

**Chapter HFS 157**

**APPENDIX I**

**QUANTITIES FOR USE WITH DECOMMISSIONING UNDER SECTION HFS 157.15**

**NOTE:** To convert  $\mu\text{Ci}$  to kBq, multiply the  $\mu\text{Ci}$  value by 37.

<b>Material</b>	<b>Microcurie</b>
Americium-241	0.01
Antimony-122	100
Antimony-124	10
Antimony-125	10
Arsenic-73	100
Arsenic-74	10
Arsenic-76	10
Arsenic-77	100
Barium-131	10
Barium-133	10
Barium-140	10
Bismuth-210	1
Bromine-82	10
Cadmium-109	10
Cadmium-115m	10
Cadmium-115	100
Calcium-45	10
Calcium-47	10
Carbon-14	100
Cerium-141	100
Cerium-143	100
Cerium-144	1
Cesium-131	1,000
Cesium-134m	100
Cesium-134	1
Cesium-135	10
Cesium-136	10
Cesium-137	10
Chlorine-36	10
Chlorine-38	10
Chromium-51	1,000
Cobalt-58m	10
Cobalt-58	10
Cobalt-60	1
Copper-64	100
Dysprosium-165	10
Dysprosium-166	100

<b>Material</b>	<b>Microcurie</b>
Erbium-169 .....	100
Erbium-171 .....	100
Europium-152 (9.2 h) .....	100
Europium-152 (13 yr) .....	1
Europium-154 .....	1
Europium-155 .....	10
Fluorine-18 .....	1,000
Gadolinium-153 .....	10
Gadolinium-159 .....	100
Gallium-72 .....	10
Germanium-71 .....	0
Gold-198 .....	100
Gold-199 .....	100
Hafnium-181 .....	10
Holmium-166 .....	100
Hydrogen-3 .....	1,000
Indium-113m .....	100
Indium-114m .....	10
Indium-115m .....	100
Indium-115 .....	10
Iodine-125 .....	1
Iodine-126 .....	1
Iodine-129 .....	0.1
Iodine-131 .....	1
Iodine-132 .....	10
Iodine-133 .....	1
Iodine-134 .....	10
Iodine-135 .....	10
Iridium-192 .....	10
Iridium-194 .....	100
Iron-55 .....	100
Iron-59 .....	10
Krypton-85 .....	100
Krypton-87 .....	10
Lanthanum-140 .....	10
Lutetium-177 .....	100
Manganese-52 .....	10
Manganese-54 .....	10
Manganese-56 .....	10
Mercury-197m .....	100
Mercury-197 .....	100
Mercury-203 .....	10

<b>Material</b>	<b>Microcurie</b>
Molybdenum-99	100
Neodymium-147	100
Neodymium-149	100
Nickel-59	100
Nickel-63	10
Nickel-65	100
Niobium-93m	10
Niobium-95	10
Niobium-97	10
Osmium-185	10
Osmium-191m	100
Osmium-191	100
Osmium-193	100
Palladium-103	100
Palladium-109	100
Phosphorus-32	10
Platinum-191	100
Platinum-193m	100
Platinum-193	100
Platinum-197m	100
Platinum-197	100
Plutonium-239	0.01
Polonium-210	0.1
Potassium-42	10
Praseodymium-142	100
Praseodymium-143	100
Promethium-147	10
Promethium-149	10
Radium-226	0.01
Rhenium-186	100
Rhenium-188	100
Rhodium-103m	100
Rhodium-105	100
Rubidium-86	10
Rubidium-87	10
Ruthenium-97	100
Ruthenium-103	10
Ruthenium-105	10
Ruthenium-106	1
Samarium-151	10
Samarium-153	100

<b>Material</b>	<b>Microcurie</b>
Scandium-46 .....	10
Scandium-47 .....	100
Scandium-48 .....	10
Selenium-75 .....	10
Silicon-31 .....	100
Silver-105 .....	10
Silver-110m .....	1
Silver-111 .....	100
Sodium-22 .....	1
Sodium-24 .....	10
Strontium-85 .....	10
Strontium-89 .....	1
Strontium-90 .....	0.1
Strontium-91 .....	10
Strontium-92 .....	10
Sulfur -35 .....	100
Tantalum-182 .....	10
Technetium-96 .....	10
Technetium-97m .....	100
Technetium-97 .....	100
Technetium-99m .....	100
Technetium-99 .....	10
Tellurium-125m .....	10
Tellurium-127m .....	10
Tellurium-127 .....	100
Tellurium-129m .....	10
Tellurium-129 .....	100
Tellurium-131m .....	10
Tellurium-132 .....	10
Terbium-160 .....	10
Thallium-200 .....	100
Thallium-201 .....	100
Thallium-202 .....	100
Thallium-204 .....	10
Thorium (natural) <sup>c/</sup> .....	100
Thulium-170 .....	10
Thulium-171 .....	10
Tin-113 .....	10
Tin-125 .....	10
Tungsten-181 .....	10
Tungsten-185 .....	10

<b>Material</b>	<b>Microcurie</b>
Tungsten-187 .....	100
Uranium (natural) <sup>d/</sup> .....	100
Uranium-233 .....	0.01
Uranium-234 .....	0.01
Uranium-235 .....	0.01
Vanadium-48 .....	10
Xenon-131m .....	1,000
Xenon-133 .....	100
Xenon-135 .....	100
Ytterbium-175 .....	100
Yttrium-90 .....	10
Yttrium-91 .....	10
Yttrium-92 .....	100
Yttrium-93 .....	100
Zinc-65 .....	10
Zinc- 69m .....	100
Zinc-69 .....	1,000
Zirconium-93 .....	10
Zirconium-95 .....	10
Zirconium-97 .....	10
Any alpha emitting radionuclide not listed above or mixtures of alpha emitters of unknown composition .....	0.01
Any radionuclide other than alpha emitting radionuclides, not listed above or mixtures of beta emitters of unknown composition .....	0.1

<sup>c/</sup> Based on alpha disintegration rate of Th-232, , Th-230 and their daughter products.

<sup>d/</sup> Based on alpha disintegration rate of U-238, U-234, and U-235

**Note:** Where there is involved a combination of isotopes in known amounts, the limit for the combination should be derived as follows: Determine, for each isotope in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific isotope when not in combination. The sum of the ratios for all the isotopes in the combination may not exceed "1" – that is, unity.