

Appendix B. Definitions

Curie: A measure of the rate of radioactive decay essentially equal to the radioactivity of one gram of radium. A microcurie is one millionth (or 10^{-6}) of a curie. A nanocurie is one billionth (or 10^{-9}) of a curie.

Half-life: Time required for a radioactive substance to lose 50 percent of its radioactivity by decay. For example the radioactivity of cobalt-60 with a half-life of 5.3 years will drop by one-half in 5.3 years.

Ion-exchange resins: Sand-like materials that chemically remove radionuclides from wastewater and concentrate them in a solid form.

Isotope: Isotopes are different forms of the same chemical element, having different numbers of neutrons but the same number of protons in the nucleus of their atoms. A single element may have many isotopes. For example, uranium naturally appears in three forms: uranium-234 (142 neutrons), uranium-235 (143 neutrons), and uranium-238 (146 neutrons); each uranium isotope has 92 protons.

Radiation: Radiation is emitted in the form of alpha particles, beta particles, gamma rays, or x-rays -- each affecting human health differently. For example, alpha particles cannot penetrate a person's skin, therefore can only harm a person if inhaled or ingested. Gamma rays, in contrast, can pass through a person's body.

Radioactivity: The spontaneous emission of radiation from the nucleus of an atom.

Radionuclide: Any species of atom whose nucleus emits radiation. Transuranic radionuclides have an atomic number greater than 92 (uranium).

Sealed sources: Sealed sources are sources of radiation that contain granules of radioactive material typically sealed inside double-walled, stainless steel capsules. Large sources can measure up to 20 inches long and 2 inches in diameter, but generally are about 3 inches long and 0.5 inch in diameter. Sealed sources are primarily used in industrial and medical applications (e.g., density and moisture gauges, well logging sources, and radiotherapy machines).

Waste form: Waste form is the matrix in or on which radionuclides are contained. The waste form of GTCC waste may be metal, ceramic, paper, etc.

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