

Table 25-1 - A₁ and A₂ values for Radionuclides

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Actinium (89)						
Ac-225 (a)	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
Silver (47)						
Ag-105	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
Aluminum (13)						
Al-26	1.0x10 ⁻¹	2.7	1.0x10 ⁻¹	2.7	7.0x10 ⁻⁴	1.9x10 ⁻²
Americium (95)						
Am-241	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
Argon (18)						
Ar-37	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
Arsenic (33)						
As-72	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
Astatine (85)						
At-211 (a)	2.0x10 ¹	5.4x10 ²	5.0x10 ⁻¹	1.4x10 ¹	7.6x10 ⁴	2.1x10 ⁶

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Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Gold (79)						
Au-193	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
Barium (56)						
Ba-131 (a)	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
Beryllium (4)						
Be-7	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
Bismuth (83)						
Bi-205	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
Bi-212 (a)	7.0x10 ⁻¹	1.9x10 ¹	6.0x10 ⁻¹	1.6x10 ¹	5.4x10 ⁵	1.5x10 ⁷
Berkelium (97)						
Bk-247	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
Bromine (35)						
Br-76	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

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Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Carbon (6)						
C-11	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
Calcium (20)						
Ca-41	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
Cadmium (48)						
Cd-109	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	3.0	8.1x10 ¹	4.0x10 ⁻¹	1.1x10 ¹	1.9x10 ⁴	5.1x10 ⁵
Cd-115m (a)	5.0x10 ⁻¹	1.4x10 ¹	5.0x10 ⁻¹	1.4x10 ¹	9.4x10 ²	2.5x10 ⁴
Cerium (58)						
Ce-139	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
Californium (98)						
Cf-248	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)	1.0x10⁻¹ 1.0x10 ⁻¹	2.7 2.7	3.0x10 ⁻³	8.1x10 ⁻²	2.0x10 ¹	5.4x10 ²
Cf-253 (a)	5.0x10⁻² 4.0x10 ¹	1.4 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
Chlorine (17)						
Cl-36	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
Curium (96)						
Cm-240	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

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	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Cm-243	9.0	2.4x10 ²	1.0x10 ⁻³	2.7x10 ⁻²	1.9	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
Cobalt (27)						
Co-55	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 ³	5.9x10 ⁶
Co-60	4.0x10 ⁻¹	1.1x10 ¹	4.0x10 ⁻¹	1.1x10 ¹	4.2x10 ¹	1.1x10 ³
Chromium (24)						
Cr-51	3.0x10 ¹	8.1x10 ²	3.0x10 ¹	8.1x10 ²	3.4x10 ³	9.2x10 ⁴
Cesium (55)						
Cs-129	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
Copper (29)						
Cu-64	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
Dysprosium (66)						
Dy-159	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

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Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Erbium (68)						
Er-169	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
Europium (63)						
Eu-147	2.0	5.4x10 ¹	2.0x10 ¹	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
Fluorine (9)						
F-18	1.0	2.7x10 ¹	6.0x10 ⁻¹	1.6x10 ¹	3.5x10 ⁶	9.5x10 ⁷
Iron (26)						
Fe-52 (a)	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
Fe-60 (a)	4.0x10 ¹	1.1x10 ³	2.0x10 ⁻¹	5.4	7.4x10 ⁻⁴	2.0x10 ⁻²
Gallium (31)						
Ga-67	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
Gadolinium (64)						
Gd-146 (a)	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	2.0	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

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Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Germanium (32)						
Ge-68 (a)	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
Hafnium (72)						
Hf-172 (a)	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
Mercury (80)						
Hg-194 (a)	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
Holmium (67)						
Ho-166	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
Iodine (53)						
I-123	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
Indium (49)						
In-111	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
In-115m	7.0	1.9x10 ²	1.0	2.7x10 ¹	2.2x10 ⁵	6.1x10 ⁶
Iridium (77)						
Ir-189 (a)	1.0x10 ¹	2.7x10 ²	1.0x10 ¹	2.7x10 ²	1.9x10 ³	5.2x10 ⁴
Ir-190	7.0x10 ⁻¹	1.9x10 ¹	7.0x10 ⁻¹	1.9x10 ¹	2.3x10 ³	6.2x10 ⁴
Ir-192 (e)	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
Potassium (19)						
K-40	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
Krypton (36)						
Kr-79	4.0	1.1x10²	2.0	5.4x10¹	4.2x10⁴	1.1x10⁶
Kr-81	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	3.0x10 ⁵	8.2x10 ⁶
Kr-85m	8.0	2.2x10 ²	3.0	8.1x10 ¹	1.5x10 ¹	3.9x10 ²
Kr-87	2.0x10 ⁻¹	5.4	2.0x10 ⁻¹	5.4	1.0x10 ⁶	2.8x10 ⁷
Lanthanum (57)						
La-137	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
Lutetium (71)						
Lu-172	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	2.0x10 ²	5.3x10 ³
Lu-174m	2.0x10 ¹	5.4x10 ²	1.0x10 ¹	2.7x10 ²	2.3x10 ¹	6.2x10 ²
Lu-177	3.0x10 ¹	8.1x10 ²	7.0x10 ⁻¹	1.9x10 ¹	4.1x10 ³	1.1x10 ⁵
Magnesium (12)						
Mg-28 (a)	3.0x10 ⁻¹	8.1	3.0x10 ⁻¹	8.1	2.0x10 ⁵	5.4x10 ⁶
Manganese (25)						
Mn-52	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Molybdenum (42)						
Mo-93	4.0x10 ¹	1.1x10 ³	2.0x10 ¹	5.4x10 ²	4.1x10 ⁻²	1.1
Mo-99 (a), (h)	1.0	2.7x10 ¹	6.0x10 ⁻¹	1.6x10 ¹	1.8x10 ⁴	4.8x10 ⁵
Nitrogen (7)						
N-13	9.0x10 ⁻¹	2.4x10 ¹	6.0x10 ⁻¹	1.6x10 ¹	5.4x10 ⁷	1.5x10 ⁹
Sodium (11)						
Na-22	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
Niobium (41)						
Nb-93m	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
Neodymium (60)						
Nd-147	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
Nickel (28)						
Ni-59	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
Neptunium (93)						
Np-235	4.0x10 ¹	1.1x10 ³	4.0x10 ¹	1.1x10 ³	5.2x10 ¹	1.4x10 ³
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
Osmium (76)						
Os-185	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Os-194 (a)	3.0x10 ⁻¹	8.1	3.0x10 ⁻¹	8.1	1.1x10 ¹	3.1x10 ²
Phosphorus (15)	5.0x10 ⁻¹	1.4x10 ¹	5.0x10 ⁻¹	1.4x10 ¹	1.1x10 ⁴	2.9x10 ⁵
P-32						
P-33	4.0x10 ¹	1.1x10 ³	1.0	2.7x10 ¹	5.8x10 ³	1.6x10 ⁵
Protactinium (91)						
Pa-230 (a)	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
Lead (82)						
Pb-201	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
Palladium (46)						
Pd-103 (a)	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
Promethium (61)						
Pm-143	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
Polonium (84)						
Po-210	4.0x10 ¹	1.1x10 ³	2.0x10 ⁻²	5.4x10 ⁻¹	1.7x10 ²	4.5x10 ³

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Praseodymium (59)						
Pr-142	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
Platinum (78)						
Pt-188 (a)	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
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
Plutonium (94)						
Pu-236	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
Radium (88)						
Ra-223 (a)	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
Rubidium (37)						
Rb-81	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Rhenium (75)						
Re-184	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
Rhodium (45)						
Rh-99	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
Radon (86)						
Rn-222 (a)	3.0x10 ⁻¹	8.1	4.0x10 ⁻³	1.1x10 ⁻¹	5.7x10 ³	1.5x10 ⁵
Ruthenium (44)						
Ru-97	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
Sulfur (16)						
S-35	4.0x10 ¹	1.1x10 ³	3.0	8.1x10 ¹	1.6x10 ³	4.3x10 ⁴
Antimony (51)						
Sb-122	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Scandium (21)						
Sc-44	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
Selenium (34)						
Se-75	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
Silicon (14)						
Si-31	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
Samarium (62)						
Sm-145	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
Tin (50)						
Sn-113 (a)	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
Strontium (38)						
Sr-82 (a)	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Tritium (1)						
T(H-3)	4.0x10 ¹	1.1x10 ³	4.0x10 ¹	1.1x10 ³	3.6x10 ²	9.7x10 ³
Tantalum (73)						
Ta-178 (long lived).	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
Terbium (65)						
Tb-157	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
Technetium (43)						
Tc-95m (a)	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	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
Tellurium (52)						
Te-121	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	1.1x10 ⁴	3.0x10 ⁵

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
Thorium (90)						
Th-227	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 (nat)	Unlimited	Unlimited	Unlimited	Unlimited	8.1x10 ⁻⁹	2.2x10 ⁻⁷
Titanium (22)						
Ti-44 (a)	5.0x10 ⁻¹	1.4x10 ¹	4.0x10 ⁻¹	1.1x10 ¹	6.4	1.7x10 ²
Thallium (81)						
Tl-200	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
Tl-204	1.0x10 ¹	2.7x10 ²	7.0x10 ⁻¹	1.9x10 ¹	1.7x10 ¹	4.6x10 ²
Thulium (69)						
Tm-167	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
Uranium (92)						
U-230 (fast lung absorption) (a)(d).	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
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
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 (nat)	Unlimited	Unlimited	Unlimited	Unlimited	2.6x10 ⁻⁸	7.1x10 ⁻⁷
U (enriched to 20% or less) (g).	Unlimited	Unlimited	Unlimited	Unlimited	See Table 25-4	See Table 25-4
U (dep)	Unlimited	Unlimited	Unlimited	Unlimited	See Table 25-4	See Table 25-4
Vanadium (23)						
V-48	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
Tungsten (74)						
W-178 (a)	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
Xenon (54)						
Xe-122 (a)	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

APPENDIX A

Element, Atomic No. Radionuclide	A ₁		A ₂		Specific Activity	
	(TBq)	(Ci) ^b	(TBq)	(Ci) ^b	(TBq/g)	(Ci/g)
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
Yttrium (39)						
Y-87 (a)	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
Ytterbium (70)						
Yb-169	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
Zinc (30)						
Zn-65	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
Zn-69m (a)	3.0	8.1x10 ¹	6.0x10 ⁻¹	1.6x10 ¹	1.2x10 ⁵	3.3x10 ⁶
Zirconium (40)						
Zr-88	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, [as listed in the following](#):-

Mg-28	Al-28
Ca-47	Sc-47
Ti-44	Sc-44
Fe-52	Mn-52m
Fe-60	Co-60m
Zn-69m	Zn-69
Ge-68	Ga-68
Rb-83	Kr-83m
Sr-82	Rb-82
Sr-90	Y-90
Sr-91	Y-91m
Sr-92	Y-92
Y-87	Sr-87m
Zr-95	Nb-95m

APPENDIX A

Zr-97	Nb-97m, Nb-97
Mo-99	Tc-99m
Tc-95m	Tc-95
Tc-96m	Tc-96
Ru-103	Rh-103m
Ru-106	Rh-106
Pd-103	Rh-103m
Ag-108m	Ag-108
Ag-110m	Ag-110
Cd-115	In-115m
In-114m	In-114
Sn-113	In-113m
Sn-121m	Sn-121
Sn-126	Sb-126m
Te-127m	Te-127
Te-129m	Te-129
Te-131m	Te-131
Te-132	I-132
I-135	Xe-135m
Xe-122	I-122
Cs-137	Ba-137m
Ba-131	Cs-131
Ba-140	La-140
Ce-144	Pr-144m, Pr-144
Pm-148m	Pm-148
Gd-146	Eu-146
Dy-166	Ho-166
Hf-172	Lu-172
W-178	Ta-178
W-188	Re-188
Re-189	Os-189m
Os-194	Ir-194
Ir-189	Os-189m
Pt-188	Ir-188
Hg-194	Au-194
Hg-195m	Hg-195
Pb-210	Bi-210
Pb-212	Bi-212, Tl-208, Po-212
Bi-210m	Tl-206
Bi-212	Tl-208, Po-212
At-211	Po-211
Rn-222	Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-223	Rn-219, Po-215, Pb-211, Bi-211, Po-211, Tl-207
Ra-224	Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Ra-225	Ac-225, Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ra-226	Rn-222, Po-218, Pb-214, At-218, Bi-214, Po-214
Ra-228	Ac-228
Ac-225	Fr-221, At-217, Bi-213, Tl-209, Po-213, Pb-209
Ac-227	Fr-223
Th-228	Ra-224, Rn-220, Po-216, Pb-212, Bi-212, Tl-208, Po-212
Th-234	Pa-234m, Pa-234
Pa-230	Ac-226, Th-226, Fr-222, Ra-222, Rn-218, Po-214
U-230	Th-226, Ra-222, Rn-218, Po-214

APPENDIX A

U-235	Th-231
Pu-241	U-237
Pu-244	U-240, Np-240m
Am-242m	Am-242, Np-238
Am-243	Np-239
Cm-247	Pu-243
Bk-249	Am-245
Cf-253	Cm-249

- b The values of A_1 and A_2 in Curies (Ci) are approximate and for information only, the regulatory standard units are Terabecquerels (TBq).
- c The ~~quantity~~[activity of Ir-192 in special form](#) 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 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.
- ~~h $A_1 = 0.1$ TBq (2.7 Ci) and $A_2 = 0.001$ TBq (0.027 Ci) for Cf-252 for domestic use.~~
- ~~h~~ $A_2 = 0.74$ TBq (20 Ci) for Mo-99 for domestic use

