Environmental Response, Compensation and Liability Act (CERCLA):	This act (Public Law 96-510) is legislation passed in 1980 which created the first comprehensive federal law to respond to releases of hazardous substances in the environment. CERCLA is commonly referred to as Superfund. It was substantially amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA).
Consequence	The result or effect (especially projected doses or dose rates) of a release of radioactive or hazardous materials to the environment.
Consequence assessment	The evaluation and interpretation of radiological or other hazardous materials measurements and other information to provide a basis for decision making.
Consolidation	The process whereby fuel rods are removed from an assembly and placed into a container in which a minimum of space is left unoccupied by the rods.
Contact-handled	Waste containers that can be handled without shielding.
Contact-handled transuranic waste	Packaged transuranic waste whose external surface dose rate does not exceed 200 millirem per hour.
Container	Any portable device in which a material is stored, transported, treated, disposed of, or otherwise handled.
Containment	1. A protective action that prevents an adversary force from escaping from and/or removing a Department of Energy (DOE) safeguards and security interest from DOE or DOE contractor control. A protection strategy of the same name.
	2. An enclosure designed to retain fission products accidentally released from a reactor core (e.g., containment structure for nuclear power plant or production reactor).
	3. Barriers or other physical confinements of airborne or liquid material released or which could be released into the environment.
Containment system	The components of the packaging intended to retain the radioactive material during transport.
Contamination	A hazardous substance dispersed in materials or places where is undesirable.
Contingency Planning Zone	Provides precautionary emergency planning for prompt and effective actions beyond the emergency planning zone (EPZ).
Contract carrier	A carrier, whatever mode, that provides services according to contractual agreement. The contract specifies charges to be applied, the character of the service, and the time of performance. There are no specified rates under regulation, but the charges applied must be made public.
Controlled area	An area where entry, activities, and exit are controlled to assure radiation protection and prevent the spread of contamination.
Corrective actions	Those measures taken to terminate or mitigate the consequences of an emergency at or

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	near the source of the emergency.
Corrosive material	A liquid or solid that causes visible destruction or irreversible alterations in human skin tissue at the site of contact, or a liquid that has severe corrosion rate on steel or aluminum, in accordance with 49 CFR 171.136.
Criticality	A termed used in weapon and reactor physics to describe the state of a given fission system when the specified conditions are such that the mass of active material present is precisely a critical mass. Thus the fission neutron production rate is a constant and is exactly balanced by the combined rate of neutron loss and utilization so that the neutron population remains a constant. Supercriticality occurs when a greater than critical mass of active material is present and the neutron population increases rapidly.
Critical mass	The smallest mass of fissionable material that will support a self-sustaining chain reaction under specified conditions.
Curie	The basic (customary) unit of radioactivity that represents the amount of radioactivity associated with one gram of radium. To say that a sample of radioactive material exhibits one curie of radioactivity means that the element is emitting radiation at the rate of 3.7 million (37 billion) times a second. Named after Marie Curie, an early nuclear scientist.
<b>D</b>	
Daughter product	An element formed by the radioactive decay of another element; often daughter products are radioactive themselves.
Decay	1. The process whereby radioactive particles undergo a change from one form, or isotope, to another, releasing radioactive particles and/or energy. 2. The decrease in activity of any radionuclide over time, due to spontaneous emission of radiation from its atomic nuclei of either alpha particles, beta particles, or gamma rays. The rate of decay for a radionuclide is related to its half-life. 3. Disintegration of the nucleus of unstable atoms by spontaneous emission of charged particles, electromagnetic radiation, or both.
Decontamination	The reduction or removal of contaminating radioactive material from a structure, area, object, or person. OR The removal of unwanted material (typically radioactive material) from facilities, soils, or equipment by washing, chemical action, mechanical cleansing or other techniques.
Depleted uranium	Uranium containing less uranium-235 than the naturally occurring distribution of uranium isotopes.
Design Basis Accidents (DBAs):	Accidents that are postulated for the purpose of establishing functional requirements for safety significant structures, systems, components, and equipment.
Domestic transportation	Transportation between locations within the United States other than a foreign country.
Dose	1. Quantity of radiation or energy absorbed; measured in grays (rad). 2. The amount of energy deposited in body tissue due to radiation exposure. Various technical terms, such as dose equivalent, effective dose equivalent, and collective dose, are used to evaluate the amount of radiation an exposed worker receives. These terms are used to describe the differing interactions of radiation with tissue as well as to assist in the management of personnel exposure to radiation. 3. A general term for denoting the quantity of radiation or energy absorbed. If unqualified, it refers to absorbed dose. For special purposes it must be appropriately qualified. If used to represent exposure expressed in roentgens ( R ), it is a measure of the total amount of ionization that the quantity of radiation could produce in air.
Dose equivalent (H):	1. A quantity of measurement used in radiation protection. This term expresses all radiations on a common scale for evaluating and comparing the effects of radiation in man. It is defined as the product of the absorbed dose in grays (rads), and certain modifying factors. The unit of dose equivalent is the sieverts (rem). 2. The product of the absorbed dose (D) in gray (rad) in tissue, a quality factor (Q), and all other gray (rad) definition modifying factors (N). Dose equivalent is expressed in units of sievert (rem) {0.01 sievert = 1 rem}.
	3. A term used to express the amount of effective radiation received by an individual. A dose equivalent considers the type of radiation, the amount of body exposed, and the risk of exposure. Measured in sieverts (rems).
Dose rate	The absorbed dose delivered per unit time. It is usually expressed as grays (rads) per hour, or in multiples or submultiples of these units, such as millirads per hour. The dose rate is commonly used to indicate the level of hazard from a radioactive source.

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Dosimeter	1. An instrument that measures exposure to radiation. A small, pocket-sized ionization chamber used for monitoring radiation exposure of personnel. 2. A device to measure accumulated radiation dose.
	3. This could be a film badge, thermoluminescent dosimeter, or an electrostatic pocket dosimeter.
Drill	A supervised instruction session for the purpose of developing, testing, and/or maintaining skills in a particular area of emergency response capability. The supervised instruction includes the conduct, evaluation, and critique of the drill by a person(s) trained in these activities. A scenario, usually of limited scope, is utilized to identify the simulated emergency conditions or information which necessitate emergency response actions.
Dry storage facilities	Shielded mobile or stationary containers, silos, modules, vaults, or dry wells filled with an inert gas or with air, as appropriate, in which spent fuel assemblies or canisters of highly radioactive material may be stored.
<b>E</b>	
Edema	Presence of abnormally large amounts of fluid in the intercellular tissue spaces of the body or part of the body.
Effective dose equivalent (HE)	The summation of the products of the dose equivalent received by specified tissues of the body (HT) and the appropriate weighting factors (WT) – that is ( $HE = \sum S WTHT$ ). It includes the dose from radiation sources internal and/or external to the body. The effective dose equivalent is expressed in units of sievert (rem).
Effective half-life	The time required for a radionuclide contained in a biological system, such as in humans, to reduce its activity by half, as a combined result of radioactive decay and biological elimination.
Effluent	A waste discharge as a liquid.
Electromagnetic radiation	A traveling wave motion that results from changing electric and magnetic fields. Familiar electromagnetic radiations range from those of short wavelengths, like x-rays and gamma rays, through the ultraviolet, visible, and infrared regions, to radar and radio waves of relatively long wavelengths.
Electron	An elementary particle with a negative charge. Electrons surround the positively charge nucleus and determine the chemical properties of the atom. Symbol e <sup>-</sup> .
Element	Any of the 118 substances that cannot be broken down further without changing its chemical properties. Singularly or in combination, elements constitute all matter.
Emergency Action Levels (EAL):	Specific, predetermined, observable criteria used to detect, recognize, and determine the emergency class of Nuclear Power Station/Plant operational emergencies. An EAL can be: an instrument reading; an equipment status indicator; a measurable parameter, onsite or offsite; a discrete, observable event; results of analyses; or another observed phenomenon that indicates entry into a particular emergency class.
Emergency actions	A collective term encompassing the assessment, corrective, and protective actions taken during the course of an emergency.
Emergency class	A subset under the categories of emergency (Operational, Energy, Continuity of Government). The class further differentiates an emergency by the degree of severity, depending on the actual or potential consequences of the emergency situation. For the Operational and Energy Emergency subcategories (i.e. Nuclear Power Stations), the classes are: Notice of Unusual Event, Alert, Site Area Emergency, and General Emergency. For the Continuity of Government subcategory, the four classes are: Pre-Attack, Trans-Attack, Immediate Post-Attack, and Post Attack (Reconstitution or Recovery).
Emergency Operations Center (EOC):	A facility from which management and support personnel carry out coordinated emergency response activities. The EOC may be a dedicated facility or office, conference room, or other predesignated location having appropriate communications and informational materials to carry out the assigned emergency response mission and located, where possible, in a secure and protected location.
Emergency plan	A brief, clear, and concise description of the overall emergency organization, designation of responsibilities, and procedures, including notifications, involved in coping with any and all aspects of a potential credible emergency.
Emergency planning	The development and preparation of emergency plans and procedures and the identification of necessary personnel and resources to provide an effective response.

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Emergency Planning Zone (EPZ):	A geographical area surrounding a specific facility for which special planning and preparedness efforts are carried out to ensure that prompt and effective protective actions can be taken to reduce or minimize the impact to onsite and off-site personnel, public health and safety, and the environment in the event of an Operational Emergency.
Emergency response	The implementation of planning and preparedness during an emergency involving the effective decisions, actions, and application of resources that must be accomplished to mitigate consequences and recover from an emergency
Enhanced North American Standard Inspection Procedures	Uniform roadside inspection standards and procedures developed by the Commercial Vehicle Safety Alliance for the pilot test inspection program of commercial motor vehicles transporting transuranic, spent nuclear fuel, and high-level radioactive waste. This standard is patterned after the North American Standard, but a much higher defect-free level.
Enriched uranium	Uranium containing more uranium-235 than the naturally occurring distribution of uranium isotopes.
Epidermis	The outermost layer of skin.
Epilation (Depilation):	The temporary or permanent removal of hair.
Erythema	An abnormal redness of the skin, due to distension of the capillaries with blood. It can be caused by many different agents; e.g., heat, certain drugs, ultraviolet rays, ionizing radiation.
Erythrocyte	A red blood corpuscle.
Evacuation	The orderly withdrawal of individuals from a hazardous or threatened area until such time as the area is again deemed safe for use.
Event	Any real-time occurrence or significant deviation from planned or expected behavior that could endanger or adversely affect people, property, or the environment.
Exclusive use	The sole use of a conveyance by a single consignor and for which all initial, intermediate, and final loading and unloading are carried out in accordance with the direction of the consignor or consignee.
Exercise	A comprehensive performance test of the integrated capability of most aspects in the emergency management program associated with the facility event. Exercises test the adequacy and effectiveness of organizational command and control; implementation procedures; notifications and communications networks; emergency equipment; response organization personnel performance; and the overall emergency response program performance. Exercises must be designed and conducted for maximum realism and attempt to duplicate the sense of stress inherent in an actual emergency situation.
Exposure	A quantity used to indicate the amount of ionization in air produced by x- or gamma radiation. The unit is the roentgen ( R ). For practical purposes, one roentgen is comparable to 1 rad or 1 rem for x- and gamma radiation.
<b>F</b>	
Federal Radiological Emergency Response Plan (FRERP):	A comprehensive, coordinated plan broadly describing the entire federal government response to radiological emergencies in support of federal, state, and local government agencies.
Federal Radiological Monitoring and Assessment Center (FRMAC)	A facility established by the Department of Energy usually at an airport near the scene of a radiological emergency, from which the offsite Technical Director conducts the Federal Radiological Monitoring and Assessment Plan (FRMAP).
Federal Radiological Monitoring and Assessment Plan (FRMAP):	A plan contained in the FRERP for coordinating federal offsite radiological monitoring and assistance with that of the affected states.
Field monitoring	The use of sensitive detection equipment instruments by trained personnel to perform measurements to determine the presence and levels of radioactive or other hazardous substance contamination at selected geographical locations in the off-site environment.
Fissile	Radioactive materials that are capable of undergoing or sustaining nuclear fission and thus require controls to assure nuclear criticality safety during transport. Fissile materials include plutonium-238, plutonium-239, and plutonium-241, uranium-233, and uranium-235.
Fissile classification	Categorization of fissile material packages into one of three classes (i.e., Fissile Class I, Fissile Class II, and Fissile Class III) according to the controls needed to provide nuclear criticality safety during transportation.

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Fission	The splitting of a heavy nucleus into two or more radioactive nuclei, accompanied by the emission of gamma rays, neutrons and a significant amount of energy. Fission usually is initiated by the heavy nucleus absorbing a neutron, but it also can occur spontaneously.
Fission products	The nuclei (fission fragments) formed by the fission of heavy elements plus the nuclides formed by the fission fragment in radioactive decay.
<b>G</b>	
Gamma rays	High energy, short wavelength electromagnetic radiation emitted from the nucleus. Gamma radiation frequently accompanies alpha and beta emissions and always accompanies fission. Gamma rays are very penetrating and are best stopped or shielded against by dense materials, such as lead or depleted uranium. Gamma rays are essentially similar to x-rays but are usually more energetic and are nuclear in origin.
General Emergency	One of the classes of emergencies in the Operational and Energy Emergency Categories. Within the category of Operational Emergency, a General Emergency represents events which are in progress or have occurred that involve actual or imminent catastrophic failure of facility safety systems with potential for loss of confinement integrity, catastrophic degradation of facility protection systems, or catastrophic failure in safety or protection systems threatening the integrity of a weapon or test device which could lead to substantial off-site impacts. Any environmental release of hazardous materials can reasonably be expected to exceed the appropriate Protective Action Guide (PAG) offsite.
Genetic effects	Genetic effects are those effects from some agent, like radiation, that are seen in the offspring of the individual who received the agent/exposure. The agent/exposure must be encountered pre-conception.
Geiger counter, or G-M meter	An instrument used to detect and measure radiation. The detecting element is a gas-filled chamber operated by a voltage whose electrical discharge will spread over the entire anode when triggered by a primary ionizing event.
Generator	Any person who is licensed by the Nuclear Regulatory Commission to use a utilization or production facility under the authority of the Atomic Energy Act of 1954.
Gray (Gy):	The gray is a unit used to measure a quantity called absorbed dose. This relates to the amount of energy actually absorbed in some material, and is used for any type of radiation and any material. One gray is equal to one joule of energy deposited in one kg of material. The unit gray can be used for any type of radiation, but it does not describe the biological effects of the different radiations. Absorbed dose is often expressed in terms of hundredths of a gray, or centigrays. One gray is equivalent to 100 rads.
Greater-than-Class-C low-level radioactive waste	Waste from commercial sources with radionuclide concentrations that exceed Nuclear Regulatory Commission limits for Class-C low-level radioactive waste as defined in 10
<b>H</b>	
Half-life	1. The time required for the activity of a radionuclide to decrease to half its initial value due to radioactive decay.
	2. The time required for a radioactive substance to lose 50 percent of its activity by decay. The half-life of the radioisotope plutonium-239, for example, is 24,000 years. Starting with a pound of plutonium-239, in 24,000 years there will be one-half pound of plutonium-239, in another 24,000 years there will be one-fourth pound, and so on. (A pound of material remains, but it gradually becomes a stable element.)
Hazard:	A process, condition, or asset which has the potential to adversely impact the health and safety of personnel, the public, the environment, or national security. Hazards are divided into three classes:
	a. <u>Low</u> : hazards which present minor onsite and negligible offsite impacts to people, the environment, or national security.
	b. <u>Moderate</u> : hazards which represent considerable potential onsite impacts to the people or the environment, but at most only minor offsite impacts to people, the environment, or national security.
	c. <u>High</u> : hazards with the potential for onsite and offsite impacts to large numbers of persons or with the potential for major impacts to the environment or national security.
Hazardous material (HAZMAT):	Any solid, liquid, or gaseous material that is toxic, flammable, radioactive, corrosive, chemically reactive, or unstable upon prolonged storage in quantities that could pose a threat to life, property, or the environment.
Hazards assessment	Used as a foundation for emergency planning purposes; including identification of any

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	hazards and targets unique to a facility, analyses of potential accidents or events, and evaluation of potential accident or event consequences.
Health physics (HP):	The science concerned with recognition, evaluation, and control of health hazards from ionizing radiation.
Heavy metals	Metals that are dense. Examples include mercury, lead, silver, gold, and uranium.
High-level [radioactive] waste (HLW):	Highly radioactive material, containing fission material, traces of uranium and plutonium, and other transuranic elements, that results from chemical reprocessing of spent fuel. Originally produced in liquid form, high-level waste must be solidified before disposal.
Highway route controlled quantity (HRCQ):	A Type B quantity package that has additional constraints imposed during transportation. The HRCQ quantity is 3,000 times a Type A quantity or 30,000 curies, whichever is less.
Highway routing [of HRCQ]:	Refers to those routes which must be selected by the carrier or that person operating a motor vehicle containing a highway route controlled quantity of radioactive materials to reduce time in transit and minimize radiological risk. The route is limited to a preferred route or a state designated alternative route whenever possible, and must be in writing with a copy supplied to the driver and shipper, that latter being notified in writing of any deviations.
I	
Incident Command Post (ICP):	The location at which the primary command functions are executed, usually collocated with the incident base.
Incident Command System (ICS):	The combination of facilities, equipment, personnel, procedures, and communications operating within a common organizational structure with responsibility for the management of assigned resources to effectively accomplish stated objectives pertaining to an incident.
Incident Commander (IC):	The individual responsible for the management of all operations at a particular hazardous materials emergency.
Ingestion exposure pathway	A geographic zone with approximately 50 miles radius centered at a nuclear power plant for which plans are developed to protect the public from exposure to radiation principally from the ingestion of water or foods such as milk or fresh vegetables that are contaminated as a result of a nuclear power plant accident.
Interim storage	The temporary holding of wastes on or away from the generator's site when disposal space is not available. Monitoring and human control are provided, and subsequent action involving treatment, transportation, or final disposition is expected.
Ion	Atomic particle, atom, or chemical radical bearing an electrical charge, either negative or positive.
Ionization	1. The separation of a normally electrically neutral atom or molecule into electrically charge components. The term is also employed to describe the degree or extent to which this separation occurs. Ionization is the removal of an electron (a negative charge) from an atom or molecule, either directly or indirectly, leaving a positively charged ion. The separated electron and ion are referred to as an ion pair.
	2. Removal of electrons from an atom, for example, by means of radiation, so that the atom becomes charged.
Ionizing radiation	1. Any radiation that causes displacement of electrons from atoms or molecules, thereby producing ions.
	2. Radiation that has enough energy to remove electrons from substances it passes through, forming ions.
Inverse Square Law	The relationship which states that gamma radiation intensity is inversely proportional to the square of the distance from a point source.
Irradiation	Exposure to ionizing radiation.
Isotopes	1. One of two or more atoms with the same atomic number (the same chemical element), but with different atomic weights. An equivalent statement is that the nuclei of isotopes have the same number of protons but different numbers of neutrons. Isotopes usually have very nearly the same chemical properties, but somewhat different physical properties.
	2. Atoms of the same element that have equal number of protons, but different numbers of neutrons. Isotopes of an element have the same atomic number but different atomic

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	mass. For example, uranium-238 and uranium-235.
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<b>JK</b>	
Joint Information Center (JIC)	A centralized facility where organizations responding to an emergency coordinate the release of accurate and timely information to the public and the media and provide a central source for all instructions. A JIC is operated cooperatively by all responding levels of federal, state, and local governments and organizations, and the involved facility. Also known as a Media Reception Center (MRC).
<b>L</b>	
Lead Federal Agency (LFA):	The federal agency that owns, authorizes, regulates, or is otherwise deemed responsible for ameliorating an emergency and that has the authority to take whatever action is necessary to stabilize the situation.
Lethal dose of radiation	The amount of ionizing radiation exposure required to cause death. A brief (within four days) whole body gamma exposure of 600 roentgens would be a lethal dose for most people.
LD-50 or LD 50 dose	The dose of radiation required to kill, within a specified period, 50 percent of the individuals in a large group of animals or organisms; e.g., LD-50/30, a lethal dose to 50 percent of the organisms in 30 days.
Licensed radioactive material	Source material, special nuclear material or by product material received, possessed, used, transferred, or disposed of under a license issued by the Nuclear Regulatory Commission.
Limited quantity	When specified as such in a section applicable to a particular material, means the maximum amount of a hazardous material for which there is a specific labeling or packaging exception.
Limited quantity of radioactive material	A quantity of radioactive material not exceeding the materials package limits specified in 49 CFR 173.423 and which conforms with requirements specified in 49 CFR 173.421.
Local Emergency Planning Committee (LEPC):	A committee appointed by the State Emergency Response Commission (SERC), as required by Title III of the Superfund Amendments and Reauthorization Act (SARA), to formulate a comprehensive emergency plan for its district.
Low enriched uranium (LEU):	Uranium material that has had uranium-235 concentration increased above natural levels but less than 20 percent.
Low-Level [radioactive] waste (LLW):	Radioactive material that is not high-level radioactive waste, spent nuclear fuel, or byproduct material. Low-Level waste is discarded radioactive material such as rags, construction rubble, glass, etc., that is only slightly or moderately contaminated. This waste is usually disposed of by land burial.
Low specific activity (LSA) materials	1. Uranium or thorium ores and physical or chemical concentrate of those ores; 2. Unirradiated natural or depleted uranium or unirradiated natural thorium; 3. Tritium oxide in aqueous solutions provided the concentration does not exceed 5.0 millicurie per milliliter; 4. Material in which the radioactivity is essentially uniformly distributed and in which the estimated average concentration of contents does not exceed amounts listed in 49 CFR 173.403; 5. Objects of non-radioactive material externally contaminated with radioactive material, provided that the radioactive material is not readily dispersible and the surface contamination when averaged over an area of 1 square meter, does not exceed 0.0001 millicurie per square centimeter of radionuclides for which the A2 quantity is not more than .05 curies, or 0.001 millicurie per square centimeter for other radionuclides.
<b>M</b>	
Malaise	A vague feeling of physical discomfort or uneasiness, such as feeling bad before developing a definite illness.
Marking	A descriptive name, identification number, instructions, cautions, weight, specification, or United Nations marks, or combinations thereof, required by this Department of Transportation on outer packaging of hazardous materials.
Mass number	The sum of the neutrons and protons in a nucleus. The mass number is the nearest whole number to an atom's atomic weight. For instance, the mass number of uranium-

## Radiological Terms

	235 is 235. Symbol: A.
Maximum permissible body burden (MPBB):	Maximum permissible body burden is the maximum amount of specific radionuclide considered to produce no adverse health effects if deposited inside the body.
Median Lethal Does (LD-50)	The amount of radiation received over the whole body which would be fatal to about 50 percent of human beings, animals, or organisms. It is usually accepted that a dose of 400 to 450 r (roentgens) received over the whole body in the course of a few minutes represents the median lethal dose for human beings.
Milli	A prefix meaning one one-thousandth of any unit. Examples include 1 milliliter (1/1000 of a liter) or 1 milliroentgen (1/1000 of a roentgen).
Millirem	A unit of radiation dosage equal to one-thousandth of a rem. According to federal standards, an individual is allowed to receive up to 500 millirem per year from nuclear fuel cycle activities.
Mixed waste	Waste containing both radioactive and hazardous components as defined by the Atomic Energy Act and the Resource Conservation and Recovery Act, respectively.
Monitoring	The use of sampling and detection equipment to determine the levels of radiation or other toxic materials.
Multi-purpose canister (MPC):	Sealed, metallic containers maintaining multiple spent fuel assemblies in a dry, inert environment and overpacked separately and uniquely for the various system elements of storage, transportation, and disposal.
Multi-purpose canister (MPC) overpack:	A structural component that provides the confinement, radiation shielding, impact resistance, and environmental protection for an MPC to meet the requirements of 10 CFR 60 for disposal, or 10 CFR 71 for transportation, or 10 CFR 72 for storage.
<b>N</b>	
Natural radiation	Radiation that is always present in the environment from such sources as cosmic rays and radioactive materials in rocks and soils. Also known as background radiation.
Neutron	1. A particle that appears in the nucleus of all atoms except hydrogen. Neutrons are one of three basic particles that make up the atom. Neutrons have no electrical charge. 2. An uncharged elementary particle with a mass slightly greater than that of the proton; found in the nucleus of every atom heavier than hydrogen. A free neutron is unstable and decays with a half-life of about 13 minutes into an electron, proton and neutrino. Neutrons sustain fission chain reaction in a nuclear reactor. Shield for neutrons is usually large quantities of materials such as water, paraffin, or polyethylene.
Non-penetrating radiation	A general term used to describe external radiations of such low penetrating power that the absorbed dose from exposures to humans is principally in the skin and does not reach deeper organs to any significant extent. It refers to alpha, beta, and very low energy gamma or x-ray radiations.
Non-stochastic effect	Non-stochastic effects are effects that can be related directly to the radiation dose received. The effect is more severe with a higher radiation dose, i.e., the burn gets worse as the dose increases. It typically has a threshold, below which the effect will not occur. A skin burn from radiation is a non-stochastic effect.
Normal form	Those materials which by nature of their physical form or encapsulation if released from a package, might present some possibility of contamination as well as direct radiation. For example, materials in the form of liquids or powdery-like substances are more likely to be dispersible.
Normal form radioactive material	Radioactive material which has not been demonstrated to qualify as special form radioactive material.
North American Standard Inspection Procedures	Uniform roadside inspection standards and procedures developed by the Commercial Vehicle Safety Alliance which targets only those critical components on a commercial motor vehicle that have been identified as accident contributors.
N.O.S.	Not Otherwise Specified Term used to denote on shipping papers/ bills of lading that the hazardous material is not specifically listed in the table of 49 CFR 172.101
Nuclear criticality	The point at which nuclear material achieves a self-sustaining chain reaction.
Nuclear Emergency Search Team (NEST):	A group of experts, assigned by radiation detection systems and associated personnel, assigned responsibility to provide technical assistance to law enforcement agencies in nuclear threat emergencies for the search and identification of any ionizing radiation producing materials that may have been lost or stolen or may be associated with bomb

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	threats or radiation dispersal threats.
Nuclear facility	A facility whose operations involve radioactive materials in such form and quantity that a significant nuclear hazard to the employees or the general public potential exists. Included are facilities that produce, process, or store radioactive liquid or solid waste, fissionable materials or tritium; conduct separation operations; conduct irradiated materials inspections, fuel fabrication, decontamination or recovery operations; or conduct fuel enrichment operations. Incidental use of radioactive materials in the facility operations (e.g., check sources, radioactive sources, x-ray machines) does not necessarily require the facility to be included in this definition.
Nuclear fuel cycle	The complete process or cycle of nuclear activities, which include mining, milling, conversion, enrichment, fuel fabrication, nuclear power plant operations, spend fuel storage, reprocessing, and waste management operations. Most of the uranium shipment on the front side shipments include both high- and low-level radiation hazards. These waste shipments may be transported in strong, tight packages or Type A or Type B packages.
Nuclear reactor	An apparatus, other than an atomic weapon, designed or used to sustain nuclear fission in a self-supporting chain reaction.
Nuclear Regulatory Commission (NRC):	The federal agency responsible for regulating commercial nuclear power plants and other commercial nuclear operations pursuant to the Atomic Energy Act of 1954, as amended. This federal agency has broad statutory authority over transportation of radioactive material similar to that of the Department of Transportation (DOT). Under a memorandum of understanding between the two agencies, however, NRC limits its activities to performing safety evaluations of packages and issuing certificates of compliance for Type B packages and packages for fissile material. The NRC prescribes rules for monitoring of packages on receipt, for limiting the exposure of individuals to ionizing radiation, and for in-transit security of certain materials. NRC imposes DOT shipping requirements by reference and inspects against them, and enforces those requirements.
Nucleus:	The central part of an atom that contains protons, neutrons, and other particles. OR The small, positively charged core of an atom. It is only 1/100,000 diameter of the atom but contains nearly all the atom's mass. All nuclei contain both protons and neutrons, except the nucleus of ordinary hydrogen, which consists of a single proton.
Nuclide:	A general term applicable to all atomic forms of the elements. The term is often erroneously used as a synonym for isotope, which properly has a more limited definition. Whereas isotopes are various forms of a single element (hence, a family of nuclides and all have the same atomic members). Nuclides comprise all the isotopic forms of all the elements.
<b>O</b>	
Offsite	The area beyond the boundaries of the site.
On-scene:	The area surrounding an accident site that is, or potentially could be, affected by the accident or incident. This area could both be onsite and offsite.
Onsite	The facility, site, or area over which the cognizant federal agency has access control authority. The onsite area includes any area that has been established as a National Defense Area or National Security Area.
Operational emergency:	One of the three categories of emergencies. Operational emergencies are significant accidents, incidents, events, or natural phenomena which seriously degrade the safety or security of EOD facilities. Operational emergencies apply to DOE reactors or other DOE facilities involved with hazardous materials, DOE-controlled nuclear weapons, components, or test devices; DOE safeguards and security events, and transportation accidents involving hazardous material.
Operational emergency event classes	Characterization of operational emergencies involving or affecting DOE facilities as Alert, Site Area Emergency, or General Emergency as determined by emergency action levels.

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<b>PQ</b>	
Package	The packaging together with its radioactive contents as presented for transport.
Packaging	For radioactive materials, the assembly of components necessary to ensure compliance with the packaging requirements of 49 CFR 173. 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 conveyance, tie-down system, and auxiliary equipment may sometimes be designated as part of the packaging.
Permissible exposure limit	The exposure, inhalation or dermal permissible exposure limit specified in 29 CFR 1910, subparts G and Z.
Petechia	A round, purplish red spot caused by bleeding under the skin.
Picocuries (p/Ci):	Measurement of radioactivity. A picocurie is one million millionth, or a trillionth, of a curie, and represents about 2.2 radioactive particle disintegrations per minute.
Placard	Represents the hazard class(es) of the material(s) contained within the freight container, motor vehicle or rail car. A warning sign made of a durable material and placed on the exterior sides of a transport vehicle.
Plume	Airborne material spreading from a particular source. Used to denote the dispersal of particles, gases, vapors, and aerosols in the atmosphere. Occasionally referred to as a cloud (for example, a radioactive cloud). A release of material into the atmosphere for a short duration may also be denoted as a puff.
Plume exposure pathway	The principal exposure sources for this pathway are: 1. Whole body external exposure (gamma radiation) and/or contact exposure to skin or eyes (hazardous substances) from contact with materials from the plume and from deposited material. 2. Inhalation and absorption of constituents in the passing plume.
Plutonium	An artificially produced element that is fissile and radioactive. It is created when an atom of uranium-238 captures a slow neutron in its nucleus.
Potassium iodide	Thyroid blocking agent that may be used in radiological events involving releases of radioiodine.
Preferred route	A preferred route consists of either or both:
	1. An interstate system highway for which an alternative route is not designed by a state routing agency, and/or
	2. A state-designated route selected by a state routing agency in accordance with DOT guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantity Shipments of Radioactive Materials, or an equivalent routing analysis.
Pressurized water reactor (PWR):	A nuclear reactor in which heat is transferred from the core to a heat exchanger via water kept under high pressure so that high temperatures can be maintained in the primary system without boiling the water. Steam is generated in a secondary circuit.
Price-Anderson Act	The legislation outline the methods for compensating nuclear power plants or nuclear transportation accident victims. Passed as Subsection 170 of the Atomic Energy Act of 1954, the Price-Anderson Act established a system in which a combination of government guarantees and private insurance coverage would pay claims for personal injury and property damage caused by nuclear accidents. The legislation limits the liability any one utility must sustain by requiring all nuclear utilities to assist in damage payments should an accident occur.
Protective action (protective response):	Physical measures, such as evacuation or sheltering, taken to prevent potential health hazards resulting from a release of hazardous materials to the environment from adversely affecting employees or the offsite population.
Protective Action Guide (PAG):	A radiation personnel exposure level or range beyond which protective action should be considered. PAG values should reflect a balance of risks and costs to onsite personnel, public health and safety, and the environment weighed against the benefits obtained from protective actions.
Proton	An elementary particle with a single positive electrical charge and a mass approximately 1837 times that of the electron. Protons are constituents of all nuclei. The atomic number (Z) of an atom is equal to the number of protons in its nucleus.

## Radiological Terms

Purpura	Bleeding under the skin. Symptom of acute radiation sickness.
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R	
Rad	1. Radiation absorbed dose, a measurement of ionizing radiation absorbed by any material. A rad measures the absorption of a specific amount of work (100 ergs) in a gram of matter. 2. Unit of absorbed dose. One rad is equal to an absorbed dose of 100 ergs per gram or 0.01 joules per kilogram (0.01 gray) 3Radiation absorbed dose. A (rad) is the unit of absorbed dose. The rad is a measure of the energy imparted to matter by ionizing particles per unit mass of irradiated material at the place of interest. A rad is approximately equal to the absorbed dose in tissue when the exposure in air is one roentgen ( R ) of medium-voltage x-radiation.
Radiation	1. Fast particles and electromagnetic waves emitted from the nucleus of an atom during radioactive disintegration. 2. The energy propagated through space or through material medium such as waves; for example, energy in the form of electromagnetic waves or of elastic waves. Radiation, or radiant energy, when unqualified, usually refers to electromagnetic radiation; such radiation commonly is classified according to frequency, as Hertzian, infrared, visible (light), ultraviolet, x-ray and gamma ray. Also, particles such as alpha and beta radiation, or rays of mixed or unknown type – for instance cosmic rays – can be called radiation.
Radiation level	The radiation dose-equivalent rate expressed in millirem per hour (mrem/hr).
Radiation accident	An accident in which there is an unintended exposure to ionizing radiation or radioactive contamination.
Radiation sickness	The prodromal manifestations of acute radiation injury, varying in severity, scope, and cause, depending on the conditions of exposure to ionizing radiation.
Radiation Emergency Assistance Center/Training Site (REAC/TS):	A multi-purpose medical facility located in Oak Ridge, TN, prepared to deal with all types of radiation exposure emergencies and provide medical and health physics advice and assistance in radiological emergencies.
Radioactive	Giving off, or capable of giving off, radiant energy in the form of particles (alpha or beta radiation) or rays (gamma radiation) by the spontaneous disintegration of the nuclei of atoms. Radioisotopes of elements lose particles and energy through the process of radioactive decay. Elements may decay into different atoms or different state of the same atom.
Radioactive material	Any material having a specific activity greater than 0.002 microcuries per gram (uCi/g)[49 CFR 173.403].
Radioactive waste	Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and of negligible economic value considering costs of recovery.
Radioactive waste disposal	The isolation of radioactive wastes from the biosphere inhabited by man and containing his food chains by emplacement in a land disposal facility. The isolation of radioactive wastes from the accessible environment and emplacement in a repository with no foreseeable intent of recovery, whether or not such emplacement permits the recovery of such waste.
Radioactivity	The spontaneous emission of radiation, generally alpha or beta particles often accompanied by gamma rays, from the nucleus of an unstable atom. As a result of this emission, the radioactive atom is converted, or decays, into an atom of a different element that might or might not be radioactive. Ultimately, as a result of one or more stages of radioactive decay, a stable, non-radioactive atom is formed.
Radiological Assistance Program (RAP):	A DOE program which provides for radiological assistance to federal, state, and major Nuclear Regulatory Commission licensees in the event of an incident involving radioactive materials.
Radiological Assistance	Experienced DOE and/or DOE contractor professionals who are adequately equipped to

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Team (RAT):	conduct offsite radiological emergency monitoring. RATs are at all DOE field offices, all national laboratories, and most area offices and associated contractors.
Rem	Roentgen equivalent man – a unit of radiation dose equivalent. The dose equivalent in rems is numerically equal to the absorbed dose multiplied by the quality factor (Q), the distribution factor, and any necessary modifying factors. The unit is used in radiation protection to measure the amount of damage to human tissue from a dose of ionizing radiation. Incorporates health risks from radiation. The scientific metric equal is the sievert (Sv).
Recovery	Actions taken after a plant (facility) has been brought to a stable or shutdown condition to return the plant (facility) to normal operations.
Release	Means any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles containing any hazardous substance or pollutant or contaminant).
Remote-handled transuranic waste	Packaged transuranic waste whose external surface dose rate exceeds 200 millirem per hour. Test specimens of fissionable material irradiated for research and development purposes only and not for the production of power or plutonium may be classified as remote-handled transuranic waste.
Repository	Any system licensed by the NRC that is intended to be used for, or may be used for, the permanent deep geologic disposal of high-level radioactive waste and spent nuclear fuel, whether or not such system is designated to permit the recovery, for a limited period during initial operation, of any materials placed in such a system. The term includes both surface and sub-surface areas at which high-level radioactive waste and spent nuclear fuel handling activities are conducted.
Reprocessing	The process by which spent nuclear fuel is separated into waste material for disposal and material such as uranium and plutonium for reuse.
Roentgen ( R ):	The unit of exposure from x- or gamma radiation. The roentgen is a unit used to measure a quantity called exposure. This can only be used to describe an amount of gamma or x-ray, and only in air. One roentgen is equal to $2.58 \times 10^{-4}$ coulombs per kg of dry air. It is a measure of the ionizations of the molecules in a mass of air. The main advantage of this unit is that it is easy to measure directly, but it is limited because it is only for deposition in air, and only for gamma and x-rays.
<b>S</b>	
Safeguards information	Information which specifically identifies measures taken for the physical protection of special nuclear material (spent nuclear fuel and high-level waste), or measures taken for the physical protection of equipment vital to the safety of operations at fixed sites and in transit. Safeguards information includes: the transportation physical security plan; schedules and itineraries for specific shipments; details of vehicle immobilization features, intrusion alarm devices, and communications systems; arrangements with, and capabilities of, local police response forces; locations of safe havens; details regarding limitations of radio-telephone communications; and procedures for response to safeguards emergencies.
Safeguards system	An integrated system of physical protection, material accountability, and material control measures that have capabilities for the protection of spent nuclear fuel and high-level waste at fixed sites and in-transit.
Sealed source	A radioactive source, sealed in an impervious container, which has sufficient mechanical strength to prevent contact with and dispersion of the radioactive material under the conditions of use and wear for which it was designed. Generally used for radiography or radiation therapy.
Sheltering	An in-place, immediate protective action which calls for people to go indoors, close all doors and windows, turn off all sources of outside air, listen to the radio or television for emergency information, and remain indoors until official notification that it is safe to go out.
Shipment	Refers to the cargo entered as the load on a shipping paper, moving from one origin to one destination, and associated with shipping activities.
Shipper	The person ( or his agent) who tenders a shipment for transportation. The term includes

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	persons who prepare packages for shipment, and offer packages to a carrier for transportation by signature on the shipping papers.
Shipping package, or warning label	Label affixed to a package of hazardous material to identify the package contents. DOT regulations establish the design and use requirements for these labels.
Shipping papers, or shipping documents	Forms containing a description of the material being transported which must accompany all packages of radioactive material.
Short-term exposure limit (STEL)	The maximum concentration allowed for a continuous 15-minute exposure period. There may be no more than four such exposures each day with at least one hour between exposures. The daily threshold limit value – time weighted average (TLV-TWA) may not be exceeded.
Sievert (Sv)	The sievert is a metric unit used to derive a quantity called equivalent dose. This relates the absorbed dose in human tissue to the effective biological damage of the radiation. Not all radiation has the same biological effect, even for the same amount of absorbed dose. Equivalent dose is often expressed in terms of millionths of a sievert, or micro-sievert. To determine equivalent dose (Sv), you multiply absorbed dose (Gy) by a quality factor (Q) that is unique to the type of incident radiation. One sievert is equal to 100 rem.
Site Area Emergency (SAE):	One of the classes of emergency in the operational and energy categories. Within the context of an operational emergency, a site area emergency represents events which are in progress or have occurred involving actual or likely major failure(s) of facility safety or safeguards systems needed for the protection of onsite personnel, the public health and safety, the environment, or national security. Any environmental releases of hazardous materials are not expected to exceed the appropriate Protective Action Guide offsite.
Sludge	A semi-solid residue from any number of air or water treatment processes. Sludge can be a hazardous material.
Slurry	A watery mixture of insoluble matter that results from some pollution control technique.
Somatic effects	Effects of radiation seen in a individual and limited to that exposed individual who receives the exposure, as distinguished from genetic effects, which also affect subsequent, unexposed generations.
Solidification	The conversion of either liquid or loose hazardous waste into a solid.
Source material	This includes:
	1 Uranium or thorium, or any combination thereof , in any physical or chemical form
	2 ores which contain by weight one-twentieth of one percent (0.05% or more of (i) uranium (ii) thorium, or (iii) any combination thereof. Source material does not include special nuclear material.
Source term	The amount of material available for release.
Special form radioactive material	This radioactive material which satisfies the following conditions: (1) it is either a single solid piece or is contained in a sealed capsule that can be opened only by destroying the capsule; (2) the piece or capsule has at least one dimension not less than 5 millimeters; (3) it satisfies the test requirements of 49 CFR 173.469.
Special nuclear material (SNM):	Plutonium 239, uranium enriched in isotope 233 or 235; any material artificially enriched by any of these elements; or any other material which the NRC determines to be special nuclear material, not including source material.
Spent fuel assemblies	Nuclear fuel is fabricated into small pellets. These pellets are encased into strong cylindrical rods. An assembly is a group of these rods fastened together. Referred to as a bundle for some boiling water reactors.
Spent fuel storage pool	A water filled basin used by reactors for the temporary or interim storage of spent fuel before it is transported for reprocessing or disposal.
Spent nuclear fuel (SNF):	Fuel that has been withdrawn from a nuclear reactor following irradiation, the constituent elements of which have not separated by reprocessing. SNF includes
	1 intact, non-defective fuel assemblies
	2 failed fuel assemblies in canisters
	3 fuel assemblies in canisters
	4 consolidated fuel rods in canisters
	5 nonfuel components inserted in pressurized water reactor fuel assemblies
	6 fuel channels attached to boiling water reactor fuel assemblies
	7 nonfuel components and structural parts of assemblies in canisters
Stable isotope	An isotope of an element that is not radioactive.

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Standard operating procedure (SOP):	A set of instructions having the force of a directive, covering those features of operations which lend themselves to a definite or standardized procedure without loss of effectiveness.
State-designated route	A preferred route selected in accordance with DOT guidelines for Selecting Preferred Highway Routes for Highway Route Controlled Quantities of Radioactive Materials or an equivalent routing analysis which adequately considers overall risk to the public.
Stochastic effects	Stochastic effects are effects that occur on a random basis with its effect being independent of the size of dose. The effect typically has no threshold and is based on probabilities, with the chances of seeing the effect increasing with dose. Cancer is a stochastic effect.
Storage	Retention of high-level radioactive waste, spent nuclear fuel, or transuranic waste with the intent to recover such waste or fuel for subsequent use, processing, or disposal.
Survey instrument	A portable instrument used for detecting and measuring radiation under varied physical conditions. The term covers a wide range of devices.
<b>T</b>	
Teratogenic effects	Teratogenic effects are effects from some agent like radiation, that are seen in the offspring of the individual who received the agent/radiation. The agent/radiation must be encountered during the gestation period.
Thorium	A naturally-occurring radioactive element.
Threshold dose	The minimum dose of radiation that will produce a detectable effect.
Threshold limit value – time weighted average (TLV-TWA):	Concentration of toxic materials for a normal 8-hour workday and a 40 hour workweek to which nearly all workers may be exposed day after day without adverse effect.
Transportation Index	1. The number placed on a radioactive materials package label that indicates the control required during transport. The transport index is the radiation level, in millirems per hour, at 3 feet from the accessible external package surface; or for fissile Class II packages, an assigned value based on criticality safety requirements for the package contents. Abbreviation: TI. 2. The dimensionless number placed on radioactive labels to designate the degree of control to be exercised by the carrier during transport of a radioactive material package.
Transportable storage cask	Any cask certified by the NRC for the purposes of transporting spent nuclear fuel as described in 10 CFR 71, and storing spent nuclear fuel in accordance with 10 CFR 72, subpart L.
Transportation Tracking and Communications System (TRANSCOM):	A 24-hour, real-time tracking and two way communications system designed to monitor the movement of radioactive materials including spent nuclear fuel, high-level radioactive waste, transuranic waste and other high visibility shipments, as determined by DOE.
Transuranic elements	Elements above uranium in the periodic table; that is, with an atomic number greater than 92. All known transuranic elements are radioactive. Examples are neptunium, plutonium, americium, and curium.
Transuranic Radioactive Waste (TRU):	1. Waste materials contaminated with isotopes above uranium in the periodic table. Transuranic waste is long-lived, but only moderately radioactive. 2. Waste containing more than 100 nanocuries of alpha emitting transuranic isotopes, with half-lives greater than twenty years, per gram of waste.
Type A package	A Type A package along with its limited radioactive contents which are limited to A1 or A2 value.
Type A packaging	A packaging designed to retain the integrity of containment and shielding required by regulation under normal conditions of transport as demonstrated by the required test.
Type B package	A Type B package together with its radioactive contents.
Type B packaging	Packaging designed to retain the integrity of containment and shielding by regulation when subjected to the normal conditions of transport and hypothetical accident test conditions as required.
<b>UV</b>	
Uranium (U):	A heavy, naturally radioactive, metallic element (atomic number 92). Its two principally occurring isotopes are uranium 235 and uranium 238. Uranium 235 is indispensable to the nuclear industry because it is the only isotope existing in nature to any appreciable extent that is fissionable by thermal neutrons. Uranium 238 is also important because it absorbs neutrons to produce a radioactive isotope that subsequently decays to

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	plutonium 239, an isotope that also is fissionable by thermal neutrons. Uranium is the heaviest element found in nature. Approximately 997 out of every 1000 uranium atoms are uranium 238. The remaining 3 atoms are the fissile uranium 235. The uranium 235 atoms splits, or fissions, into lighter elements when its nucleus is struck by a neutron.
Uranium hexafluoride	A colorless, water insoluble corrosive chemical compound in the nuclear fuel cycle. With the application of heat, uranium hexafluoride (UF <sub>6</sub> ) becomes a gas used to separate uranium-235 (the uranium isotope required for reactor fuel) from uranium.
Uranium mill tailings	Naturally occurring radioactive rock and soil that are the result of uranium mining and milling. Tailings may also contain other minerals or metals not extracted in the process of mining uranium from ore.
Vehicle warning placard	A sign displayed on the outside of a carrier of hazardous material indicating the nature of the cargo.
Vitrification	The process of immobilizing waste by producing a glass-like solid that permanently captures the radioactive materials.
<b>WXYZ</b>	
Waste Form	Radioactive waste material, and any encapsulating or stabilizing matrix.
Waste Isolation Pilot Plant (WIPP):	Research and demonstration facility located at Carlsbad, NM, intended to demonstrate safe disposal of radioactive waste in a deep geologic environment. Conversion of the WIPP to a disposal facility for transuranic waste is pending.
Waste minimization	Employing new techniques to reduce the amount of hazardous and radioactive wastes generated to as low a level as possible.
Whole body dose	The dose of radiation received by the body in its entirety, as distinct from a dose to a limited area of the body.
X-rays	1. Electromagnetic radiations used in medical diagnosis; a penetrating electromagnetic radiation, usually generated by accelerating atoms to high velocity and suddenly stopping them by collision with a solid body
	2. Penetrating electromagnetic radiation whose wave lengths are shorter than those of visible light. They are usually produced by bombarding a metallic target with fast electrons in a high vacuum. In nuclear reactions, it is customary to refer to photons originating in the nucleus as gamma rays, and to those originating in the extranuclear parts of the atom as x-rays. These rays are sometimes called roentgen rays after their discoverer, W. C. Roentgen.