

3701:1-40-14

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## Appendix A

Quantities of Radioactive Materials Requiring Consideration of the  
Need for an Emergency Plan for Responding to a Release

Radionuclide <sup>1</sup>	Release Fraction	Quantity (TBq)	Quantity (Ci)
Actinium-228	0.001	148	4,000
Americium-241	0.001	0.074	2
Americium-242	0.001	0.074	2
Americium-243	0.001	0.074	2
Antimony-124	0.01	148	4,000
Antimony-126	0.01	222	6,000
Barium-133	0.01	370	10,000
Barium-140	0.01	1110	30,000
Bismuth-207	0.01	185	5,000
Bismuth-210	0.01	22.2	600
Cadmium-109	0.01	37	1,000
Cadmium-113	0.01	2.96	80
Calcium-45	0.01	740	20,000
Californium-252	0.001	0.333	9 (20 MG)
Carbon-14 (non-carbon dioxide)	0.01	1850	50,000
Cerium-141	0.01	370	10,000
Cerium-144	0.01	11.1	300
Cesium-134	0.01	74	2,000
Cesium-137	0.01	111	3,000
Chlorine-36	0.5	3.7	100
Chromium-51	0.01	11100	300,000
Cobalt-60	0.001	185	5,000
Copper-64	0.01	7400	200,000
Curium-242	0.001	2.22	60

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Radionuclide <sup>1</sup>	Release Fraction	Quantity (TBq)	Quantity (Ci)
Curium-243	0.001	0.111	3
Curium-244	0.001	0.148	4
Curium-245	0.001	0.074	2
Europium-152	0.01	18.5	500
Europium-154	0.01	14.8	400
Europium-155	0.01	111	3,000
Germanium-68	0.01	74	2,000
Gadolinium-153	0.01	185	5,000
Gold-198	0.01	1110	30,000
Hafnium-172	0.01	14.8	400
Hafnium-181	0.01	259	7,000
Holmium-166m	0.01	3.7	100
Hydrogen-3	0.5	740	20,000
Iodine-125	0.5	0.37	10
Iodine-131	0.5	0.37	10
Indium-114m	0.01	37	1,000
Iridium-192	0.001	1480	40,000
Iron-55	0.01	1480	40,000
Iron-59	0.01	259	7,000
Krypton-85	1.0	222000	6,000,000
Lead-210	0.01	0.296	8
Manganese-56	0.01	2220	60,000
Mercury-203	0.01	370	10,000
Molybdenum-99	0.01	1110	30,000
Neptunium-237	0.001	0.074	2
Nickel-63	0.01	740	20,000

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Niobium-94	0.01	11.1	300
Phosphorus-32	0.5	3.7	100
Phosphorus-33	0.5	37	1,000
Polonium-210	0.01	0.37	10
Potassium-42	0.01	333	9,000
Promethium-145	0.01	140	4,000
Promethium-147	0.01	148	4,000
Radium-226	0.001	3.7	100
Ruthenium-106	0.01	7.4	200
Samarium-151	0.01	148	4,000
Scandium-46	0.01	111	3,000
Selenium-75	0.01	370	10,000
Silver-110m	0.01	37	1,000
Sodium-22	0.01	333	9,000
Sodium-24	0.01	370	10,000
Strontium-89	0.01	111	3,000
Strontium-90	0.01	3.33	90
Sulfur-35	0.5	33.3	900
Technetium-99	0.01	370	10,000
Technetium-99m	0.01	14800	400,000
Tellurium-127m	0.01	185	5,000
Tellurium-129m	0.01	185	5,000
Terbium-160	0.01	148	4,000
Thulium-170	0.01	148	4,000
Tin-113	0.01	370	10,000
Tin-123	0.01	111	3,000

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Radionuclide <sup>1</sup>	Release Fraction	Quantity (TBq)	Quantity (Ci)
Tin-126	0.01	37	1,000
Titanium-44	0.01	3.7	100
Vanadium-48	0.01	259	7,000
Xenon-133	1.0	33300	900,000
Yttrium-91	0.01	74	2,000
Zinc-65	0.01	185	5,000
Zirconium-93	0.01	14.8	400
Zirconium-95	0.01	185	5,000
Any other beta-gamma emitter	0.01	370	10,000
Mixed fission products	0.01	37	1,000
Mixed corrosion products	0.01	370	10,000
Contaminated equipment beta-gamma	0.001	370	10,000
Irradiated material, any form other than solid noncombustible.	0.01	37	1,000
Irradiated material, solid noncombustible	0.001	370	10,000
Mixed radioactive waste, beta-gamma	0.01	37	1,000
Packaged mixed waste, beta-gamma	0.001	370	10,000
Any other alpha emitter	0.001	0.074	2
Contaminated equipment, alpha	0.0001	0.74	20
Packaged waste, alpha	0.0001	0.74	20
Combinations of radioactive materials listed above <sup>1</sup>			

<sup>1</sup> For combinations of radioactive materials, consideration of the need for an emergency plan is required if the sum of the ratios of the quantity of each radioactive material authorized to the quantity listed for that material in this appendix exceeds one.

<sup>2</sup> Waste packaged in Type B containers does not require an emergency plan.