

391-3-17-.06 TRANSPORTATION OF RADIOACTIVE MATERIAL. AMENDED.

- (1) General.
 - (a) Purpose. The Regulations in this Rule, 391-3-17-.06, establish requirements for packaging, preparation for shipment, and transportation of radioactive material.
 - (b) Scope. This Rule applies to any licensee authorized by specific or general license issued by the Department, Agreement State, or NRC to receive, possess, use, or transfer licensed material to a carrier for transport of the material outside the site of usage as specified in the license, or transports that material on public highways or public access roads. No provision of this part authorizes possession of licensed material.
- (2) Requirement for License. No person shall transport radioactive material or deliver radioactive material to a carrier for transport except as authorized in a general or specific license issued by the Department or as exempted in (4).
- (3) Definitions. As used in this Rule, the following definitions apply:
 - (a) "A₁" and "A₂" mean, respectively, the maximum activity of special form radioactive material (A₁) and the maximum activity of radioactive material, other than special form material, LSA, and SCO material (A₂), permitted in a Type A package.
 - (b) "Carrier" means a person engaged in the transportation of passengers or property by land or water as a common, contract, or private carrier, or by civil aircraft.
 - (c) "Certificate holder" means a person who has been issued a certificate of compliance or other package approval by the U.S. Nuclear Regulatory Commission.
 - (d) "Certificate of Compliance (CoC)" means the certificate issued by the U.S. Nuclear Regulatory Commission, which approves the design of a package for the transportation of radioactive material.
 - (e) "Close reflection by water" means immediate contact by water of sufficient thickness for maximum reflection of neutrons.
 - (f) "Closed transport vehicle" means a transport vehicle equipped with a securely attached exterior enclosure that during normal transportation restricts the access of unauthorized persons to the cargo space containing the radioactive material. The enclosure may be either temporary or

permanent but shall limit access from top, sides, and ends. In the case of packaged materials, it may be of the "see-through" type.

- (g) "Consignment" means each shipment of a package or groups of packages or load of radioactive material offered by a shipper for transport.
- (h) "Containment system" means the assembly components of the packaging intended to retain the radioactive material during transport.
- (i) "Conveyance" means:
 - 1. For transport by public highway or rail any transport vehicle or large freight container;
 - 2. For transport by water any vessel, or any hold, compartment, or defined deck area of a vessel including any transport vehicle on board the vessel; and
 - 3. For transport by any aircraft.
- (j) "Criticality Safety Index (CSI)" means the dimensionless number (rounded up to the next tenth) assigned to and placed on the label of a fissile material package, to designate the degree of control of accumulation of packages containing fissile material during transportation. Determination of the criticality safety index is described in 10 CFR 71.22, 71.23 and 71.59.
- (k) "Deuterium" means deuterium and any deuterium compounds, including heavy water, in which the ratio of deuterium atoms to hydrogen atoms exceeds 1:5,000.
- (l) "DOT" means the U.S. Department of Transportation.
- (m) "Exclusive use" means 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. The consignor and the carrier must ensure that any loading or unloading is performed by personnel having radiological training and resources appropriate for safe handling of the consignment. The consignor must issue specific instructions, in writing, for maintenance of exclusive use shipment controls, and include them with the shipping paper information provided to the carrier by the consignor.¹

¹ The term "exclusive use" is used interchangeably with the terms "sole use" or "full load" in other regulations, such as Title 49 of the Code of Federal Regulations.

- (n) "Fissile material" means the radionuclides uranium-233, uranium-235, plutonium-239, and plutonium-241, or any combination of these radionuclides. Fissile material means the fissile nuclides themselves, not material containing fissile nuclides. Neither natural nor depleted uranium is fissile material.² Unirradiated natural uranium or depleted uranium that has been irradiated in thermal reactors only are not included in this definition. Certain exclusions from fissile material controls are provided in 10 CFR 71.15.
- (o) "Graphite" means graphite with a boron equivalent content less than five (5) parts per million and density greater than 1.5 grams per cubic centimeter.
- (p) "Licensed material" means byproduct, source, or special nuclear material received, possessed, used, or transferred under a general or specific license issued by the U.S. Nuclear Regulatory Commission or an Agreement State pursuant to the regulations in 10 CFR or this Chapter, respectively.
- (q) "Low specific activity material" means radioactive material with limited specific activity that satisfies the descriptions and limits set forth below. Shielding materials surrounding the LSA material may not be considered in determining the estimated average specific activity of the package contents. LSA material must be in one of three groups:
1. LSA-I
 - (i) Ores containing only naturally occurring radionuclides (e.g., uranium, thorium) and Uranium or thorium concentrates of those ores; or
 - (ii) Solid unirradiated natural or depleted uranium or natural thorium or their solid or liquid compounds or mixtures; or
 - (iii) Radioactive material, other than fissile material, for which the A_2 value is unlimited; or
 - (iv) Mill tailings, contaminated earth, concrete, rubble, other debris, and activated material in which the radioactive material is essentially uniformly distributed and, the average specific activity does not exceed $10^{-6} A_2/g$.

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Department jurisdiction extends only to special nuclear material if quantities are not sufficient to form a critical mass as defined in Rule .01(2)(xxxx) of these Regulations.

2. LSA-II
 - (i) Water with tritium concentration up to 20.0 Ci/L (0.8 TBq/liter); or
 - (ii) Material in which the radioactivity is essentially uniformly distributed; and the average specific activity does not exceed $10^{-4} A_2/g$ for solids and gases, and $10^{-5} A_2/g$ for liquids.
3. LSA-III. Solids (e.g. consolidated wastes, activated materials) in which:
 - (i) The radioactive material is essentially uniformly distributed throughout a solid or a collection of solid objects, or is essentially uniformly distributed in a solid compact binding agent (such as concrete, bitumen, ceramic, etc);
 - (ii) The radioactive material is relatively insoluble, or it is intrinsically contained in a relatively insoluble material, so that, even under loss of packaging, the loss of radioactive material per package by leaching, when placed in water for seven days, would not exceed $0.1 A_2$; and
 - (iii) The average specific activity of the solid does not exceed $2 \times 10^{-3} A_2/g$.
- (r) "Low toxicity alpha emitters" means natural uranium, depleted uranium, natural thorium; uranium-235, uranium-238, thorium-232, thorium-228 or thorium-230 when contained in ores or physical or chemical concentrates or tailings; or alpha emitters with a half-life of less than 10 days.
- (s) "Maximum normal operating pressure" means the maximum gauge pressure that would develop in the containment system in a period of one year under the heat condition specified in 10 CFR 71.71(c)(1), in the absence of venting, external cooling by an ancillary system, or operational controls during transport.
- (t) "Natural thorium" means thorium with the naturally occurring distribution of thorium isotopes (essentially 100 weight percent thorium-232).
- (u) "Normal form radioactive material" means radioactive material that has not been demonstrated to qualify as "special form radioactive material."

- (v) "Nuclear waste" means a quantity of source, byproduct or special nuclear material³ required to be in US Nuclear Regulatory Commission-approved specification packaging while transported to, through or across a state boundary to a disposal site, or to a collection point for transport to a disposal site.
- (w) "Optimum interspersed hydrogenous moderation" means the presence of hydrogenous material between packages to such an extent that the maximum nuclear reactivity results.
- (x) "Package" means the packaging together with its radioactive contents as presented for transport.
 - 1. "Fissile material package or Type AF package, Type BF package, Type B(U)F package, or Type B(M)F package" means a fissile material packaging together with its fissile material contents.
 - 2. "Type A package" means a Type A packaging together with its radioactive contents. A Type A package is defined and must comply with the DOT regulations in 49 CFR Part 173.
 - 3. "Type B package" means a Type B packaging together with its radioactive contents. On approval, a Type B package design is designated by NRC as B(U) unless the package has a maximum normal operating pressure of more than 700 kPa (100 lb/in²) gauge or a pressure relief device that would allow the release of radioactive material to the environment under the tests specified in 10 CFR Part 71 (hypothetical accident conditions), in which case it will receive a designation B(M). B(U) refers to the need for unilateral approval of international shipments; B(M) refers to the need for multilateral approval of international shipments. There is no distinction made in how packages with these designations may be used in domestic transportation. To determine their distinction for international transportation, see DOT regulations in 49 CFR Part 173. A Type B package approved before September 6, 1983, was designated only as Type B. Limitations on its use are specified in .06(8).
- (y) "Packaging" means the assembly of components necessary to ensure compliance with the packaging requirements of this Rule. 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 vehicle, tie-down system, and auxiliary equipment may be designated as part of the packaging.

³ The definition of nuclear waste in this Part is used in the same way as in 49 CFR 173.403.

- (z) "Regulations of the US Department of Transportation" means the regulations in 49 CFR Parts 100-189 and Parts 390-397.
- (aa) "Regulations of the US Nuclear Regulatory Commission" means the regulations in 10 CFR 71 for purposes of this Rule.
- (bb) "Special form radioactive material" means radioactive material that 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 (0.2 in.); and
 3. It satisfies the test requirements specified by the Nuclear Regulatory Commission. A special form encapsulation designed in accordance with the Nuclear Regulatory Commission requirements in effect on June 30, 1983, and constructed prior to July 1, 1985, may continue to be used. A special form encapsulation designed in accordance with the Nuclear Regulatory Commission requirements in effect on March 31, 1996, and constructed prior to April 1, 1998, may continue to be used. A special form encapsulation either designed or constructed after April 1, 1998, must meet requirements of this definition applicable at the time of its design or construction.
- (cc) "Specific activity" of a radionuclide means the radioactivity of a radionuclide per unit mass of that nuclide. The specific activity of a material in which the radionuclide is essentially uniformly distributed is the radioactivity per unit mass of the material.
- (dd) "Spent nuclear fuel or Spent fuel" means fuel that has been withdrawn from a nuclear reactor following irradiation, has undergone at least one (1) year's decay since being used as a source of energy in a power reactor, and has not been chemically separated into its constituent elements by reprocessing. Spent fuel includes the special nuclear material, byproduct material, source material, and other radioactive materials associated with fuel assemblies.
- (ee) "Surface Contaminated Object (SCO)" means a solid object that is not itself classed as radioactive material, but which has radioactive material distributed on any of its surfaces. SCO must be in one of two groups with surface activity not exceeding the following limits:

1. SCO-I: A solid object on which:
 - (i) The non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 10^{-4} microcurie/ cm^2 (4 Bq/cm^2) for beta and gamma and low toxicity alpha emitters, or 10^{-5} microcurie/ cm^2 (0.4 Bq/cm^2) for all other alpha emitters;
 - (ii) The fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 1.0 microcurie/ cm^2 ($4 \times 10^4 \text{ Bq/cm}^2$) for beta and gamma and low toxicity alpha emitters, or 0.1 microcurie/ cm^2 ($4 \times 10^3 \text{ Bq/cm}^2$) for all other alpha emitters; and
 - (iii) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 1.0 microcurie/ cm^2 ($4 \times 10^4 \text{ Bq/cm}^2$) for beta and gamma and low toxicity alpha emitters, or 0.1 microcurie/ cm^2 ($4 \times 10^3 \text{ Bq/cm}^2$) for all other alpha emitters.
2. SCO-II: A solid object on which the limits for SCO-I are exceeded and on which:
 - (i) The non-fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 10^{-2} microcurie/ cm^2 (400 Bq/cm^2) for beta and gamma and low toxicity alpha emitters, or 10^{-3} microcurie/ cm^2 (40 Bq/cm^2) for all other alpha emitters;
 - (ii) The fixed contamination on the accessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 20 microcurie/ cm^2 ($8 \times 10^5 \text{ Bq/cm}^2$) for beta and gamma and low toxicity alpha emitters, or 2 microcurie/ cm^2 ($8 \times 10^4 \text{ Bq/cm}^2$) for all other alpha emitters; and
 - (iii) The non-fixed contamination plus the fixed contamination on the inaccessible surface averaged over 300 cm^2 (or the area of the surface if less than 300 cm^2) does not exceed 20 microcurie/ cm^2 ($8 \times 10^5 \text{ Bq/cm}^2$) for beta and gamma and low toxicity alpha emitters, or 2 microcurie/ cm^2 ($8 \times 10^4 \text{ Bq/cm}^2$) for all other alpha emitters.

- (ff) "Transport index" means the dimension-less number (rounded up to the next tenth) placed on the label of a package, to designate the degree of control to be exercised by the carrier during transportation. The transportation index is the number expressing the maximum radiation level in millirem per hour at 1 meter from the external surface of the package.
- (gg) "Type A package" means a packaging that, together with its radioactive contents limited to A_1 or A_2 as appropriate, meets the requirements of 49 CFR 173.410 and 173.412 and is designed to retain the integrity of containment and shielding required by this Rule under normal conditions of transport as demonstrated by the tests set forth in 49 CFR 173.465 or 173.466, as appropriate.
- (hh) "Type A quantity" means a quantity of radioactive material, the aggregate radioactivity of which does not exceed A_1 for special form radioactive material or A_2 for normal form radioactive material, where A_1 and A_2 are given in Table 4, "A₁ and A₂ Values for Radionuclides" or may be determined by procedures described in (23) of this Rule.
- (ii) "Type B package" is defined in Rule 391-3-17-.01(2)(qqq).
- (jj) "Type B packaging" means a packaging designed to retain the integrity of containment and shielding when subjected to the normal conditions of transport and hypothetical accident test conditions set forth in 10 CFR Part 71.
- (kk) "Type B quantity" means a quantity of radioactive material greater than a Type A quantity.
- (ll) "Unirradiated uranium" means uranium containing not more than 2×10^3 Bq of plutonium per gram of uranium-235, not more than 9×10^6 Bq of fission products per gram of uranium-235, and not more than 5×10^{-3} grams of uranium-236 per gram of uranium-235.
- (mm) "Uranium-natural, depleted, enriched" means
 1. Natural uranium means uranium with the naturally occurring distribution of uranium isotopes (approximately 0.711 weight percent uranium-235, and the remainder by weight essentially uranium-238).
 2. Depleted uranium means uranium containing less uranium-235 than the naturally occurring distribution of uranium isotopes.

3. Enriched uranium means uranium containing more uranium-235 than the naturally occurring distribution of uranium isotopes.

(4) Exemptions.

- (a) Common and contract carriers, freight forwarders, and warehousemen who are subject to the requirements of the U.S. Department of Transportation (DOT) in 49 CFR 170 through 189 or the U.S. Postal Service in the Postal Service Manual (Domestic Mail Manual), Section C-023.9.0, and the U.S. Postal Service, are exempt from the requirements of this Rule to the extent that they transport or store radioactive material in the regular course of their carriage for others or storage incident thereto. Common and contract carriers who are not subject to the requirements of the U.S. Department of Transportation or U.S. Postal Service are subject to (2) of this Rule and other applicable requirements of these Regulations.
- (b) Any licensee is exempt from the requirements of this Rule to the extent that the licensee delivers to a carrier for transport a package containing radioactive material having a specific activity not greater than 0.002 microcurie per gram (70 Bq/gm).
- (c) Any physician licensed by Georgia to dispense drugs in the practice of medicine is exempt from Rule .06 with respect to transport by the physician of licensed material for use in the practice of medicine. However, any physician operating under this exemption must be licensed under Rule .05.
- (d) A licensee is exempt from the requirements of Rule .06 with respect to shipment or carriage of the following low-level materials:
 1. Natural material and ores containing naturally occurring radionuclides that are not intended to be processed for use of these radionuclides, provided the activity concentration of the material does not exceed 10 times the values specified in Table 7.
 2. Materials for which the activity concentration is not greater than the activity concentration values specified in Table 7, or for which the consignment activity is not greater than the limit for an exempt consignment found in Table 7.
- (e) A licensee is exempt from the requirements of Rule .06, other than .06(5) and .06(17), with respect to shipment or carriage of the following packages, providing the packages do not contain any fissile material, or the material is exempt from classification as fissile material in .06(4)(f):

1. A package that contains no more than a Type A quantity of radioactive material;
 2. A package transported within the United States that contains no more than 20 Ci (0.74 TBq) of special form plutonium-244; or
 3. A package contains LSA or SCO radioactive material, provided that the LSA or SCO material has an external radiation dose of less than or equal to 1 rem/hr (10 mSv/hr) at a distance of 3 meters from the unshielded material or that the package contains only LSA-I or SCO-I material.
- (f) Fissile material meeting the requirements of at least one of the following six paragraphs in this part are exempt from classification as fissile material and from the fissile material package standards of 10 CFR 71.55 and 71.59, but are subject to all other requirements of this part, except as noted.
1. Individual package containing two (2) grams or less of fissile material.
 2. Individual or bulk packaging containing fifteen (15) grams or less of fissile material provided the package has at least 200 grams of solid nonfissile material for every gram of fissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass for solid nonfissile material.
 3. Low concentrations of solid fissile material commingled with solid nonfissile material, provided that (i) there is at least 2,000 grams of solid nonfissile material for every gram of fissile material, and (ii) there is no more than 180 grams of fissile material distributed within 360 kg of contiguous nonfissile material. Lead, beryllium, graphite, and hydrogenous material enriched in deuterium may be present in the package but must not be included in determining the required mass for solid nonfissile material.
 4. Uranium enriched in uranium-235 to a maximum of one (1) percent by weight, and with a total plutonium and uranium-233 content of up to one (1) percent of the mass of uranium-235, provided that the mass of any beryllium, graphite, and hydrogenous material enriched in deuterium constitutes less than five (5) percent of the uranium mass.
 5. Liquid solutions of uranyl nitrate enriched in uranium-235 to a maximum of two (2) percent by mass, with a total plutonium and

uranium-233 content not exceeding 0.002 percent of the mass of uranium, and with a minimum nitrogen to uranium atomic ratio (N/U) of 2. The material must be contained in at least a DOT Type A package.

6. Packages containing, individually, a total plutonium mass of not more than 1,000 grams, of which not more than twenty (20) percent by mass may consist of plutonium-238, plutonium-241, or any combination of these radionuclides.

(5) Transportation of Licensed Material.

- (a) Each licensee who transports licensed material outside the site of usage, as specified in a Department license, or where transport is on public highway, or public access road, or who delivers licensed material to a carrier for transport, shall:

1. Comply with the applicable requirements, appropriate to the mode of transport, of the regulations of the US Department of Transportation (DOT).

- (i) The licensee shall particularly note DOT regulations in the following areas:
 - (I) Packaging - 49 CFR Part 173, Subparts A and B and I.
 - (II) Marking and Labeling - 49 CFR Part 172: Subpart D, and §§ 49 CFR 172.400 through 172.407, §§ 172.436 through 172.440 of Subpart E.
 - (III) Placarding - 49 CFR Part 172: Subpart F, especially §§ 172.500 through 172.519, 172.556 and Appendices B and C.
 - (IV) Accident Reporting - 49 CFR Part 171: §§ 171.15 and 171.16.
 - (V) Shipping Papers and Emergency Information - 49 CFR Part 172, Subpart C and Subpart G.
 - (VI) Hazardous material employee training - 49 CFR Part 172: Subpart H.
 - (VII) Security Plans – 49 CFR Part 172: Subpart I.

- (VIII) Hazardous material shipper/carrier registration - 49 CFR Part 107: Subpart G.
- (ii) The licensee shall also note DOT regulations pertaining to the following modes of transportation:
 - (I) Rail - 49 CFR Part 174, Subparts A through D and K.
 - (II) Air - 49 CFR Part 175.
 - (III) Vessel - 49 CFR Part 176, Subparts A through F and M.
 - (IV) Public Highway - 49 CFR Part 177 and Parts 390 through 397.
- 2. Assure that any special instructions needed to safely open the package are sent to or have been made available to the consignee in accordance with Rule 391-3-17-.03(12)(f).
- (b) If, for any reason, the regulations of the DOT are not applicable to a shipment of licensed material, the licensee shall conform to the standards and requirements of 49 CFR Parts 170-189 appropriate to the mode of transport to the same extent as if the shipment was subject to the regulations.
- (6) General Licenses for Carriers.
 - (a) A general license is hereby issued to any common or contract carrier not exempt under (4) to receive, possess, transport, and store radioactive material in the regular course of their carriage for others or storage incident thereto, provided the transportation and storage is in accordance with the applicable requirements, appropriate to the mode of transport, of the DOT insofar as such requirements relate to the loading and storage of packages, placarding of the transporting vehicle, and incident reporting.⁴
 - (b) A general license is hereby issued to any private carrier to transport radioactive material, provided the transportation is in accordance with the applicable requirements, appropriate to the mode of transport, of the DOT insofar as such requirements relate to the loading and storage of packages, placarding of the transporting vehicle, and incident reporting.

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Notification of an incident shall be filed with, or made to, the Department as prescribed in 49 CFR, regardless of and in addition to notification made to DOT or to other agencies.

- (c) Persons who transport radioactive material pursuant to the general licenses in (6)(a) or (b) are exempt from the requirements of Rules 391-3-17-.03 and .07 to the extent that they transport radioactive material.

(7) General License: NRC-Approved Packages.

- (a) A general license is hereby issued to any licensee to transport, or to deliver to a carrier for transport, licensed material in a package for which a license, certificate of compliance, or other approval has been issued by the U.S. Nuclear Regulatory Commission (NRC).
- (b) This general license applies only to a licensee who:
 - 1. Has a copy of the specific license, certificate of compliance, or other approval of the package and has the drawings and other documents referenced in the approval relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment;
 - 2. Complies with the terms and conditions of the license, certificate, or other approval by the Nuclear Regulatory Commission, as applicable, and the applicable requirements of this Rule;
 - 3. Prior to the licensee's first use of the package, has registered with the U.S. Nuclear Regulatory Commission; and
 - 4. Has a quality assurance program required by (22).
- (c) The general license in (7)(a) applies only when the package approval authorizes use of the package under this general license.
- (d) For a Type B or fissile material package the design of which was approved by NRC before April 1, 1996 the general license is subject to additional restrictions of (8).

(8) General License: Previously Approved Type B Packages.

- (a) A Type B package previously approved by the NRC, but not designated as B(U), B(M), B(U)F, or B(M)F, in the identification number of the NRC Certificate of Compliance, may be used under the general license of (7) with the following additional limitations:
 - 1 Fabrication of the packaging was satisfactorily completed before August 31, 1986, as demonstrated by application of its model number in accordance with NRC regulations at 10 CFR 71.85(c);

2. A package used for shipment to a location outside the United States is subject to multilateral approval, as defined in DOT regulations at 49 CFR 173.403; and
 3. A serial number that uniquely identifies each packaging which conforms to the approved design is assigned to, and legibly and durably marked on, the outside of each packaging.
- (b) A Type B(U) package, a Type B(M) package, a low specific activity (LSA) material package or a fissile material package, previously approved by the NRC but without the designation "-85" in the identification number of the NRC certificate of compliance, may be used under the general license of (7) with the following additional conditions:
1. Fabrication of the package is satisfactory completed by April 1, 1999 as demonstrated by application of its model number in accordance with NRC regulations at 10 CFR 71.85(c);
 2. A package used for shipment to a location outside the United States is subject to multilateral approval as defined in DOT regulations at 49 CFR 173.403 and
 3. A serial number which uniquely identifies each packaging which conforms to the approved design is assigned to and legibly and durably marked on the outside of each packaging.
- (9) General License: DOT Specification Container.
- (a) A general license is issued to any licensee of the Department to transport, or to deliver to a carrier for transport, licensed material in a specification container for fissile material or for a Type B quantity of radioactive material as specified in 49 CFR Parts 173 and 178.
- (b) This general license applies only to a licensee who:
1. Has a copy of the specification;
 2. Complies with the terms and conditions of the specification and the applicable requirements of this Rule; and
 3. Has a quality assurance program required by (22).
- (c) The general license in (9)(a) is subject to the limitation that the specification container may not be used for a shipment to a location outside the United States, except by multilateral approval, as defined in DOT regulations at 49 CFR 173.403.

(10) General License: Use of Foreign-Approved Package.

- (a) A general license is issued to any licensee of the Department to transport, or to deliver to a carrier for transport, licensed material in a package the design of which has been approved in a foreign national competent authority certificate which has been revalidated by the DOT as meeting the applicable requirements of 49 CFR 171.12.
- (b) This general license applies only to international shipments.
- (c) This general license applies only to a licensee who:
 - 1. Has a copy of the applicable certificate, the revalidation, and the drawings and other documents referenced in the certificate relating to the use and maintenance of the packaging and to the actions to be taken prior to shipment;
 - 2. Complies with the terms and conditions of the certificate and revalidation and with the applicable requirements of this Rule; and
 - 3. Has a quality assurance program approved by the NRC.

(11) General License: Fissile Material, Limited Quantity per Package.

- (a) A general license is hereby issued to any licensee to transport fissile material, or to deliver fissile material to a carrier for transport, if the material is shipped in accordance with this section. The material must be contained in a Type A package. The Type A package must also meet the DOT requirements of 49 CFR 173.417(a).
- (b) This general license applies only to a licensee who has a quality assurance program required by (22).
- (c) This general license applies only when a package contains no more than a Type A quantity of fissile material and contains less than 500 grams total of beryllium, graphite, or hydrogenous material enriched in deuterium.
- (d) 1. This general license applies only to packages containing fissile material that are labeled with a Criticality Safety Index (CSI), defined as

$$CSI = 10 \left[\frac{\text{grams of } ^{235}\text{U}}{X} + \frac{\text{grams of } ^{233}\text{U}}{Y} + \frac{\text{grams of Pu}}{Z} \right]$$

where the values of X, Y, and Z used in the CSI equation must be taken from Tables 1 or 2, as appropriate. If Table 2 is used to

obtain the value of X, then the values for the terms for uranium-233 and plutonium must be assumed to be zero. Table 1 values for X, Y, and Z must be used to determine the CSI if:

- i. Uranium-233 is present in the package;
 - ii. The mass of plutonium exceeds one (1) percent of the mass of uranium-235;
 - iii. The uranium is of unknown uranium-235 enrichment or greater than 24 weight percent enrichment; or
 - iv. Substances having a moderating effectiveness (i.e., an average hydrogen density greater than water) (e.g., certain hydrocarbon oils or plastics) are present in any form, except as polyethylene used for packing or wrapping.
2. In all cases, the Criticality Safety Index must be rounded up to one decimal place and may not exceed 10.0.
 3. For a shipment of multiple packages containing fissile material, the sum of the CSIs must be less than or equal to 50 (for shipment on a non-exclusive use conveyance) and less than or equal to 100 (for shipment on an exclusive use conveyance).

Table 1
Mass Limits for General License Packages Containing Mixed Quantities
Of Fissile Material or Uranium-235 of Unknown Enrichment

| Fissile Material | Fissile Material mass mixed with moderating substances having an average hydrogen density less than or equal to water (in grams) | Fissile Material mass mixed with moderating substances having an average hydrogen density greater than water ^(a) (in grams) |
|--|--|--|
| ^{235}U (X) | 60 | 38 |
| ^{233}U (Y) | 43 | 27 |
| ^{239}Pu or ^{241}Pu (Z) | 37 | 24 |

(a) – When mixtures of moderating substances are present, the lower mass limits shall be used if more than 15 percent of the moderating substances has an average hydrogen density greater than water.

Table 2
Mass Limits for General License Packages Containing Uranium-235
of Known Enrichment

| Uranium Enrichment in weight percent of ²³⁵ U not exceeding | Fissile Material mass of ²³⁵ U (X) (in grams) |
|---|---|
| 24 | 60 |
| 20 | 63 |
| 15 | 67 |
| 11 | 72 |
| 10 | 76 |
| 9.5 | 78 |
| 9 | 81 |
| 8.5 | 82 |
| 8 | 85 |
| 7.5 | 88 |
| 7 | 90 |
| 6.5 | 93 |
| 6 | 97 |
| 5.5 | 102 |
| 5 | 108 |
| 4.5 | 114 |
| 4 | 120 |
| 3.5 | 132 |
| 3 | 150 |
| 2.5 | 180 |
| 2 | 246 |
| 1.5 | 408* |
| 1.35 | 480* |
| 1 | 1,020* |
| 0.92 | 1,800* |

*- Pursuant to the Department's agreement with the USNRC, jurisdiction extends only to 350 grams of uranium-235.

(12) General License: Plutonium-Beryllium Special Form Material.

- (a) A general license is hereby issued to any licensee to transport fissile material in the form of plutonium-beryllium (Pu-Be) special form sealed sources, or to deliver Pu-Be sealed sources to a carrier for transport, if the material is shipped in accordance with this section. The material must be contained in a Type A package. The Type A package must also meet the DOT requirements of 49 CFR 173.417(a).

- (b) This general license applies only when all of the following requirements are met:
1. The package contains no more than a Type A quantity of radioactive material.
 2. The package contains less than 1,000 grams of plutonium, provided that: plutonium-239, plutonium-241, or any combination of these radionuclides, constitutes less than 240 grams of the total quantity of plutonium in the package.

- (c) 1. This general license applies only to packages that are labeled with a Criticality Safety Index, calculated by:

$$\text{CSI} = (10 / 24) \times (\text{grams } ^{239}\text{Pu} + \text{grams } ^{241}\text{Pu})$$

where the CSI value is less than or equal to 100 and must be rounded up to the first decimal place.

2. For a shipment of multiple packages containing Pu-Be sealed sources, the sum of the CSIs must be less than or equal to 50 (for shipment on a nonexclusive use conveyance) and less than or equal to 100 (for shipment on an exclusive use conveyance).

- (d) The general license has a quality assurance program required by (22).

(13) Assumptions as to Unknown Properties of Fissile Material. When the isotopic abundance, mass, concentration, degree of irradiation, degree of moderation, or other pertinent property of fissile material in any package is not known, the licensee shall package the fissile material as if the unknown properties had credible values that will cause the maximum neutron multiplication.

(14) External Radiation Standards For All Packages.

- (a) Except as provided in (14)(b), each package of radioactive materials offered for transportation must be designed and prepared for shipment so that under conditions normally incident to transportation the radiation level does not exceed 200 mrem/hr (2 mSv/hr) at any point on the external surface of the package, and the transport index does not exceed 10.
- (b) A package that exceeds the radiation level limits specified in (14)(a) must be transported by exclusive use shipment only, and the radiation levels for such shipment must not exceed the following during transportation:

- (1) 200 mrem/hr (2 mSv/hr) on the external surface of the package, unless the following conditions are met, in which case the limit is 1,000 mrem/hr (10 mSv/hr):
 - (i) The shipment is made in a closed transport vehicle;
 - (ii) The package is secured within the vehicle so that its position remains fixed during transportation; and
 - (iii) There are no loading or unloading operations between the beginning and end of the transportation;
 - (2) 200 mrem/hr (2 mSv/hr) at any point on the outer surface of the vehicle, including the top and underside of the vehicle; or in the case of a flat-bed style vehicle, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load or enclosure, if used, and on the lower external surface of the vehicle; and
 - (3) 10 mrem/hr (0.1 mSv/hr) at any point two (2) meters (80 inches) from the outer lateral surfaces of the vehicle (excluding the top and underside of the vehicle); or in the case of a flat-bed style vehicle, at any point two (2) meters (6.6 feet) from the vertical planes projected by the outer edges of the vehicle (excluding the top and underside of the vehicle); and
 - (4) 2 mrem/hr (0.02 mSv/hr) in any normally occupied space, except that this provision does not apply to private carriers, if exposed personnel under their control wear radiation dosimetry devices in conformance with Rule 391-3-17-.03(8)(b).
- (c) For shipments made under the provisions of (14)(b), the shipper will provide specific written instructions to the carrier for maintenance of the exclusive use shipment controls. The instructions must be included with the shipping paper information.
 - (d) The written instructions required for exclusive use shipments must be sufficient so that, when followed, they will cause the carrier to avoid actions that will unnecessarily delay delivery or unnecessarily result in increased radiation levels or radiation exposures to transport workers or members of the general public.
- (15) Preliminary Determinations. Prior to the first use of any packaging for the shipment of radioactive material:
- (a) The licensee shall ascertain that there are no defects that could significantly reduce the effectiveness of the packaging;

- (b) Where the maximum normal operating pressure will exceed 35 kilopascal (5 lb/in²) gauge, the licensee shall test the containment system at an internal pressure at least 50 percent higher than the maximum normal operating pressure to verify the capability of that system to maintain its structural integrity at that pressure;
 - (c) The licensee shall determine that the packaging has been fabricated in accordance with the design approved by the NRC; and
 - (d) The licensee shall conspicuously and durably mark the packaging with its model number, serial number, gross weight, and a package identification number assigned by the NRC.
- (16) Routine Determinations. Prior to each shipment of licensed material, the licensee shall determine that:
- (a) The package is proper for the contents to be shipped;
 - (b) The package is in unimpaired physical condition except for superficial defects such as marks or dents;
 - (c) Each closure device of the packaging, including any required gasket, is properly installed and secured and free of defects;
 - (d) Any system for containing liquid is adequately sealed and has adequate space or other specified provision for expansion of the liquid;
 - (e) Any pressure relief device is operable and set in accordance with written procedures;
 - (f) The package has been loaded and closed in accordance with written procedures;
 - (g) For fissile material, any moderator or neutron absorber, if required, is present and in proper condition;
 - (h) Any structural part of the package which could be used to lift or tie down the package during transport is rendered inoperable for that purpose unless it satisfies design requirements specified by 10 CFR 71.45;
 - (i) The level of non-fixed radioactive contamination on the external surfaces of each package offered for shipment is as low as reasonably achievable.
 - 1. The level of non-fixed radioactive contamination may be determined by wiping an area of 300 square centimeters of the surface concerned with an absorbent material, using moderate

pressure, and measuring the activity on the wiping material. Sufficient measurements must be taken in the most appropriate locations to yield a representative assessment of the removable contamination levels. Except as provided in (16)(i)2., the amount of radioactivity measured on any single wiping material, when averaged over the surface wiped, must not exceed the limits given in Table 3 at any time during transport. Other methods of assessment of equal or greater efficiency may be used. When other methods are used, the detection efficiency of the method used must be taken into account and in no case may the removable contamination on the external surfaces of the package exceed 10 times the limits listed in Table 3.

- 2. In the case of packages transported as exclusive use shipments by rail or highway only, the non-fixed radioactive contamination at any time during transport must not exceed 10 times the levels prescribed in (16)(i)1. The levels at the beginning of transport must not exceed the levels in (16)(i)1.;

Table 3
Non-Fixed (Removable) External Radioactive Contamination-Wipe Limits

| Contaminant | Maximum Permissible limits | | |
|---|----------------------------|--------------------------|-------------------------|
| | $\mu\text{Ci}/\text{cm}^2$ | dpm/cm^2 | Bq/cm^2 |
| Beta-/gamma-emitting radionuclides; and low toxicity alpha emitters..... | 10^{-5} | 22 | 0.4 |
| All other alpha-emitting radionuclides..... | 10^{-6} | 2.2 | 0.04 |

- (j) External radiation levels around the package and around the vehicle, if applicable, will not exceed 200 millirem per hour (2 mSv/hr) at any point on the external surface of the package at any time during transportation. The transport index shall not exceed 10.
- (k) For package transported as exclusive use by rail, highway, or water, radiation levels external to the package may exceed the limits specified in (16)(j). but shall not exceed any of the following:

1. 200 millirem per hour (2 mSv/hr) on the accessible external surface of the package unless the following conditions are met, in which case the limit is 1,000 millirem per hour (10 mSv/hr):
 - (i) The shipment is made in a closed transport vehicle,
 - (ii) Provisions are made to secure the package so that its position within the vehicle remains fixed during transportation, and
 - (iii) There are no loading or unloading operations between the beginning and end of the transportation;
 2. 200 millirem per hour (2 mSv/hr) at any point on the outer surface of the vehicle, including the top and underside of the vehicle, or, in the case of a flat-bed style vehicle with a personnel barrier⁵, at any point on the vertical planes projected from the outer edges of the vehicle, on the upper surface of the load (or enclosure, if used), and on the lower external surface of the vehicle;
 3. 10 millirem per hour (0.1 mSv/hr) at any point 2 meters from the vertical planes represented by the outer lateral surfaces of the vehicle; or in the case of a flat-bed style vehicle, at any point 2 meters from the vertical planes projected from the outer edges of the vehicle; and
 4. 2 millirem per hour (0.02 mSv/hr) in any normally occupied positions of the vehicle, except that this provision does not apply to private motor carriers when persons occupying these positions are provided with special health supervision, personnel radiation exposure monitoring devices, and training in accordance with 391-3-17-.07(3) of this Chapter; and
- (l) A package must be prepared for transport so that in still air at 100 degrees Fahrenheit (38 degrees Celsius) and in the shade, no accessible surface of a package would have a temperature exceeding 122 degrees Fahrenheit (50 degrees Celsius) in a nonexclusive use shipment or 185 degrees Fahrenheit (85 degrees Celsius) in an exclusive use shipment. Accessible package surface temperatures shall not exceed these limits at any time during transportation.

⁵ A flat-bed style vehicle with a personnel barrier shall have radiation levels determined at vertical planes. If no personnel barrier is in place, the package cannot exceed 200 millirem per hour (2 mSv/hr) at any accessible surface.

- (m) A package may not incorporate a feature intended to allow continuous venting during transport.
- (17) Air Transport of Plutonium. Notwithstanding the provisions of any general licenses and notwithstanding any exemptions stated directly in this Rule or included indirectly by citation of the DOT regulations, as may be applicable, the licensee shall assure that plutonium in any form is not transported by air, or delivered to a carrier for air transport, unless:
- (a) The plutonium is contained in a medical device designed for individual human application;
 - (b) The plutonium is contained in a material in which the specific activity is not greater than the activity concentration values for plutonium as specified in Table 7, and in which the radioactivity is essentially uniformly distributed;
 - (c) The plutonium is shipped in a single package containing no more than an A_2 quantity of plutonium in any isotope or form and is shipped in accordance with (5); or
 - (d) The plutonium is shipped in a package specifically authorized, in the certificate of compliance, issued by the Nuclear Regulatory Commission, for the shipment of plutonium by air and the licensee requires, through special arrangement with the carrier, compliance with 49 CFR 175.704, the US Department of Transportation regulations applicable to the air transport of plutonium.
- (18) Opening instructions. Before delivery of a package to a carrier for transport, the licensee shall ensure that any special instructions needed to safely open the package have been sent to, or otherwise made available to, the consignee for the consignee's use in accordance with Rule 391-3-17-.03(12)(f).
- (19) Shipment Records. Each licensee shall maintain for a period of three years after shipment a record of each shipment of licensed material not exempt under (4), showing, where applicable:
- (a) Identification of the packaging by model number;
 - (b) Verification that there were no significant defects in the packaging, as shipped;
 - (c) Volume and identification of coolant;
 - (d) Type and quantity of licensed material in each package, and the total quantity of each shipment;

- (e) Date of the shipment;
 - (f) Name and address of the transferee;
 - (g) Address to which the shipment was made; and
 - (h) Results of the determinations required by (15) and the conditions of the package approval.
- (20) Reports. The licensee shall report to the Department within 30 days:
- (a) Any instance in which there is significant reduction in the effectiveness of any authorized packaging during use; and
 - (b) Details of any defects with safety significance in the packaging after first use, with the means employed to repair the defects and prevent their recurrence.
- (21) Advance Notification of Transport of Irradiated Reactor Fuel and Nuclear Waste.
- (a) Prior to the transport of any licensed material outside of the confines of the licensee's facility or other place of use or storage, or prior to the delivery of any nuclear waste to a carrier for transport, each licensee shall provide advance notification of such transport to the governor, or governor's designee,⁶ of each state within or through which the licensed material will be transported.
 - (b) Advance notification is required for shipments of irradiated reactor fuel in quantities less than that subject to advance notification requirements in 10 CFR 73.37. Advance notification is also required when:
 - 1. The licensed material is required to be in Type B packaging for transportation;
 - 2. The licensed material is being transported into, within, or through, a state en route to a disposal facility or to a collection point for transport to a disposal facility; and
 - 3. The quantity of licensed material in a single package exceeds:
 - (i) 3000 times the A_1 value of the radionuclides as specified in Table 4, for special form radioactive material;

⁶ A list of the mailing addresses of the governors and governors' designees is available upon request from the Director, State Programs, NRC, Washington, D.C., 20555. The list will be published in the Federal Register on or about June 30 of each year to reflect any changes in information.

- (ii) 3000 times the A_2 value of the radionuclides as specified in Table 4 for normal form radioactive material; or
 - (iii) 27,000 Ci (1000 TBq);
- (c) Each advance notification required by (20)(a) shall contain the following information:
 - 1. The name, address, and telephone number of the shipper, carrier, and receiver of the shipment;
 - 2. A description of the irradiated reactor fuel or nuclear waste contained in the shipment as required by 49 CFR 172.202 and 172.203(d);
 - 3. The point of origin of the shipment and the seven-day period during which departure of the shipment is estimated to occur;
 - 4. The seven-day period during which arrival of the shipment at state boundaries is estimated to occur;
 - 5. The destination of the shipment, and the seven-day period during which arrival of the shipment is estimated to occur; and
 - 6. A point of contact with a telephone number for current shipment information.
- (d) Procedures for Submitting Advance Notification
 - 1. The notification required by (20)(a) shall be made in writing to the office of each appropriate governor, or governor's designee, and to the Department.
 - 2. A notification delivered by mail must be postmarked at least seven days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.
 - 3. A notification delivered by messenger must reach the office of the governor, or governor's designee, at least four days before the beginning of the seven-day period during which departure of the shipment is estimated to occur.
 - 4. A copy of the notification shall be retained by the licensee for three years.

- (e) The licensee shall notify each appropriate governor, or governor's designee, and the Department of any changes to schedule information provided pursuant to (20)(a). Such notification shall be by telephone to a responsible individual in the office of the governor, or governor's designee, of the appropriate state or states. The licensee shall maintain for three years a record of the name of the individual contacted.
- (f) Each licensee who cancels an irradiated reactor fuel or nuclear waste shipment, for which advance notification has been sent, shall send a cancellation notice to the governor, or governor's designee, of each appropriate state and to the Department. A copy of the notice shall be retained by the licensee for three years.

(22) Quality Assurance Requirements.

- (a) Unless otherwise authorized by the Department, each licensee shall establish, maintain, and execute a quality assurance program to verify by procedures such as checking, auditing, and inspection that deficiencies, deviations, and defective material and equipment relating to the shipment of packages containing radioactive material are promptly identified and corrected.
- (b) The licensee shall identify the material and components to be covered by the quality assurance program.
- (c) Each licensee shall document the quality assurance program by written procedures or instructions and shall carry out the program in accordance with those procedures throughout the period during which packaging is used.
- (d) Prior to the use of any package for the shipment of radioactive material, each licensee shall obtain approval by the Department of its quality assurance program.
- (e) The licensee shall maintain sufficient written records to demonstrate compliance with the quality assurance program. Records of quality assurance pertaining to the use of a package for shipment of radioactive material shall be maintained for a period of three years after shipment.
- (f) Radiography containers. A program for transport container inspection and maintenance limited to radiographic exposure devices, source changers, or packages transporting these devices and meeting the requirements of rule 391-3-17-.04(11)(d) and (e) or equivalent Agreement State requirement, is deemed to satisfy the requirements of 10 CFR 71.12(b) and .06 (21).

(23) Determination of A_1 and A_2 .

- (a) Values of A_1 and A_2 for individual radionuclides, which are the bases for many activity limits elsewhere in these regulations, are given in Table 4. The curie (Ci) values specified are obtained by converting from the Terabecquerel (TBq) value. The curie values are expressed to three significant figures to assure that the difference in the TBq and Ci quantities is one tenth of one percent or less. Where values of A_1 or A_2 are unlimited, it is for radiation control purposes only. For nuclear criticality safety, some materials are subject to controls placed on fissile material.
- (b) 1. For individual radionuclides whose identities are known but are not listed in Table 4, the A_1 and A_2 values contained in Table 5 may be used. Otherwise, the licensee shall obtain prior Department approval of the A_1 and A_2 values for radionuclides not listed in Table 4, before shipping the material
2. For individual radionuclides whose identities are known but are not listed in Table 7, the exempt material activity concentration and exempt consignment activity values contained in Table 5 may be used. Otherwise, the licensee shall obtain prior Department approval of the exempt material activity concentration and exempt consignment activity values for radionuclides not listed in Table 7, before shipping the material.
- (c) In calculations of A_1 and A_2 for a radionuclide not in Table 4, a single radioactive decay chain, in which radionuclides are present in their naturally occurring proportions, and in which no daughter nuclide has a half-life either longer than 10 days, or longer than that of the parent nuclide, shall be considered as a single radionuclide, and the activity to be taken into account, and the A_1 and A_2 value to be applied shall be those corresponding to the parent nuclide of that chain. In the case of radioactive decay chains in which any daughter nuclide has a half-life either longer than ten days, or greater than of the parent nuclide, the parent and those daughters nuclides shall be considered as a mixture of different nuclides.
- (d) Mixtures of radionuclides.
1. For mixture of radionuclides whose identities and respective activities are known, following conditions apply:
- (i) For a special form radioactive material, the maximum quantity transported in a Type A package:

$$\sum_i \frac{B(i)}{A_1(i)} \leq 1$$

- (ii) For normal form radioactive material, maximum quantity transported in a Type A package:

$$\sum_i \frac{B(i)}{A_2(i)} \leq 1$$

where B(i) is the activity of radionuclide i and A₁(i) and A₂(i) are the A₁ and A₂ values for radionuclide i, respectively.

Alternatively an A₁ value for mixtures of special form material may be as follows:

A₁ for mixture =

$$\frac{1}{\sum_i \frac{f(i)}{A_1(i)}}$$

where f(i) is the fraction of activity of nuclide i in the mixture and A₁(i) is the appropriate A₁ value for nuclide i.

An A₂ value for mixtures of normal form material may be determined as follows:

A₂ for mixture =

$$\frac{1}{\sum_i \frac{f(i)}{A_2(i)}}$$

where f(i) is the fraction of activity of nuclide i in the mixture A₂(i) is the appropriate A₂ value for nuclide i.

- (e) The exempt activity concentration for mixtures of radionuclides may be determined as follows:

$$\text{Exempt activity concentration for mixture} = \frac{1}{\sum_i \frac{f(i)}{[A](i)}}$$

where f(i) is the fraction activity concentration of radionuclide (i) in the mixture and [A] is the activity concentration for exempt material containing radionuclide (i).

- (f) The activity limit for an exempt consignment for mixtures of radionuclides may be determined as follows:

$$\text{Exempt consignment activity limit for mixture} = \frac{1}{\sum_i \frac{f(i)}{A(i)}}$$

where $f(i)$ is the fraction of activity of radionuclide (i) in the mixture and $[A]$ is the activity limit for exempt consignments for radionuclide (i).

- (g) When the identity of each radionuclide is known, but the individual activities of some of the radionuclides are not known, the radionuclides may be grouped, and the lowest A_1 or A_2 value, as appropriate, for the radionuclides in each group may be used in applying formulas above. Groups may be based on the total alpha activity and the total beta/gamma activity when these are known, using the lowest A_1 or A_2 values for the alpha emitters and beta/gamma emitters.

Table 4 - A₁ and A₂ VALUES FOR RADIONUCLIDES

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Ac-225 (a) | Actinium (89) | 8.0X10 ⁻¹ | 2.2X10 ¹ | 6.0X10 ⁻³ | 1.6X10 ⁻¹ | 2.1X10 ³ | 5.8X10 ⁴ |
| Ac-227 (a) | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 9.0X10 ⁻⁵ | 2.4X10 ⁻³ | 2.7 | 7.2X10 ¹ |
| Ac-228 | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 8.4X10 ⁴ | 2.2X10 ⁶ |
| Ag-105 | Silver (47) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 1.1X10 ³ | 3.0X10 ⁴ |
| Ag-108m (a) | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 9.7X10 ⁻¹ | 2.6X10 ¹ |
| Ag-110m (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.8X10 ² | 4.7X10 ³ |
| Ag-111 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.8X10 ³ | 1.6X10 ⁵ |
| Al-26 | Aluminum (13) | 1.0X10 ⁻¹ | 2.7 | 1.0X10 ⁻¹ | 2.7 | 7.0X10 ⁻⁴ | 1.9X10 ⁻² |
| Am-241 | Americium (95) | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 1.3X10 ⁻¹ | 3.4 |
| Am-242m (a) | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 3.6X10 ⁻¹ | 1.0X10 ¹ |
| Am-243 (a) | | 5.0 | 1.4X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 7.4X10 ⁻³ | 2.0X10 ⁻¹ |
| Ar-37 | Argon (18) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 3.7X10 ³ | 9.9X10 ⁴ |
| Ar-39 | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ¹ | 5.4X10 ² | 1.3 | 3.4X10 ¹ |
| Ar-41 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.5X10 ⁶ | 4.2X10 ⁷ |
| As-72 | Arsenic (33) | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 6.2X10 ⁴ | 1.7X10 ⁶ |
| As-73 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 8.2X10 ² | 2.2X10 ⁴ |
| As-74 | | 1.0 | 2.7X10 ¹ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 3.7X10 ³ | 9.9X10 ⁴ |
| As-76 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 5.8X10 ⁴ | 1.6X10 ⁶ |
| As-77 | | 2.0X10 ¹ | 5.4X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 3.9X10 ⁴ | 1.0X10 ⁶ |
| At-211 (a) | Astatine (85) | 2.0X10 ¹ | 5.4X10 ² | 5.0X10 ⁻¹ | 1.4X10 ¹ | 7.6X10 ⁴ | 2.1X10 ⁶ |
| Au-193 | Gold (79) | 7.0 | 1.9X10 ² | 2.0 | 5.4X10 ¹ | 3.4X10 ⁴ | 9.2X10 ⁵ |
| Au-194 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.5X10 ⁴ | 4.1X10 ⁵ |
| Au-195 | | 1.0X10 ¹ | 2.7X10 ² | 6.0 | 1.6X10 ² | 1.4X10 ² | 3.7X10 ³ |
| Au-198 | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 9.0X10 ³ | 2.4X10 ⁵ |
| Au-199 | | 1.0X10 ¹ | 2.7X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 7.7X10 ³ | 2.1X10 ⁵ |
| Ba-131 (a) | Barium (56) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 3.1X10 ³ | 8.4X10 ⁴ |
| Ba-133 | | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 9.4 | 2.6X10 ² |
| Ba-133m | | 2.0X10 ¹ | 5.4X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.2X10 ⁴ | 6.1X10 ⁵ |
| Ba-140 (a) | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 3.0X10 ⁻¹ | 8.1 | 2.7X10 ³ | 7.3X10 ⁴ |
| Be-7 | Beryllium (4) | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ¹ | 5.4X10 ² | 1.3X10 ⁴ | 3.5X10 ⁵ |
| Be-10 | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 8.3X10 ⁻⁴ | 2.2X10 ⁻² |
| Bi-205 | Bismuth (83) | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 1.5X10 ³ | 4.2X10 ⁴ |
| Bi-206 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 3.8X10 ³ | 1.0X10 ⁵ |
| Bi-207 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 1.9 | 5.2X10 ¹ |
| Bi-210 | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.6X10 ³ | 1.2X10 ⁵ |
| Bi-210m (a) | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 2.1X10 ⁻⁵ | 5.7X10 ⁻⁴ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Bi-212 (a) | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.4X10 ⁵ | 1.5X10 ⁷ |
| Bk-247 | Berkelium (97) | 8.0 | 2.2X10 ² | 8.0X10 ⁻⁴ | 2.2X10 ⁻² | 3.8X10 ⁻² | 1.0 |
| Bk-249 (a) | | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ⁻¹ | 8.1 | 6.1X10 ¹ | 1.6X10 ³ |
| Br-76 | Bromine (35) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 9.4X10 ⁴ | 2.5X10 ⁶ |
| Br-77 | | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 2.6X10 ⁴ | 7.1X10 ⁵ |
| Br-82 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁴ | 1.1X10 ⁶ |
| C-11 | Carbon (6) | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.1X10 ⁷ | 8.4X10 ⁸ |
| C-14 | | 4.0X10 ¹ | 1.1X10 ³ | 3.0 | 8.1X10 ¹ | 1.6X10 ⁻¹ | 4.5 |
| Ca-41 | Calcium (20) | Unlimited | Unlimited | Unlimited | Unlimited | 3.1X10 ⁻³ | 8.5X10 ⁻² |
| Ca-45 | | 4.0X10 ¹ | 1.1X10 ³ | 1.0 | 2.7X10 ¹ | 6.6X10 ² | 1.8X10 ⁴ |
| Ca-47 (a) | | 3.0 | 8.1X10 ¹ | 3.0X10 ⁻¹ | 8.1 | 2.3X10 ⁴ | 6.1X10 ⁵ |
| Cd-109 | Cadmium (48) | 3.0X10 ¹ | 8.1X10 ² | 2.0 | 5.4X10 ¹ | 9.6X10 ¹ | 2.6X10 ³ |
| Cd-113m | | 4.0X10 ¹ | 1.1X10 ³ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 8.3 | 2.2X10 ² |
| Cd-115 (a) | | 3.0 | 8.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.9X10 ⁴ | 5.1X10 ⁵ |
| Cd-115m | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 9.4X10 ² | 2.5X10 ⁴ |
| Ce-139 | Cerium (58) | 7.0 | 1.9X10 ² | 2.0 | 5.4X10 ¹ | 2.5X10 ² | 6.8X10 ³ |
| Ce-141 | | 2.0X10 ¹ | 5.4X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.1X10 ³ | 2.8X10 ⁴ |
| Ce-143 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.5X10 ⁴ | 6.6X10 ⁵ |
| Ce-144 (a) | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 1.2X10 ² | 3.2X10 ³ |
| Cf-248 | Californium (98) | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻³ | 1.6X10 ⁻¹ | 5.8X10 ¹ | 1.6X10 ³ |
| Cf-249 | | 3.0 | 8.1X10 ¹ | 8.0X10 ⁻⁴ | 2.2X10 ⁻² | 1.5X10 ⁻¹ | 4.1 |
| Cf-250 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ⁻³ | 5.4X10 ⁻² | 4.0 | 1.1X10 ² |
| Cf-251 | | 7.0 | 1.9X10 ² | 7.0X10 ⁻⁴ | 1.9X10 ⁻² | 5.9X10 ⁻² | 1.6 |
| Cf-252 (h) | | 5.0X10 ⁻² | 1.4 | 3.0X10 ⁻³ | 8.1X10 ⁻² | 2.0X10 ¹ | 5.4X10 ² |
| Cf-253 (a) | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ⁻² | 1.1 | 1.1X10 ³ | 2.9X10 ⁴ |
| Cf-254 | | 1.0X10 ⁻³ | 2.7X10 ⁻² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 3.1X10 ² | 8.5X10 ³ |
| Cl-36 | Chlorine (17) | 1.0X10 ¹ | 2.7X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.2X10 ⁻³ | 3.3X10 ⁻² |
| Cl-38 | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 4.9X10 ⁶ | 1.3X10 ⁸ |
| Cm-240 | Curium (96) | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 7.5X10 ² | 2.0X10 ⁴ |
| Cm-241 | | 2.0 | 5.4X10 ¹ | 1.0 | 2.7X10 ¹ | 6.1X10 ² | 1.7X10 ⁴ |
| Cm-242 | | 4.0X10 ¹ | 1.1X10 ³ | 1.0X10 ⁻² | 2.7X10 ⁻¹ | 1.2X10 ² | 3.3X10 ³ |
| Cm-243 | | 9.0 | 2.4X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 1.9X10 ⁻³ | 5.2X10 ¹ |
| Cm-244 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ⁻³ | 5.4X10 ⁻² | 3.0 | 8.1X10 ¹ |
| Cm-245 | | 9.0 | 2.4X10 ² | 9.0X10 ⁻⁴ | 2.4X10 ⁻² | 6.4X10 ⁻³ | 1.7X10 ⁻¹ |
| Cm-246 | | 9.0 | 2.4X10 ² | 9.0X10 ⁻⁴ | 2.4X10 ⁻² | 1.1X10 ⁻² | 3.1X10 ⁻¹ |
| Cm-247 (a) | | 3.0 | 8.1X10 ¹ | 1.0X10 ⁻³ | 2.7X10 ⁻² | 3.4X10 ⁻⁶ | 9.3X10 ⁻⁵ |
| Cm-248 | | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 3.0X10 ⁻⁴ | 8.1X10 ⁻³ | 1.6X10 ⁻⁴ | 4.2X10 ⁻³ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Co-55 | Cobalt (27) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 1.1X10 ⁵ | 3.1X10 ⁶ |
| Co-56 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.1X10 ³ | 3.0X10 ⁴ |
| Co-57 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ¹ | 2.7X10 ² | 3.1X10 ² | 8.4X10 ³ |
| Co-58 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.2X10 ³ | 3.2X10 ⁴ |
| Co-58m | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 2.2X10 ⁵ | 5.9X10 ⁶ |
| Co-60 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.2X10 ¹ | 1.1X10 ³ |
| Cr-51 | Chromium (24) | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ¹ | 8.1X10 ² | 3.4X10 ³ | 9.2X10 ⁴ |
| Cs-129 | Cesium (55) | 4.0 | 1.1X10 ² | 4.0 | 1.1X10 ² | 2.8X10 ⁴ | 7.6X10 ⁵ |
| Cs-131 | | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ¹ | 8.1X10 ² | 3.8X10 ³ | 1.0X10 ⁵ |
| Cs-132 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 5.7X10 ³ | 1.5X10 ⁵ |
| Cs-134 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 4.8X10 ¹ | 1.3X10 ³ |
| Cs-134m | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.0X10 ⁵ | 8.0X10 ⁶ |
| Cs-135 | | 4.0X10 ¹ | 1.1X10 ³ | 1.0 | 2.7X10 ¹ | 4.3X10 ⁻⁵ | 1.2X10 ⁻³ |
| Cs-136 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 2.7X10 ³ | 7.3X10 ⁴ |
| Cs-137 (a) | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.2 | 8.7X10 ¹ |
| Cu-64 | Copper (29) | 6.0 | 1.6X10 ² | 1.0 | 2.7X10 ¹ | 1.4X10 ⁵ | 3.9X10 ⁶ |
| Cu-67 | | 1.0X10 ¹ | 2.7X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 2.8X10 ⁴ | 7.6X10 ⁵ |
| Dy-159 | Dysprosium (66) | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ¹ | 5.4X10 ² | 2.1X10 ² | 5.7X10 ³ |
| Dy-165 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.0X10 ⁵ | 8.2X10 ⁶ |
| Dy-166 (a) | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 3.0X10 ⁻¹ | 8.1 | 8.6X10 ³ | 2.3X10 ⁵ |
| Er-169 | Erbium (68) | 4.0X10 ¹ | 1.1X10 ³ | 1.0 | 2.7X10 ¹ | 3.1X10 ³ | 8.3X10 ⁴ |
| Er-171 | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 9.0X10 ⁴ | 2.4X10 ⁶ |
| Eu-147 | Europium (63) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 1.4X10 ³ | 3.7X10 ⁴ |
| Eu-148 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.0X10 ² | 1.6X10 ⁴ |
| Eu-149 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ¹ | 5.4X10 ² | 3.5X10 ² | 9.4X10 ³ |
| Eu-150 (short lived) | | 2.0 | 5.4X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.1X10 ⁴ | 1.6X10 ⁶ |
| Eu-150 (long lived) | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.1X10 ⁴ | 1.6X10 ⁶ |
| Eu-152 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 6.5 | 1.8X10 ² |
| Eu-152m | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 8.2X10 ⁴ | 2.2X10 ⁶ |
| Eu-154 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 9.8 | 2.6X10 ² |
| Eu-155 | | 2.0X10 ¹ | 5.4X10 ² | 3.0 | 8.1X10 ¹ | 1.8X10 ¹ | 4.9X10 ² |
| Eu-156 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 2.0X10 ³ | 5.5X10 ⁴ |
| F-18 | Fluorine (9) | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.5X10 ⁶ | 9.5X10 ⁷ |
| Fe-52 (a) | Iron (26) | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 2.7X10 ⁵ | 7.3X10 ⁶ |
| Fe-55 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 8.8X10 ¹ | 2.4X10 ³ |
| Fe-59 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 1.8X10 ³ | 5.0X10 ⁴ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Fe-60 (a) | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻¹ | 5.4 | 7.4X10 ⁻⁴ | 2.0X10 ⁻² |
| Ga-67 | Gallium (31) | 7.0 | 1.9X10 ² | 3.0 | 8.1X10 ¹ | 2.2X10 ⁴ | 6.0X10 ⁵ |
| Ga-68 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 1.5X10 ⁶ | 4.1X10 ⁷ |
| Ga-72 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.1X10 ⁵ | 3.1X10 ⁶ |
| Gd-146 (a) | Gadolinium (64) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.9X10 ² | 1.9X10 ⁴ |
| Gd-148 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ⁻³ | 5.4X10 ⁻² | 1.2 | 3.2X10 ¹ |
| Gd-153 | | 1.0X10 ¹ | 2.7X10 ² | 9.0 | 2.4X10 ² | 1.3X10 ² | 3.5X10 ³ |
| Gd-159 | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.9X10 ⁴ | 1.1X10 ⁶ |
| Ge-68 (a) | Germanium (32) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 2.6X10 ² | 7.1X10 ³ |
| Ge-71 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 5.8X10 ³ | 1.6X10 ⁵ |
| Ge-77 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.3X10 ⁵ | 3.6X10 ⁶ |
| Hf-172 (a) | Hafnium (72) | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.1X10 ¹ | 1.1X10 ³ |
| Hf-175 | | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 3.9X10 ² | 1.1X10 ⁴ |
| Hf-181 | | 2.0 | 5.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.3X10 ² | 1.7X10 ⁴ |
| Hf-182 | | Unlimited | Unlimited | Unlimited | Unlimited | 8.1X10 ⁻⁶ | 2.2X10 ⁻⁴ |
| Hg-194 (a) | Mercury (80) | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.3X10 ⁻¹ | 3.5 |
| Hg-195m (a) | | 3.0 | 8.1X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 1.5X10 ⁴ | 4.0X10 ⁵ |
| Hg-197 | | 2.0X10 ¹ | 5.4X10 ² | 1.0X10 ¹ | 2.7X10 ² | 9.2X10 ³ | 2.5X10 ⁵ |
| Hg-197m | | 1.0X10 ¹ | 2.7X10 ² | 4.0X10 ⁻¹ | 1.1X10 ¹ | 2.5X10 ⁴ | 6.7X10 ⁵ |
| Hg-203 | | 5.0 | 1.4X10 ² | 1.0 | 2.7X10 ¹ | 5.1X10 ² | 1.4X10 ⁴ |
| Ho-166 | Holmium (67) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 2.6X10 ⁴ | 7.0X10 ⁵ |
| Ho-166m | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.6X10 ⁻² | 1.8 |
| I-123 | Iodine (53) | 6.0 | 1.6X10 ² | 3.0 | 8.1X10 ¹ | 7.1X10 ⁴ | 1.9X10 ⁶ |
| I-124 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 9.3X10 ³ | 2.5X10 ⁵ |
| I-125 | | 2.0X10 ¹ | 5.4X10 ² | 3.0 | 8.1X10 ¹ | 6.4X10 ² | 1.7X10 ⁴ |
| I-126 | | 2.0 | 5.4X10 ¹ | 1.0 | 2.7X10 ¹ | 2.9X10 ³ | 8.0X10 ⁴ |
| I-129 | | Unlimited | Unlimited | Unlimited | Unlimited | 6.5X10 ⁻⁶ | 1.8X10 ⁻⁴ |
| I-131 | | 3.0 | 8.1X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 4.6X10 ³ | 1.2X10 ⁵ |
| I-132 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.8X10 ⁵ | 1.0X10 ⁷ |
| I-133 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.2X10 ⁴ | 1.1X10 ⁶ |
| I-134 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 9.9X10 ⁵ | 2.7X10 ⁷ |
| I-135 (a) | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.3X10 ⁵ | 3.5X10 ⁶ |
| In-111 | Indium (49) | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 1.5X10 ⁴ | 4.2X10 ⁵ |
| In-113m | | 4.0 | 1.1X10 ² | 2.0 | 5.4X10 ¹ | 6.2X10 ⁵ | 1.7X10 ⁷ |
| In-114m (a) | | 1.0X10 ¹ | 2.7X10 ² | 5.0X10 ⁻¹ | 1.4X10 ¹ | 8.6X10 ² | 2.3X10 ⁴ |
| In-115m | | 7.0 | 1.9X10 ² | 1.0 | 2.7X10 ¹ | 2.2X10 ⁵ | 6.1X10 ⁶ |
| Ir-189 (a) | Iridium (77) | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ¹ | 2.7X10 ² | 1.9X10 ³ | 5.2X10 ⁴ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Ir-190 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 2.3X10 ³ | 6.2X10 ⁴ |
| Ir-192 (c) | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.4X10 ² | 9.2X10 ³ |
| Ir-194 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 3.1X10 ⁴ | 8.4X10 ⁵ |
| K-40 | Potassium (19) | 9.0X10 ⁻¹ | 2.4X10 ¹ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 2.4X10 ⁻⁷ | 6.4X10 ⁻⁶ |
| K-42 | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 2.2X10 ⁵ | 6.0X10 ⁶ |
| K-43 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.2X10 ⁵ | 3.3X10 ⁶ |
| Kr-81 | Krypton (36) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 7.8X10 ⁻⁴ | 2.1X10 ⁻² |
| Kr-85 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ¹ | 2.7X10 ² | 1.5X10 ¹ | 3.9X10 ² |
| Kr-85m | | 8.0 | 2.2X10 ² | 3.0 | 8.1X10 ¹ | 3.0X10 ⁵ | 8.2X10 ⁶ |
| Kr-87 | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 1.0X10 ⁶ | 2.8X10 ⁷ |
| La-137 | Lanthanum (57) | 3.0X10 ¹ | 8.1X10 ² | 6.0 | 1.6X10 ² | 1.6X10 ⁻³ | 4.4X10 ⁻² |
| La-140 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 2.1X10 ⁴ | 5.6X10 ⁵ |
| Lu-172 | Lutetium (71) | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.2X10 ³ | 1.1X10 ⁵ |
| Lu-173 | | 8.0 | 2.2X10 ² | 8.0 | 2.2X10 ² | 5.6X10 ¹ | 1.5X10 ³ |
| Lu-174 | | 9.0 | 2.4X10 ² | 9.0 | 2.4X10 ² | 2.3X10 ¹ | 6.2X10 ² |
| Lu-174m | | 2.0X10 ¹ | 5.4X10 ² | 1.0X10 ¹ | 2.7X10 ² | 2.0X10 ² | 5.3X10 ³ |
| Lu-177 | | 3.0X10 ¹ | 8.1X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 4.1X10 ³ | 1.1X10 ⁵ |
| Mg-28 (a) | Magnesium (12) | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 2.0X10 ⁵ | 5.4X10 ⁶ |
| Mn-52 | Manganese (25) | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.6X10 ⁴ | 4.4X10 ⁵ |
| Mn-53 | | Unlimited | Unlimited | Unlimited | Unlimited | 6.8X10 ⁻⁵ | 1.8X10 ⁻³ |
| Mn-54 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 2.9X10 ² | 7.7X10 ³ |
| Mn-56 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 8.0X10 ⁵ | 2.2X10 ⁷ |
| Mo-93 | Molybdenum (42) | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ¹ | 5.4X10 ² | 4.1X10 ⁻² | 1.1 |
| Mo-99 (a) (i) | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.8X10 ⁴ | 4.8X10 ⁵ |
| N-13 | Nitrogen (7) | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.4X10 ⁷ | 1.5X10 ⁹ |
| Na-22 | Sodium (11) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 2.3X10 ² | 6.3X10 ³ |
| Na-24 | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 3.2X10 ⁵ | 8.7X10 ⁶ |
| Nb-93m | Niobium (41) | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ¹ | 8.1X10 ² | 8.8 | 2.4X10 ² |
| Nb-94 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.9X10 ⁻³ | 1.9X10 ⁻¹ |
| Nb-95 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.5X10 ³ | 3.9X10 ⁴ |
| Nb-97 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 9.9X10 ⁵ | 2.7X10 ⁷ |
| Nd-147 | Neodymium (60) | 6.0 | 1.6X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.0X10 ³ | 8.1X10 ⁴ |
| Nd-149 | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 4.5X10 ⁵ | 1.2X10 ⁷ |
| Ni-59 | Nickel (28) | Unlimited | Unlimited | Unlimited | Unlimited | 3.0X10 ⁻³ | 8.0X10 ⁻² |
| Ni-63 | | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ¹ | 8.1X10 ² | 2.1 | 5.7X10 ¹ |
| Ni-65 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 7.1X10 ⁵ | 1.9X10 ⁷ |
| Np-235 | Neptunium (93) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 5.2X10 ¹ | 1.4X10 ³ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Np-236 (short-lived) | | 2.0X10 ¹ | 5.4X10 ² | 2.0 | 5.4X10 ¹ | 4.7X10 ⁻⁴ | 1.3X10 ⁻² |
| Np-236 (long-lived) | | 9.0X10 ⁰ | 2.4X10 ² | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 4.7X10 ⁻⁴ | 1.3X10 ⁻² |
| Np-237 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ⁻³ | 5.4X10 ⁻² | 2.6X10 ⁻⁵ | 7.1X10 ⁻⁴ |
| Np-239 | | 7.0 | 1.9X10 ² | 4.0X10 ⁻¹ | 1.1X10 ¹ | 8.6X10 ³ | 2.3X10 ⁵ |
| Os-185 | Osmium (76) | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 2.8X10 ² | 7.5X10 ³ |
| Os-191 | | 1.0X10 ¹ | 2.7X10 ² | 2.0 | 5.4X10 ¹ | 1.6X10 ³ | 4.4X10 ⁴ |
| Os-191m | | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ¹ | 8.1X10 ² | 4.6X10 ⁴ | 1.3X10 ⁶ |
| Os-193 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.0X10 ⁴ | 5.3X10 ⁵ |
| Os-194 (a) | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.1X10 ¹ | 3.1X10 ² |
| P-32 | Phosphorus (15) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 1.1X10 ⁴ | 2.9X10 ⁵ |
| P-33 | | 4.0X10 ¹ | 1.1X10 ³ | 1.0 | 2.7X10 ¹ | 5.8X10 ³ | 1.6X10 ⁵ |
| Pa-230 (a) | Protactinium (91) | 2.0 | 5.4X10 ¹ | 7.0X10 ⁻² | 1.9 | 1.2X10 ³ | 3.3X10 ⁴ |
| Pa-231 | | 4.0 | 1.1X10 ² | 4.0X10 ⁻⁴ | 1.1X10 ⁻² | 1.7X10 ⁻³ | 4.7X10 ⁻² |
| Pa-233 | | 5.0 | 1.4X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.7X10 ² | 2.1X10 ⁴ |
| Pb-201 | Lead (82) | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 6.2X10 ⁴ | 1.7X10 ⁶ |
| Pb-202 | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ¹ | 5.4X10 ² | 1.2X10 ⁻⁴ | 3.4X10 ⁻³ |
| Pb-203 | | 4.0 | 1.1X10 ² | 3.0 | 8.1X10 ¹ | 1.1X10 ⁴ | 3.0X10 ⁵ |
| Pb-205 | | Unlimited | Unlimited | Unlimited | Unlimited | 4.5X10 ⁻⁶ | 1.2X10 ⁻⁴ |
| Pb-210 (a) | | 1.0 | 2.7X10 ¹ | 5.0X10 ⁻² | 1.4 | 2.8 | 7.6X10 ¹ |
| Pb-212 (a) | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 2.0X10 ⁻¹ | 5.4 | 5.1X10 ⁴ | 1.4X10 ⁶ |
| Pd-103 (a) | Palladium (46) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 2.8X10 ³ | 7.5X10 ⁴ |
| Pd-107 | | Unlimited | Unlimited | Unlimited | Unlimited | 1.9X10 ⁻⁵ | 5.1X10 ⁻⁴ |
| Pd-109 | | 2.0 | 5.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 7.9X10 ⁴ | 2.1X10 ⁶ |
| Pm-143 | Promethium (61) | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 1.3X10 ² | 3.4X10 ³ |
| Pm-144 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 9.2X10 ¹ | 2.5X10 ³ |
| Pm-145 | | 3.0X10 ¹ | 8.1X10 ² | 1.0X10 ¹ | 2.7X10 ² | 5.2 | 1.4X10 ² |
| Pm-147 | | 4.0X10 ¹ | 1.1X10 ³ | 2.0 | 5.4X10 ¹ | 3.4X10 ¹ | 9.3X10 ² |
| Pm-148m (a) | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 7.9X10 ² | 2.1X10 ⁴ |
| Pm-149 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.5X10 ⁴ | 4.0X10 ⁵ |
| Pm-151 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.7X10 ⁴ | 7.3X10 ⁵ |
| Po-210 | Polonium (84) | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 1.7X10 ² | 4.5X10 ³ |
| Pr-142 | Praseodymium (59) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.3X10 ⁴ | 1.2X10 ⁶ |
| Pr-143 | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.5X10 ³ | 6.7X10 ⁴ |
| Pt-188 (a) | Platinum (78) | 1.0 | 2.7X10 ¹ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 2.5X10 ³ | 6.8X10 ⁴ |
| Pt-191 | | 4.0 | 1.1X10 ² | 3.0 | 8.1X10 ¹ | 8.7X10 ³ | 2.4X10 ⁵ |
| Pt-193 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 1.4 | 3.7X10 ¹ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Pt-193m | | 4.0X10 ¹ | 1.1X10 ³ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.8X10 ³ | 1.6X10 ⁵ |
| Pt-195m | | 1.0X10 ¹ | 2.7X10 ² | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.2X10 ³ | 1.7X10 ⁵ |
| Pt-197 | | 2.0X10 ¹ | 5.4X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.2X10 ⁴ | 8.7X10 ⁵ |
| Pt-197m | | 1.0X10 ¹ | 2.7X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.7X10 ⁵ | 1.0X10 ⁷ |
| Pu-236 | Plutonium (94) | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ⁻³ | 8.1X10 ⁻² | 2.0X10 ¹ | 5.3X10 ² |
| Pu-237 | | 2.0X10 ¹ | 5.4X10 ² | 2.0X10 ¹ | 5.4X10 ² | 4.5X10 ² | 1.2X10 ⁴ |
| Pu-238 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 6.3X10 ⁻¹ | 1.7X10 ¹ |
| Pu-239 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 2.3X10 ⁻³ | 6.2X10 ⁻² |
| Pu-240 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 8.4X10 ⁻³ | 2.3X10 ⁻¹ |
| Pu-241 (a) | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻² | 1.6 | 3.8 | 1.0X10 ² |
| Pu-242 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 1.5X10 ⁻⁴ | 3.9X10 ⁻³ |
| Pu-244 (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.0X10 ⁻³ | 2.7X10 ⁻² | 6.7X10 ⁻⁷ | 1.8X10 ⁻⁵ |
| Ra-223 (a) | Radium (88) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 7.0X10 ⁻³ | 1.9X10 ⁻¹ | 1.9X10 ³ | 5.1X10 ⁴ |
| Ra-224 (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 5.9X10 ³ | 1.6X10 ⁵ |
| Ra-225 (a) | | 2.0X10 ⁻¹ | 5.4 | 4.0X10 ⁻³ | 1.1X10 ⁻¹ | 1.5X10 ³ | 3.9X10 ⁴ |
| Ra-226 (a) | | 2.0X10 ⁻¹ | 5.4 | 3.0X10 ⁻³ | 8.1X10 ⁻² | 3.7X10 ⁻² | 1.0 |
| Ra-228 (a) | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 1.0X10 ¹ | 2.7X10 ² |
| Rb-81 | Rubidium (37) | 2.0 | 5.4X10 ¹ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 3.1X10 ⁵ | 8.4X10 ⁶ |
| Rb-83 (a) | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 6.8X10 ² | 1.8X10 ⁴ |
| Rb-84 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.8X10 ³ | 4.7X10 ⁴ |
| Rb-86 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 3.0X10 ³ | 8.1X10 ⁴ |
| Rb-87 | | Unlimited | Unlimited | Unlimited | Unlimited | 3.2X10 ⁻⁹ | 8.6X10 ⁻⁸ |
| Rb(nat) | | Unlimited | Unlimited | Unlimited | Unlimited | 6.7X10 ⁶ | 1.8X10 ⁸ |
| Re-184 | Rhenium (75) | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 6.9X10 ² | 1.9X10 ⁴ |
| Re-184m | | 3.0 | 8.1X10 ¹ | 1.0 | 2.7X10 ¹ | 1.6X10 ² | 4.3X10 ³ |
| Re-186 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.9X10 ³ | 1.9X10 ⁵ |
| Re-187 | | Unlimited | Unlimited | Unlimited | Unlimited | 1.4X10 ⁻⁹ | 3.8X10 ⁻⁸ |
| Re-188 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.6X10 ⁴ | 9.8X10 ⁵ |
| Re-189 (a) | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.5X10 ⁴ | 6.8X10 ⁵ |
| Re(nat) | | Unlimited | Unlimited | Unlimited | Unlimited | 0.0 | 2.4X10 ⁻⁸ |
| Rh-99 | Rhodium (45) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 3.0X10 ³ | 8.2X10 ⁴ |
| Rh-101 | | 4.0 | 1.1X10 ² | 3.0 | 8.1X10 ¹ | 4.1X10 ¹ | 1.1X10 ³ |
| Rh-102 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 4.5X10 ¹ | 1.2X10 ³ |
| Rh-102m | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 2.3X10 ² | 6.2X10 ³ |
| Rh-103m | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 1.2X10 ⁶ | 3.3X10 ⁷ |
| Rh-105 | | 1.0X10 ¹ | 2.7X10 ² | 8.0X10 ⁻¹ | 2.2X10 ¹ | 3.1X10 ⁴ | 8.4X10 ⁵ |
| Rn-222 (a) | Radon (86) | 3.0X10 ⁻¹ | 8.1 | 4.0X10 ⁻³ | 1.1X10 ⁻¹ | 5.7X10 ³ | 1.5X10 ⁵ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Ru-97 | Ruthenium (44) | 5.0 | 1.4X10 ² | 5.0 | 1.4X10 ² | 1.7X10 ⁴ | 4.6X10 ⁵ |
| Ru-103 (a) | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 1.2X10 ³ | 3.2X10 ⁴ |
| Ru-105 | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.5X10 ⁵ | 6.7X10 ⁶ |
| Ru-106 (a) | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 1.2X10 ² | 3.3X10 ³ |
| S-35 | Sulphur (16) | 4.0X10 ¹ | 1.1X10 ³ | 3.0 | 8.1X10 ¹ | 1.6X10 ³ | 4.3X10 ⁴ |
| Sb-122 | Antimony (51) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.5X10 ⁴ | 4.0X10 ⁵ |
| Sb-124 | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.5X10 ² | 1.7X10 ⁴ |
| Sb-125 | | 2.0 | 5.4X10 ¹ | 1.0 | 2.7X10 ¹ | 3.9X10 ¹ | 1.0X10 ³ |
| Sb-126 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.1X10 ³ | 8.4X10 ⁴ |
| Sc-44 | Scandium (21) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 6.7X10 ⁵ | 1.8X10 ⁷ |
| Sc-46 | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 1.3X10 ³ | 3.4X10 ⁴ |
| Sc-47 | | 1.0X10 ¹ | 2.7X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 3.1X10 ⁴ | 8.3X10 ⁵ |
| Sc-48 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 5.5X10 ⁴ | 1.5X10 ⁶ |
| Se-75 | Selenium (34) | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 5.4X10 ² | 1.5X10 ⁴ |
| Se-79 | | 4.0X10 ¹ | 1.1X10 ³ | 2.0 | 5.4X10 ¹ | 2.6X10 ⁻³ | 7.0X10 ⁻² |
| Si-31 | Silicon (14) | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.4X10 ⁶ | 3.9X10 ⁷ |
| Si-32 | | 4.0X10 ¹ | 1.1X10 ³ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 3.9 | 1.1X10 ² |
| Sm-145 | Samarium (62) | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ¹ | 2.7X10 ² | 9.8X10 ¹ | 2.6X10 ³ |
| Sm-147 | | Unlimited | Unlimited | Unlimited | Unlimited | 8.5X10 ⁻¹ | 2.3X10 ⁻⁸ |
| Sm-151 | | 4.0X10 ¹ | 1.1X10 ³ | 1.0X10 ¹ | 2.7X10 ² | 9.7X10 ⁻¹ | 2.6X10 ¹ |
| Sm-153 | | 9.0 | 2.4X10 ² | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.6X10 ⁴ | 4.4X10 ⁵ |
| Sn-113 (a) | Tin (50) | 4.0 | 1.1X10 ² | 2.0 | 5.4X10 ¹ | 3.7X10 ² | 1.0X10 ⁴ |
| Sn-117m | | 7.0 | 1.9X10 ² | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.0X10 ³ | 8.2X10 ⁴ |
| Sn-119m | | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ¹ | 8.1X10 ² | 1.4X10 ² | 3.7X10 ³ |
| Sn-121m (a) | | 4.0X10 ¹ | 1.1X10 ³ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 2.0 | 5.4X10 ¹ |
| Sn-123 | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 3.0X10 ² | 8.2X10 ³ |
| Sn-125 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ³ | 1.1X10 ⁵ |
| Sn-126 (a) | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.0X10 ⁻³ | 2.8X10 ⁻² |
| Sr-82 (a) | Strontium (38) | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 2.3X10 ³ | 6.2X10 ⁴ |
| Sr-85 | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 8.8X10 ² | 2.4X10 ⁴ |
| Sr-85m | | 5.0 | 1.4X10 ² | 5.0 | 1.4X10 ² | 1.2X10 ⁶ | 3.3X10 ⁷ |
| Sr-87m | | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 4.8X10 ⁵ | 1.3X10 ⁷ |
| Sr-89 | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.1X10 ³ | 2.9X10 ⁴ |
| Sr-90 (a) | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 5.1 | 1.4X10 ² |
| Sr-91 (a) | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.3X10 ⁵ | 3.6X10 ⁶ |
| Sr-92 (a) | | 1.0 | 2.7X10 ¹ | 3.0X10 ⁻¹ | 8.1 | 4.7X10 ⁵ | 1.3X10 ⁷ |
| T (H-3) | Tritium (1) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 3.6X10 ² | 9.7X10 ³ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Ta-178 (long-lived) | Tantalum (73) | 1.0 | 2.7X10 ¹ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 4.2X10 ⁶ | 1.1X10 ⁸ |
| Ta-179 | | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ¹ | 8.1X10 ² | 4.1X10 ¹ | 1.1X10 ³ |
| Ta-182 | | 9.0X10 ⁻¹ | 2.4X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 2.3X10 ² | 6.2X10 ³ |
| Tb-157 | Terbium (65) | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 5.6X10 ⁻¹ | 1.5X10 ¹ |
| Tb-158 | | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 5.6X10 ⁻¹ | 1.5X10 ¹ |
| Tb-160 | | 1.0 | 2.7X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 4.2X10 ² | 1.1X10 ⁴ |
| Tc-95m (a) | Technetium (43) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 8.3X10 ² | 2.2X10 ⁴ |
| Tc-96 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.2X10 ⁴ | 3.2X10 ⁵ |
| Tc-96m (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.4X10 ⁶ | 3.8X10 ⁷ |
| Tc-97 | | Unlimited | Unlimited | Unlimited | Unlimited | 5.2X10 ⁻⁵ | 1.4X10 ⁻³ |
| Tc-97m | | 4.0X10 ¹ | 1.1X10 ³ | 1.0 | 2.7X10 ¹ | 5.6X10 ² | 1.5X10 ⁴ |
| Tc-98 | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 3.2X10 ⁻⁵ | 8.7X10 ⁻⁴ |
| Tc-99 | | 4.0X10 ¹ | 1.1X10 ³ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.3X10 ⁻⁴ | 1.7X10 ⁻² |
| Tc-99m | | 1.0X10 ¹ | 2.7X10 ² | 4.0 | 1.1X10 ² | 1.9X10 ⁵ | 5.3X10 ⁶ |
| Te-121 | Tellurium (52) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 2.4X10 ³ | 6.4X10 ⁴ |
| Te-121m | | 5.0 | 1.4X10 ² | 3.0 | 8.1X10 ¹ | 2.6X10 ² | 7.0X10 ³ |
| Te-123m | | 8.0 | 2.2X10 ² | 1.0 | 2.7X10 ¹ | 3.3X10 ² | 8.9X10 ³ |
| Te-125m | | 2.0X10 ¹ | 5.4X10 ² | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.7X10 ² | 1.8X10 ⁴ |
| Te-127 | | 2.0X10 ¹ | 5.4X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 9.8X10 ⁴ | 2.6X10 ⁶ |
| Te-127m (a) | | 2.0X10 ¹ | 5.4X10 ² | 5.0X10 ⁻¹ | 1.4X10 ¹ | 3.5X10 ² | 9.4X10 ³ |
| Te-129 | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 7.7X10 ⁵ | 2.1X10 ⁷ |
| Te-129m (a) | | 8.0X10 ⁻¹ | 2.2X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 1.1X10 ³ | 3.0X10 ⁴ |
| Te-131m (a) | | 7.0X10 ⁻¹ | 1.9X10 ¹ | 5.0X10 ⁻¹ | 1.4X10 ¹ | 3.0X10 ⁴ | 8.0X10 ⁵ |
| Te-132 (a) | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.1X10 ⁴ | 3.0X10 ⁵ |
| Th-227 | Thorium (90) | 1.0X10 ¹ | 2.7X10 ² | 5.0X10 ⁻³ | 1.4X10 ⁻¹ | 1.1X10 ³ | 3.1X10 ⁴ |
| Th-228 (a) | | 5.0X10 ⁻¹ | 1.4X10 ¹ | 1.0X10 ⁻³ | 2.7X10 ⁻² | 3.0X10 ¹ | 8.2X10 ² |
| Th-229 | | 5.0 | 1.4X10 ² | 5.0X10 ⁻⁴ | 1.4X10 ⁻² | 7.9X10 ⁻³ | 2.1X10 ⁻¹ |
| Th-230 | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 7.6X10 ⁻⁴ | 2.1X10 ⁻² |
| Th-231 | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 2.0X10 ⁴ | 5.3X10 ⁵ |
| Th-232 | | Unlimited | Unlimited | Unlimited | Unlimited | 4.0X10 ⁻⁹ | 1.1X10 ⁻⁷ |
| Th-234 (a) | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 8.6X10 ² | 2.3X10 ⁴ |
| Th (natural) | | Unlimited | Unlimited | Unlimited | Unlimited | 8.1X10 ⁻⁹ | 2.2X10 ⁻⁷ |
| Ti-44 (a) | Titanium (22) | 5.0X10 ⁻¹ | 1.4X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 6.4 | 1.7X10 ² |
| Tl-200 | Thallium (81) | 9.0X10 ⁻¹ | 2.4X10 ¹ | 9.0X10 ⁻¹ | 2.4X10 ¹ | 2.2X10 ⁴ | 6.0X10 ⁵ |
| Tl-201 | | 1.0X10 ¹ | 2.7X10 ² | 4.0 | 1.1X10 ² | 7.9X10 ³ | 2.1X10 ⁵ |
| Tl-202 | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 2.0X10 ³ | 5.3X10 ⁴ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|---|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Tl-204 | | 1.0X10 ¹ | 2.7X10 ² | 7.0X10 ⁻¹ | 1.9X10 ¹ | 1.7X10 ¹ | 4.6X10 ² |
| Tm-167 | Thulium (69) | 7.0 | 1.9X10 ² | 8.0X10 ⁻¹ | 2.2X10 ¹ | 3.1X10 ³ | 8.5X10 ⁴ |
| Tm-170 | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.2X10 ² | 6.0X10 ³ |
| Tm-171 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ |
| U-230 (fast lung absorption) (a)(d) | Uranium (92) | 4.0X10 ¹ | 1.1X10 ³ | 1.0X10 ⁻¹ | 2.7 | 1.0X10 ³ | 2.7X10 ⁴ |
| U-230 (medium lung absorption) (a)(e) | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ⁻³ | 1.1X10 ⁻¹ | 1.0X10 ³ | 2.7X10 ⁴ |
| U-230 (slow lung absorption) (a)(f) | | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ⁻³ | 8.1X10 ⁻² | 1.0X10 ³ | 2.7X10 ⁴ |
| U-232 (fast lung absorption) (d) | | 4.0X10 ¹ | 1.1X10 ³ | 1.0X10 ⁻² | 2.7X10 ⁻¹ | 8.3X10 ⁻¹ | 2.2X10 ¹ |
| U-232 (medium lung absorption) (e) | | 4.0X10 ¹ | 1.1X10 ³ | 7.0X10 ⁻³ | 1.9X10 ⁻¹ | 8.3X10 ⁻¹ | 2.2X10 ¹ |
| U-232 (slow lung absorption) (f) | | 1.0X10 ¹ | 2.7X10 ² | 1.0X10 ⁻³ | 2.7X10 ⁻² | 8.3X10 ⁻¹ | 2.2X10 ¹ |
| U-233 (fast lung absorption) (d) | | 4.0X10 ¹ | 1.1X10 ³ | 9.0X10 ⁻² | 2.4 | 3.6X10 ⁻⁴ | 9.7X10 ⁻³ |
| U-233 (medium lung absorption) (e) | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 3.6X10 ⁻⁴ | 9.7X10 ⁻³ |
| U-233 (slow lung absorption) (f) | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻³ | 1.6X10 ⁻¹ | 3.6X10 ⁻⁴ | 9.7X10 ⁻³ |
| U-234 (fast lung absorption) (d) | | 4.0X10 ¹ | 1.1X10 ³ | 9.0X10 ⁻² | 2.4 | 2.3X10 ⁻⁴ | 6.2X10 ⁻³ |
| U-234 (medium lung absorption) (e) | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 2.3X10 ⁻⁴ | 6.2X10 ⁻³ |
| U-234 (slow lung absorption) (f) | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻³ | 1.6X10 ⁻¹ | 2.3X10 ⁻⁴ | 6.2X10 ⁻³ |
| U-235 (all lung absorption types) (a),(d),(e),(f) | | Unlimited | Unlimited | Unlimited | Unlimited | 8.0X10 ⁻⁸ | 2.2X10 ⁻⁶ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|--|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| U-236 (fast lung absorption) (d) | | Unlimited | Unlimited | Unlimited | Unlimited | 2.4X10 ⁻⁶ | 6.5X10 ⁻⁵ |
| U-236 (medium lung absorption) (e) | | 4.0X10 ¹ | 1.1X10 ³ | 2.0X10 ⁻² | 5.4X10 ⁻¹ | 2.4X10 ⁻⁶ | 6.5X10 ⁻⁵ |
| U-236 (slow lung absorption) (f) | | 4.0X10 ¹ | 1.1X10 ³ | 6.0X10 ⁻³ | 1.6X10 ⁻¹ | 2.4X10 ⁻⁶ | 6.5X10 ⁻⁵ |
| U-238 (all lung absorption types) (d),(e),(f) | | Unlimited | Unlimited | Unlimited | Unlimited | 1.2X10 ⁻⁸ | 3.4X10 ⁻⁷ |
| U (natural) | | Unlimited | Unlimited | Unlimited | Unlimited | 2.6X10 ⁻⁸ | 7.1X10 ⁻⁷ |
| U (enriched to 20% or less) (g) | | Unlimited | Unlimited | Unlimited | Unlimited | See Table 6 | See Table 6 |
| U (dep) | | Unlimited | Unlimited | Unlimited | Unlimited | See Table 6 | See Table 5 |
| V-48 | Vanadium (23) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 6.3X10 ³ | 1.7X10 ⁵ |
| V-49 | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 3.0X10 ² | 8.1X10 ³ |
| W-178 (a) | Tungsten (74) | 9.0 | 2.4X10 ² | 5.0 | 1.4X10 ² | 1.3X10 ³ | 3.4X10 ⁴ |
| W-181 | | 3.0X10 ¹ | 8.1X10 ² | 3.0X10 ¹ | 8.1X10 ² | 2.2X10 ² | 6.0X10 ³ |
| W-185 | | 4.0X10 ¹ | 1.1X10 ³ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 3.5X10 ² | 9.4X10 ³ |
| W-187 | | 2.0 | 5.4X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 2.6X10 ⁴ | 7.0X10 ⁵ |
| W-188 (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 3.0X10 ⁻¹ | 8.1 | 3.7X10 ² | 1.0X10 ⁴ |
| Xe-122 (a) | Xenon (54) | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.8X10 ⁴ | 1.3X10 ⁶ |
| Xe-123 | | 2.0 | 5.4X10 ¹ | 7.0X10 ⁻¹ | 1.9X10 ¹ | 4.4X10 ⁵ | 1.2X10 ⁷ |
| Xe-127 | | 4.0 | 1.1X10 ² | 2.0 | 5.4X10 ¹ | 1.0X10 ³ | 2.8X10 ⁴ |
| Xe-131m | | 4.0X10 ¹ | 1.1X10 ³ | 4.0X10 ¹ | 1.1X10 ³ | 3.1X10 ³ | 8.4X10 ⁴ |
| Xe-133 | | 2.0X10 ¹ | 5.4X10 ² | 1.0X10 ¹ | 2.7X10 ² | 6.9X10 ³ | 1.9X10 ⁵ |
| Xe-135 | | 3.0 | 8.1X10 ¹ | 2.0 | 5.4X10 ¹ | 9.5X10 ⁴ | 2.6X10 ⁶ |
| Y-87 (a) | Yttrium (39) | 1.0 | 2.7X10 ¹ | 1.0 | 2.7X10 ¹ | 1.7X10 ⁴ | 4.5X10 ⁵ |
| Y-88 | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 5.2X10 ² | 1.4X10 ⁴ |
| Y-90 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 2.0X10 ⁴ | 5.4X10 ⁵ |
| Y-91 | | 6.0X10 ⁻¹ | 1.6X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 9.1X10 ² | 2.5X10 ⁴ |
| Y-91m | | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 1.5X10 ⁶ | 4.2X10 ⁷ |
| Y-92 | | 2.0X10 ⁻¹ | 5.4 | 2.0X10 ⁻¹ | 5.4 | 3.6X10 ⁵ | 9.6X10 ⁶ |
| Y-93 | | 3.0X10 ⁻¹ | 8.1 | 3.0X10 ⁻¹ | 8.1 | 1.2X10 ⁵ | 3.3X10 ⁶ |
| Yb-169 | Ytterbium (70) | 4.0 | 1.1X10 ² | 1.0 | 2.7X10 ¹ | 8.9X10 ² | 2.4X10 ⁴ |
| Yb-175 | | 3.0X10 ¹ | 8.1X10 ² | 9.0X10 ⁻¹ | 2.4X10 ¹ | 6.6X10 ³ | 1.8X10 ⁵ |
| Zn-65 | Zinc (30) | 2.0 | 5.4X10 ¹ | 2.0 | 5.4X10 ¹ | 3.0X10 ² | 8.2X10 ³ |
| Zn-69 | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.8X10 ⁶ | 4.9X10 ⁷ |

| Symbol of radionuclide | Element and atomic number | A ₁ (TBq) | A ₁ (Ci) ^b | A ₂ (TBq) | A ₂ (Ci) ^b | Specific activity | |
|------------------------|---------------------------|----------------------|----------------------------------|----------------------|----------------------------------|----------------------|----------------------|
| | | | | | | (TBq/g) | (Ci/g) |
| Zn-69m (a) | | 3.0 | 8.1X10 ¹ | 6.0X10 ⁻¹ | 1.6X10 ¹ | 1.2X10 ⁵ | 3.3X10 ⁶ |
| Zr-88 | Zirconium (40) | 3.0 | 8.1X10 ¹ | 3.0 | 8.1X10 ¹ | 6.6X10 ² | 1.8X10 ⁴ |
| Zr-93 | | Unlimited | Unlimited | Unlimited | Unlimited | 9.3X10 ⁻⁵ | 2.5X10 ⁻³ |
| Zr-95 (a) | | 2.0 | 5.4X10 ¹ | 8.0X10 ⁻¹ | 2.2X10 ¹ | 7.9X10 ² | 2.1X10 ⁴ |
| Zr-97 (a) | | 4.0X10 ⁻¹ | 1.1X10 ¹ | 4.0X10 ⁻¹ | 1.1X10 ¹ | 7.1X10 ⁴ | 1.9X10 ⁶ |

^a A₁ and/or A₂ values include contributions from daughter nuclides with half-lives less than 10 days.

^b The values of A₁ and A₂ in Curies (Ci) are approximate and for information only; the regulatory standard units are Terabecquerels (TBq).

^c The quantity may be determined from a measurement of the rate of decay or a measurement of the radiation level at a prescribed distance from the source.

^d These values apply only to compounds of uranium that take the chemical form of UF₆, UO₂F₂ and UO₂(NO₃)₂ in both normal and accident conditions of transport.

^e These values apply only to compounds of uranium that take the chemical form of UO₃, UF₄, UCl₄ and hexavalent compounds in both normal and accident conditions of transport.

^f These values apply to all compounds of uranium other than those specified in notes (d) and (e) of this table.

^g These values apply to unirradiated uranium only.

^h A₁ = 0.1 TBq (2.7 Ci) and A₂ = 0.001 TBq (0.027 Ci) for Cf-252 for domestic use.

ⁱ A₂ = 0.74 TBq (20 Ci) for Mo-99 for domestic use.

TABLE 5 — GENERAL VALUES FOR A₁ AND A₂

| Contents | A ₁ | | A ₂ | | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limits for exempt consignments (Bq) | Activity limits for exempt consignments (Ci) |
|---|----------------------|------------------------|----------------------|------------------------|---|---|--|--|
| | (TBq) | (Ci) | (TBq) | (Ci) | | | | |
| Only beta or gamma emitting radionuclides are known to be present | 1 x 10 ⁻¹ | 2.7 x 10 ⁰ | 2 x 10 ⁻² | 5.4 x 10 ⁻¹ | 1 x 10 ¹ | 2.7 x 10 ⁻¹⁰ | 1 x 10 ⁴ | 2.7 x 10 ⁻⁷ |
| Only alpha emitting radionuclides are known to be present | 2 x 10 ⁻¹ | 5.4 x 10 ⁰ | 9 x 10 ⁻⁵ | 2.4 x 10 ⁻³ | 1 x 10 ⁻¹ | 2.7 x 10 ⁻¹² | 1 x 10 ³ | 2.7 x 10 ⁻⁸ |
| No relevant data are available | 1 x 10 ⁻³ | 2.7 x 10 ⁻² | 9 x 10 ⁻⁵ | 2.4 x 10 ⁻³ | 1 x 10 ⁻¹ | 2.7 x 10 ⁻¹² | 1 x 10 ³ | 2.7 x 10 ⁻⁸ |

TABLE 6 — ACTIVITY-MASS RELATIONSHIPS FOR URANIUM

| Uranium Enrichment ¹ wt % U-235 present | Specific Activity | |
|---|----------------------|----------------------|
| | TBq/g | Ci/g |
| 0.45 | 1.8×10^{-8} | 5.0×10^{-7} |
| 0.72 | 2.6×10^{-8} | 7.1×10^{-7} |
| 1 | 2.8×10^{-8} | 7.6×10^{-7} |
| 1.5 | 3.7×10^{-8} | 1.0×10^{-6} |
| 5 | 1.0×10^{-7} | 2.7×10^{-6} |
| 10 | 1.8×10^{-7} | 4.8×10^{-6} |
| 20 | 3.7×10^{-7} | 1.0×10^{-5} |
| 35 | 7.4×10^{-7} | 2.0×10^{-5} |
| 50 | 9.3×10^{-7} | 2.5×10^{-5} |
| 90 | 2.2×10^{-6} | 5.8×10^{-5} |
| 93 | 2.6×10^{-6} | 7.0×10^{-5} |
| 95 | 3.4×10^{-6} | 9.1×10^{-5} |

¹ The figures for uranium include representative values for the activity of the uranium-234 that is concentrated during the enrichment process.

Table 7 — EXEMPT MATERIAL ACTIVITY CONCENTRATIONS AND EXEMPT CONSIGNMENT ACTIVITY LIMITS FOR RADIONUCLIDES

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Ac-225 | Actinium (89) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| Ac-227 | | 1.0×10^{-1} | 2.7×10^{-12} | 1.0×10^3 | 2.7×10^{-8} |
| Ac-228 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Ag-105 | Silver (47) | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Ag-108m (b) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Ag-110m | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Ag-111 | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^6 | 2.7×10^{-5} |
| Al-26 | Aluminum (13) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| Am-241 | Americium (95) | 1.0 | 2.7×10^{-11} | 1.0×10^4 | 2.7×10^{-7} |
| Am-242m (b) | | 1.0 | 2.7×10^{-11} | 1.0×10^4 | 2.7×10^{-7} |
| Am-243 (b) | | 1.0 | 2.7×10^{-11} | 1.0×10^3 | 2.7×10^{-8} |
| Ar-37 | Argon (18) | 1.0×10^6 | 2.7×10^{-5} | 1.0×10^8 | 2.7×10^{-3} |
| Ar-39 | | 1.0×10^7 | 2.7×10^{-4} | 1.0×10^4 | 2.7×10^{-7} |
| Ar-41 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^9 | 2.7×10^{-2} |
| As-72 | Arsenic (33) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| As-73 | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^7 | 2.7×10^{-4} |
| As-74 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| As-76 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^5 | 2.7×10^{-6} |
| As-77 | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^6 | 2.7×10^{-5} |
| At-211 | Astatine (85) | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^7 | 2.7×10^{-4} |
| Au-193 | Gold (79) | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^7 | 2.7×10^{-4} |
| Au-194 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Au-195 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^7 | 2.7×10^{-4} |
| Au-198 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Au-199 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Ba-131 | Barium (56) | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Ba-133 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Ba-133m | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Ba-140 (b) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| Be-7 | Beryllium (4) | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^7 | 2.7×10^{-4} |
| Be-10 | | 1.0×10^4 | 2.7×10^{-7} | 1.0×10^6 | 2.7×10^{-5} |
| Bi-205 | Bismuth (83) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Bi-206 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| Bi-207 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Bi-210 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Bi-210m | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Bi-212 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Bk-247 | Berkelium (97) | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Bk-249 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Br-76 | Bromine (35) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Br-77 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Br-82 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| C-11 | Carbon (6) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| C-14 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ca-41 | Calcium (20) | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ca-45 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ca-47 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cd-109 | Cadmium (48) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cd-113m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cd-115 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cd-115m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ce-139 | Cerium (58) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ce-141 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ce-143 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ce-144 (b) | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cf-248 | Californium (98) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cf-249 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Cf-250 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cf-251 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Cf-252 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cf-253 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cf-254 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Cl-36 | Chlorine (17) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cl-38 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cm-240 | Curium (96) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cm-241 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cm-242 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cm-243 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cm-244 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cm-245 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Cm-246 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Cm-247 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cm-248 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Co-55 | Cobalt (27) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Co-56 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Co-57 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Co-58 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Co-58m | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Co-60 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cr-51 | Chromium (24) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Cs-129 | Cesium (55) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cs-131 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cs-132 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cs-134 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cs-134m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cs-135 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Cs-136 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Cs-137 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Cu-64 | Copper (29) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Cu-67 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Dy-159 | Dysprosium (66) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Dy-165 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Dy-166 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Er-169 | Erbium (68) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Er-171 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-147 | Europium (63) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-148 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-149 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Eu-150 (short lived) | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-150 (long lived) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-152 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-152m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-154 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Eu-155 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Eu-156 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| F-18 | Fluorine (9) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Fe-52 | Iron (26) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Fe-55 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Fe-59 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Fe-60 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ga-67 | Gallium (31) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ga-68 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ga-72 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Gd-146 | Gadolinium (64) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Gd-148 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Gd-153 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Gd-159 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ge-68 | Germanium (32) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ge-71 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Ge-77 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Hf-172 | Hafnium (72) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hf-175 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hf-181 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hf-182 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hg-194 | Mercury (80) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hg-195m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hg-197 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Hg-197m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Hg-203 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ho-166 | Holmium (67) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ho-166m | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-123 | Iodine (53) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| I-124 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-125 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-126 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-129 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| I-131 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-132 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| I-133 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| I-134 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| I-135 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| In-111 | Indium (49) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| In-113m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| In-114m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| In-115m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ir-189 | Iridium (77) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ir-190 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ir-192 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Ir-194 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| K-40 | Potassium (19) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| K-42 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| K-43 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Kr-81 | Krypton (36) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Kr-85 | | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Kr-85m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ¹⁰ | 2.7X10 ⁻¹ |
| Kr-87 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| La-137 | Lanthanum (57) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| La-140 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Lu-172 | Lutetium (71) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Lu-173 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Lu-174 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Lu-174m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Lu-177 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Mg-28 | Magnesium (12) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Mn-52 | Manganese (25) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Mn-53 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Mn-54 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Mn-56 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Mo-93 | Molybdenum (42) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Mo-99 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| N-13 | Nitrogen (7) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Na-22 | Sodium (11) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Na-24 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Nb-93m | Niobium (41) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Nb-94 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Nb-95 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Nb-97 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Nd-147 | Neodymium (60) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Nd-149 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ni-59 | Nickel (28) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Ni-63 | | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Ni-65 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Np-235 | Neptunium (93) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Np-236 (short-lived) | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Np-236 (long-lived) | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Np-237 (b) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Np-239 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Os-185 | Osmium (76) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Os-191 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Os-191m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Os-193 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Os-194 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| P-32 | Phosphorus (15) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| P-33 | | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Pa-230 | Protactinium (91) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pa-231 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Pa-233 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pb-201 | Lead (82) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pb-202 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pb-203 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pb-205 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pb-210 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Pb-212 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Pd-103 | Palladium (46) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Pd-107 | | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Pd-109 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pm-143 | Promethium (61) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pm-144 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pm-145 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pm-147 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pm-148m | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pm-149 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pm-151 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Po-210 | Polonium (84) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Pr-142 | Praseodymium (59) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Pr-143 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pt-188 | Platinum (78) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pt-191 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pt-193 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pt-193m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pt-195m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pt-197 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pt-197m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Pu-236 | Plutonium (94) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Pu-237 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Pu-238 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Pu-239 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Pu-240 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Pu-241 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Pu-242 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Pu-244 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Ra-223 (b) | Radium (88) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ra-224 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ra-225 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Ra-226 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Ra-228 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Rb-81 | Rubidium (37) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Rb-83 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Rb-84 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Rb-86 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Rb-87 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Rb(nat) | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Re-184 | Rhenium (75) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Re-184m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Re-186 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Re-187 | | 1.0X10 ⁶ | 2.7X10 ⁻⁵ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Re-188 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Re-189 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Re(nat) | | 1.0X10 ⁶ | 2.7X10 ⁻⁵ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Rh-99 | Rhodium (45) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Rh-101 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Rh-102 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Rh-102m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Rh-103m | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Rh-105 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Rn-222 (b) | Radon (86) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Ru-97 | Ruthenium (44) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ru-103 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ru-105 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ru-106 (b) | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| S-35 | Sulphur (16) | 1.0X10 ⁵ | 2.7X10 ⁻⁶ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Sb-122 | Antimony (51) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Sb-124 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sb-125 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sb-126 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sc-44 | Scandium (21) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sc-46 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sc-47 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sc-48 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Se-75 | Selenium (34) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Se-79 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Si-31 | Silicon (14) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Si-32 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sm-145 | Samarium (62) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Sm-147 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Sm-151 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Sm-153 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sn-113 | Tin (50) | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Sn-117m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sn-119m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Sn-121m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Sn-123 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sn-125 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sn-126 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sr-82 | Strontium (38) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sr-85 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|------------------------|---------------------------|---|---|--|--|
| Sr-85m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Sr-87m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sr-89 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Sr-90 (b) | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Sr-91 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Sr-92 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| T (H-3) | Tritium (1) | 1.0X10 ⁶ | 2.7X10 ⁻⁵ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Ta-178 (long-lived) | Tantalum (73) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Ta-179 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Ta-182 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Tb-157 | Terbium (65) | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Tb-158 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Tb-160 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Tc-95m | Technetium (43) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Tc-96 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Tc-96m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Tc-97 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁸ | 2.7X10 ⁻³ |
| Tc-97m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Tc-98 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Tc-99 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Tc-99m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Te-121 | Tellurium (52) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Te-121m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Te-123m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Te-125m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Te-127 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Te-127m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Te-129 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Te-129m | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Te-131m | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Te-132 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Th-227 | Thorium (90) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Th-228 (b) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Th-229 (b) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| Th-230 | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Th-231 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|---|---------------------------|---|---|--|--|
| Th-232 | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| Th-234 (b) | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^5 | 2.7×10^{-6} |
| Th (nat) (b) | | 1.0 | 2.7×10^{-11} | 1.0×10^3 | 2.7×10^{-8} |
| Ti-44 | Titanium (22) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| Tl-200 | Thallium (81) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^6 | 2.7×10^{-5} |
| Tl-201 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Tl-202 | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Tl-204 | | 1.0×10^4 | 2.7×10^{-7} | 1.0×10^4 | 2.7×10^{-7} |
| Tm-167 | Thulium (69) | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^6 | 2.7×10^{-5} |
| Tm-170 | | 1.0×10^3 | 2.7×10^{-8} | 1.0×10^6 | 2.7×10^{-5} |
| Tm-171 | | 1.0×10^4 | 2.7×10^{-7} | 1.0×10^8 | 2.7×10^{-3} |
| U-230 (fast lung absorption) (b),(d) | Uranium (92) | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| U-230 (medium lung absorption) (e) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-230 (slow lung absorption) (f) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-232 (fast lung absorption) (b),(d) | | 1.0 | 2.7×10^{-11} | 1.0×10^3 | 2.7×10^{-8} |
| U-232 (medium lung absorption) (e) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-232 (slow lung absorption) (f) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-233 (fast lung absorption) (d) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-233 (medium lung absorption) (e) | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^5 | 2.7×10^{-6} |
| U-233 (slow lung absorption) (f) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| U-234 (fast lung absorption) (d) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-234 (medium lung absorption) (e) | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^5 | 2.7×10^{-6} |
| U-234 (slow lung absorption) (f) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^5 | 2.7×10^{-6} |
| U-235 (all lung absorption types) (b),(d),(e),(f) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-236 (fast lung absorption) (d) | | 1.0×10^1 | 2.7×10^{-10} | 1.0×10^4 | 2.7×10^{-7} |
| U-236 (medium lung absorption) (e) | | 1.0×10^2 | 2.7×10^{-9} | 1.0×10^5 | 2.7×10^{-6} |

| Symbol of radionuclide | Element and atomic number | Activity concentration for exempt material (Bq/g) | Activity concentration for exempt material (Ci/g) | Activity limit for exempt consignment (Bq) | Activity limit for exempt consignment (Ci) |
|---|---------------------------|---|---|--|--|
| U-236 (slow lung absorption) (f) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| U-238 (all lung absorption types) (b),(d),(e),(f) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| U (natural) (b) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| U (enriched to 20% or less) (g) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| U (dep) | | 1.0 | 2.7X10 ⁻¹¹ | 1.0X10 ³ | 2.7X10 ⁻⁸ |
| V-48 | Vanadium (23) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| V-49 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| W-178 | Tungsten (74) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| W-181 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| W-185 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| W-187 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| W-188 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Xe-122 | Xenon (54) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Xe-123 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁹ | 2.7X10 ⁻² |
| Xe-127 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Xe-131m | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Xe-133 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁴ | 2.7X10 ⁻⁷ |
| Xe-135 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ¹⁰ | 2.7X10 ⁻¹ |
| Y-87 | Yttrium (39) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Y-88 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Y-90 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Y-91 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Y-91m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Y-92 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Y-93 | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |
| Yb-169 | Ytterbium (70) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Yb-175 | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Zn-65 | Zinc (30) | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Zn-69 | | 1.0X10 ⁴ | 2.7X10 ⁻⁷ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Zn-69m | | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Zr-88 | Zirconium (40) | 1.0X10 ² | 2.7X10 ⁻⁹ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Zr-93 (b) | | 1.0X10 ³ | 2.7X10 ⁻⁸ | 1.0X10 ⁷ | 2.7X10 ⁻⁴ |
| Zr-95 | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁶ | 2.7X10 ⁻⁵ |
| Zr-97 (b) | | 1.0X10 ¹ | 2.7X10 ⁻¹⁰ | 1.0X10 ⁵ | 2.7X10 ⁻⁶ |

^a [Reserved]

^b Parent nuclides and their progeny included in secular equilibrium are listed in the following:

| | |
|---------|--|
| Sr-90 | Y-90 |
| Zr-93 | Nb-93m |
| Zr-97 | Nb-97 |
| Ru-106 | Rh-106 |
| Cs-137 | Ba-137m |
| Ce-134 | La-134 |
| Ce-144 | Pr-144 |
| Ba-140 | La-140 |
| Bi-212 | Tl-208 (0.36), Po-212 (0.64) |
| Pb-210 | Bi-210, Po-210 |
| Pb-212 | Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Rn-220 | Po-216 |
| Rn-222 | Po-218, Pb-214, Bi-214, Po-214 |
| Ra-223 | Rn-219, Po-215, Pb-211, Bi-211, Tl-207 |
| Ra-224 | Rn-220, Po-216, Pb-212, Bi-212, Tl-208(0.36), Po-212 (0.64) |
| Ra-226 | Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 |
| Ra-228 | Ac-228 |
| Th-226 | Ra-222, Rn-218, Po-214 |
| Th-228 | Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Th-229 | Ra-225, Ac-225, Fr-221, At-217, Bi-213, Po-213, Pb-209 |
| Th-nat | Ra-228, Ac-228, Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| Th-234 | Pa-234m |
| U-230 | Th-226, Ra-222, Rn-218, Po-214 |
| U-232 | Th-228, Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208 (0.36), Po-212 (0.64) |
| U-235 | Th-231 |
| U-238 | Th-234, Pa-234m |
| U-nat | Th-234, Pa-234m, U-234, Th-230, Ra-226, Rn-222, Po-218, Pb-214, Bi-214, Po-214, Pb-210, Bi-210, Po-210 |
| U-240 | Np-240m |
| Np-237 | Pa-233 |
| Am-242m | Am-242 |
| Am-243 | Np-239 |

^c [Reserved]

^d These values apply only to compounds of uranium that take the chemical form of UF_6 , UO_2F_2 and $UO_2(NO_3)_2$ in both normal and accident conditions of transport.

^e These values apply only to compounds of uranium that take the chemical form of UO_3 , UF_4 , UCl_4 and hexavalent compounds in both normal and accident conditions of transport.

^f These values apply to all compounds of uranium other than those specified in notes (d) and (e) of this table.

^g These values apply to unirradiated uranium only.

Authority O.C.G.A. 31-13-1 et seq.; Ga. L. 1964, pp. 499, 507, 566-575, as amended (Georgia Radiation Control Act).