**Alpha Particle:** A positive electrically charged particle of radiation consisting of two protons and two neutrons (same as a helium nucleus). It is emitted from the nucleus of many radioactive materials during radioactive decay. Alpha particles have a very low kinetic energy and therefore can be stopped by a sheet of paper or clothing. However, if ingested, alpha particles have a Quality Factor (QF) of 20 times that of straight gamma or X-ray radiation, making them dangerously toxic if inhaled or ingested.

**Daughter isotope:** The compound remaining after the parent isotope (original isotope) has undergone decay.

**Disintegration (Decay):** The transformation of radioactive atoms into a stable state resulting in energy (radiation) and particle emission.

**Gamma Rays:** High energy, short wavelength electromagnetic radiation emitted during radioactive decay.

**Gamma Radiography:** Radiographs (film, DDA plates, CR plates) are exposedusing a gamma ray camera or radiograph shooting machine which can be portable, fixed in a cabinet or located in a vault.

**Gamma Source (source):** Industrial gamma radiography typically uses a man=made (activated) radiation source (Cobalt-60, Iridium-192, and Cesium-137). These sources are typically created for specific purposes and applications.

**Half-Life:** the amount of time required for ½ of the original number of radioactive atoms to decay or change into daughter atoms.

**Half-Life Ir 192:** 74 days

**Half-Life Co 60:** 5.3 years

**Half-Life Cs 137:** 30.17 years

 **Half- life Calculator**: <https://www.calculator.net/half-life-calculator.html>

**Inverse Square Law:** A law of nature which describes the relationship of radiation intensity to distance from the source of radiation, stated mathematically as “the intensity of radiation is inversely proportional to the square of its distance from the source”. Radiographers use this mathematical principal to calculate safe distances and radiation dose rates for known distances while exposing radiographs with either X-ray or Gamma radiation.

**Nuclear Fission:** The process by which the nucleus of a stable atom splits upon impact of another particle and splits into 2 smaller parts. The resulting atoms are not the same element as the parent atom and are considered unstable and radioactive. This is the process by which Industrial isotopes (Cobalt 60, Iridium 192, Cesium 137) are created.

**Nuclear Fusion:** a nuclear reaction in which atomic nuclei of a lower atomic number fuse to form a heavier nucleus with the release of energy. The sun is an example of this process.

**Radioactive:** A state in which atoms have excess energy and are unstable. The nucleus disintegrates in the process of becoming stable. This disintegration results in the emission of radiation and we measure this with the Curie (Ci)