

Radionuclide Facts

Americium 241 (Am-241) *Industrial*

Not normally found in humans
 Found in ionization-type smoke detectors and industrial sealed sources
 Generates neutrons when combined with beryllium
 Half-life = 432 years

Barium 133 (Ba-133) *Industrial, Medical*

Not normally found in humans
 Found in industrial and medical sealed sources
 Used in "Buster" gauges
 Half-life = 10.5 years

Cesium 137 (Cs-137) *Industrial, Medical*

Not normally found in humans
 Found in industrial sealed sources and (rarely) as powder
 Used for medical therapy
 Half-life = 30.2 years

Cobalt 57 (Co-57) *Industrial*

Not normally found in humans
 Found in medical sealed sources, vials or large discs, and (rarely) as liquids, powders or capsules
 Half-life = 271 days

Cobalt 60 (Co-60) *Industrial, Medical*

Not normally found in humans
 Found in medical and industrial sealed sources or (rarely) as powders or metal pellets
 Used for medical treatment
 Half-life = 5.27 years

Gallium 67 (Ga-67) *Medical*

Used in humans for diagnostic imaging
 Detectable for 2-3 weeks following medical procedure
 Half-life = 3.26 days

Iodine 131 (I-131) *Medical*

Used in humans and cats for radiation therapy
 Will likely be concentrated in neck or bladder areas
 Detectable for 3-4 weeks following medical procedure
 Internal use can generate dose rates as high as 2-3 mR/hr at contact
 Half-life = 8.01 days

Indium 111 (In-111) *Medical*

Used in humans for diagnostic imaging
 Detectable for 4-7 days following medical procedure
 Half-life = 2.83 days

Iridium 192 (Ir-192) *Industrial, Medical*

Not normally found in humans
 Found in medical and industrial sealed sources
 Often shipped in depleted uranium shielding
 Half-life = 74.0 days

Potassium 40 (K-40) *Natural*

Occurs naturally in humans and some plants
 Should not be detectable in humans
 Found in high volumes in mineral salts
 Half-life = 1.26 billion years

Radium 226 (Ra-226) *Natural*

Found in dials of older wrist watches, clocks, radios, and compasses-the original "glow-in-the-dark" material
 Also found in rocks and uranium ore
 Half-life = 1,602 years

Technetium 99m (Tc-99m) *Industrial, Medical*

Is the most commonly used medical radionuclide in humans
 Internal use can generate dose rates as high as 2-5 mR/hr at contact
 Also commonly used as an industrial calibration source
 Half-life = 6.02 hours

Thorium 232 (Th-232) *Natural*

Not normally found in humans
 Found in metals, high-temperature alloys, powders, chemical compounds, rocks, and welding rods
 Used in optical coatings for camera lenses
 Half-life = 14.1 billion years

Thallium 201 (Tl-201) *Medical*

Used in humans for heart imaging
 Detectable for 2-3 weeks following medical procedure
 Half-life = 73.1 hours

Uranium 238 (U-238) *Industrial*

Not normally found in humans
 Found in metals, powders, and chemical compounds such as uranyl nitrate
 Half-life = 4.47 billion years

Xenon 133 (Xe-133) *Medical*

Used in gaseous form in humans for lung diagnosis
 Not normally detectable in humans
 Shipped under license in small cylinders
 Half-life = 5.25 days

Special Nuclear Material *SNM*

Includes neptunium 237 (Np-237), plutonium 239 (Pu-239), uranium 233 (U-233), and uranium 235 (U-235)
 Found in metals and powders
 Produced in nuclear reactors
 Used for nuclear fission weapons
 Generates neutrons
 Np-237 half-life = 2.14 million years
 Pu-239 half-life = 24,130 years
 U-233 half-life = 159,200 years
 U-235 half-life = 704 million years

If neutrons are detected

- A neutron alarm means that a consistent source of neutrons is present in the area
- The most likely cause is a mixed industrial Am-241 + beryllium source
- A neutron alarm can also be caused by Special Nuclear Material
- The source MUST be found and verified

After finding a source, remember to reset background

- Move away from the source
- Return to "search" mode
- Measure background
- Resume search for additional radioactive materials

