APPENDIX C

Appendix C

Labeling. (a) The following quantities of licensed or registered material shall require labeling. The quantities listed below were derived by taking 1/10th of the most restrictive ALI listed in table I, columns 1 and 2, of appendix B, rounding to the nearest factor of 10, and constraining the values listed between 37 Bq and 37 MBq (0.001 and 1,000 μCi). Values of 3.7 MBq (100 μCi) have been assigned for radionuclides having a radioactive half-life in excess of E+9 years, except rhenium, 37 MBq (1,000 μCi), to take into account their low specific activity.

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Hydrogen-3	1,000	Chlorine-38	1,000
Beryllium-7	1,000	Chlorine-39	1,000
Beryllium-10	1	Argon-39	1,000
Carbon-11	1,000	Argon-41	1,000
Carbon-14	1,000	Potassium-40	100
Fluorine-18	1,000	Potassium-42	1,000
Sodium-22	10	Potassium-43	1,000
Sodium-24	100	Potassium-44	1,000
Magnesium-28	100	Potassium-45	1,000
Aluminum-26	10	Calcium-41	100
Silicon-31	1,000	Calcium-45	100
Silicon-32	1	Calcium-47	100
Phosphorus-32	10	Scandium-43	1,000
Phosphorus-33	100	Scandium-44m	100
Sulfur-35	100	Scandium-44	100
Chlorine-36	10	Scandium-46	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Scandium-47	100	Cobalt-57	100
Scandium-48	100	Cobalt-58m	1,000
Scandium-49	1,000	Cobalt-58	100
Titanium-44	1	Cobalt-60m	1,000
Titanium-45	1,000	Cobalt-60	1
Vanadium-47	1,000	Cobalt-61	1,000
Vanadium-48	100	Cobalt-62m	1,000
Vanadium-49	1,000	Nickel-56	100
Chromium-48	1,000	Nickel-57	100
Chromium-49	1,000	Nickel-59	100
Chromium-51	1,000	Nickel-63	100
Manganese-51	1,000	Nickel-65	1,000
Manganese-52m	1,000	Nickel-66	10
Manganese-52	1,000	Copper-60	1,000
Manganese-53	1,000	Copper-61	1,000
Manganese-54	100	Copper-64	1,000
Manganese-56	1,000	Copper-67	1,000
Iron-52	100	Zinc-62	100
Iron-55	100	Zinc-63	1,000
Iron-59	10	Zinc-65	10
Iron-60	1	Zinc-69m	100
Cobalt-55	100	Zinc-69	1,000
Cobalt-56	10	Zinc-71m	1,000

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Zinc-72	100	Arsenic-77	100
Gallium-65	1,000	Arsenic-78	1,000
Gallium-66	100	Selenium-70	1,000
Gallium-67	1,000	Selenium-73m	1,000
Gallium-68	1,000	Selenium-73	100
Gallium-70	1,000	Selenium-75	100
Gallium-72	100	Selenium-79	100
Gallium-73	1,000	Selenium-81m	1,000
Germanium-66	1,000	Selenium-81	1,000
Germanium-67	1,000	Selenium-83	1,000
Germanium-68	10	Bromine-74m	1,000
Germanium-69	1,000	Bromine-74	1,000
Germanium-71	1,000	Bromine-75	1,000
Germanium-75	1,000	Bromine-76	100
Germanium-77	1,000	Bromine-77	1,000
Germanium-78	1,000	Bromine-80m	1,000
Arsenic-69	1,000	Bromine-80	1,000
Arsenic-70	1,000	Bromine-82	100
Arsenic-71	100	Bromine-83	1,000
Arsenic-72	100	Bromine-84	1,000
Arsenic-73	100	Krypton-74	1,000
Arsenic-74	100	Krypton-76	1,000
Arsenic-76	100	Krypton-77	1,000

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Krypton-79	1,000	Strontium-89	10
Krypton-81	1,000	Strontium-90	0.1
Krypton-83m	1,000	Strontium-91	100
Krypton-85m	1,000	Strontium-92	100
Krypton-85	1,000	Yttrium-86m	1,000
Krypton-87	1,000	Yttrium-86	100
Krypton-88	1,000	Yttrium-87	100
Rubidium-79	1,000	Yttrium-88	10
Rubidium-81m	1,000	Yttrium-90m	1,000
Rubidium-81	1,000	Yttrium-90	10
Rubidium-82m	1,000	Yttrium-91	1,000
Rubidium-83	100	Yttrium-92	100
Rubidium-84	100	Yttrium-93	100
Rubidium-86	100	Yttrium-94	1,000
Rubidium-87	100	Yttrium-95	1,000
Rubidium-88	1,000	Zirconium-86	100
Rubidium-89	1,000	Zirconium-88	10
Strontium-80	100	Zirconium-89	100
Strontium-81	1,000	Zirconium-93	1
Strontium-83	100	Zirconium-95	10
Strontium-85m	1,000	Zirconium-97	100
Strontium-85	100	Niobium-88	1,000
Strontium-87m	1,000	Niobium-89m (66 min)	1,000

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*
Niobium-89 (122 min)	1,000
Niobium-90	100
Niobium-93m	10
Niobium-94	1
Niobium-95m	100
Niobium-95	100
Niobium-96	100
Niobium-97	1,000
Niobium-98	1,000
Molybdenum-90	100
Molybdenum-93m	100
Molybdenum-93	10
Molybdenum-99	100
Molybdenum-101	1,000
Technetium-93m	1,000
Technetium-93	1,000
Technetium-94m	1,000
Technetium-94	1,000
Technetium-96m	1,000
Technetium-96	100
Technetium-97m	100
Technetium-97	1,000
Technetium-98	10
Technetium-99m	1,000
Technetium-99	100
Technetium-101	1,000
Technetium-104	1,000
Ruthenium-94	1,000
Ruthenium-97	1,000
Ruthenium-103	100
Ruthenium-105	1,000
Ruthenium-106	1
Rhodium-99m	1,000
Rhodium-99	100
Rhodium-100	100
Rhodium-101m	1,000
Rhodium-101	10
Rhodium-102m	10
Rhodium-102	10
Rhodium-103m	1,000
Rhodium-105	100
Rhodium-106m	1,000
Rhodium-107	1,000
Palladium-100	100
Palladium-103	100
Palladium-107	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Palladium-109	100	Indium-110 (69.1 min)	1,000
Silver-102	1,000	Indium-110 (4.9 h)	1,000
Silver-103	1,000	Indium-111	100
Silver-104m	1,000	Indium-112	1,000
Silver-104	1,000	Indium-113m	1,000
Silver-105	100	Indium-114m	10
Silver-106m	100	Indium-115m	1,000
Silver-106	1,000	Indium-115	100
Silver-108m	1	Indium-116m	1,000
Silver-110m	10	Indium-117m	1,000
Silver-111	100	Indium-117	1,000
Silver-112	100	Indium-119m	1,000
Silver-115	1,000	Tin-110	100
Cadmium-104	1,000	Tin-111	1,000
Cadmium-107	1,000	Tin-113	100
Cadmium-109	1	Tin-117m	100
Cadmium-113m	0.1	Tin-119m	100
Cadmium-113	100	Tin-121m	100
Cadmium-115m	10	Tin-121	1,000
Cadmium-115	100	Tin-123m	1,000
Cadmium-117m	1,000	Tin-123	10
Cadmium-117	1,000	Tin-125	10
Indium-109	1,000		

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Tin-126	10	Antimony-130	1,000
Tin-127	1,000	Antimony-131	1,000
Tin-128	1,000	Tellurium-116	1,000
Antimony-115	1,000	Tellurium-121m	10
Antimony-116m	1,000	Tellurium-121	100
Antimony-116	1,000	Tellurium-123m	10
Antimony-117	1,000	Tellurium-123	100
Antimony-118m	1,000	Tellurium-125m	10
Antimony-119	1,000	Tellurium-127m	10
Antimony-120 (16 min)	1,000	Tellurium-127	1,000
		Tellurium-129m	10
Antimony-120 (5.76 d)	100	Tellurium-129	1,000
Antimony-122	100	Tellurium-131m	10
Antimony-124m	1,000	Tellurium-131	100
Antimony-124	10	Tellurium-132	10
Antimony-125	100	Tellurium-133m	100
Antimony-126m	1,000	Tellurium-133	1,000
Antimony-126	100	Tellurium-134	1,000
Antimony-127	100	Iodine-120m	1,000
Antimony-128 (10.4 min)	1,000	Iodine-120	100
		Iodine-121	1,000
Antimony-128 (9.01 h)	100	Iodine-123	100
Antimony-129	100	Iodine-124	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Iodine-125	1	Xenon-138	1,000
Iodine-126	1	Cesium-125	1,000
Iodine-128	1,000	Cesium-127	1,000
Iodine-129	1	Cesium-129	1,000
Iodine-130	10	Cesium-130	1,000
Iodine-131	1	Cesium-131	1,000
Iodine-132m	100	Cesium-132	100
Iodine-132	100	Cesium-134m	1,000
Iodine-133	10	Cesium-134	10
Iodine-134	1,000	Cesium-135m	1,000
Iodine-135	100	Cesium-135	100
Xenon-120	1,000	Cesium-136	10
Xenon-121	1,000	Cesium-137	10
Xenon-122	1,000	Cesium-138	1,000
Xenon-123	1,000	Barium-126	1,000
Xenon-125	1,000	Barium-128	100
Xenon-127	1,000	Barium-131m	1,000
Xenon-129m	1,000	Barium-131	100
Xenon-131m	1,000	Barium-133m	100
Xenon-133m	1,000	Barium-133	100
Xenon-133	1,000	Barium-135m	100
Xenon-135m	1,000	Barium-139	1,000
Xenon-135	1,000	Barium-140	100

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Barium-141	1,000	Praseodymium-142m	1,000
Barium-142	1,000	Praseodymium-142	100
Lanthanum-131	1,000	Praseodymium-143	100
Lanthanum-132	100	Praseodymium-144	1,000
Lanthanum-135	1,000	Praseodymium-145	100
Lanthanum-137	10	Praseodymium-147	1,000
Lanthanum-138	100	Neodymium-136	1,000
Lanthanum-140	100	Neodymium-138	100
Lanthanum-141	100	Neodymium-139m	1,000
Lanthanum-142	1,000	Neodymium-139	1,000
Lanthanum-143	1,000	Neodymium-141	1,000
Cerium-134	100	Neodymium-147	100
Cerium-135	100	Neodymium-149	1,000
Cerium-137m	100	Neodymium-151	1,000
Cerium-137	1,000	Promethium-141	1,000
Cerium-139	100	Promethium-143	100
Cerium-141	100	Promethium-144	10
Cerium-143	100	Promethium-145	10
Cerium-144	1	Promethium-146	1
Praseodymium-136	1,000	Promethium-147	10
Praseodymium-137	1,000	Promethium-148m	10
Praseodymium-138m	1,000	Promethium-148	10
Praseodymium-139	1,000	Promethium-149	100

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Promethium-150	1,000	Europium-155	10
Promethium-151	100	Europium-156	100
Samarium-141m	1,000	Europium-157	100
Samarium-141	1,000	Europium-158	1,000
Samarium-142	1,000	Gadolinium-145	1,000
Samarium-145	100	Gadolinium-146	10
Samarium-146	1	Gadolinium-147	100
Samarium-147	100	Gadolinium-148	0.001
Samarium-151	10	Gadolinium-149	100
Samarium-153	100	Gadolinium-151	10
Samarium-155	1,000	Gadolinium-152	100
Samarium-156	1,000	Gadolinium-153	10
Europium-145	100	Gadolinium-159	100
Europium-146	100	Terbium-147	1,000
Europium-147	100	Terbium-149	100
Europium-148	10	Terbium-150	1,000
Europium-149	100	Terbium-151	100
Europium-150 (12.62 h)	100	Terbium-153	1,000
		Terbium-154	100
Europium-150 (34.2 y)	1	Terbium-155	1,000
Europium-152m	100	Terbium-156m (5.0 h)	1,000
Europium-152	1	Terbium-156m (24.4 h)	1,000
Europium-154	1		

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Terbium-156	100	Erbium-169	100
Terbium-157	10	Erbium-171	100
Terbium-158	1	Erbium-172	100
Terbium-160	10	Thulium-162	1,000
Terbium-161	100	Thulium-166	100
Dysprosium-155	1,000	Thulium-167	100
Dysprosium-157	1,000	Thulium-170	10
Dysprosium-159	100	Thulium-171	10
Dysprosium-165	1,000	Thulium-172	100
Dysprosium-166	100	Thulium-173	100
Holmium-155	1,000	Thulium-175	1,000
Holmium-157	1,000	Ytterbium-162	1,000
Holmium-159	1,000	Ytterbium-166	100
Holmium-161	1,000	Ytterbium-167	1,000
Holmium-162m	1,000	Ytterbium-169	100
Holmium-162	1,000	Ytterbium-175	100
Holmium-164m	1,000	Ytterbium-177	1,000
Holmium-164	1,000	Ytterbium-178	1,000
Holmium-166m	1	Lutetium-169	100
Holmium-166	100	Lutetium-170	100
Holmium-167	1,000	Lutetium-171	100
Erbium-161	1,000	Lutetium-172	100
Erbium-165	1,000	Lutetium-173	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Lutetium-174m	10	Tantalum-173	1,000
Lutetium-174	10	Tantalum-174	1,000
Lutetium-176m	1,000	Tantalum-175	1,000
Lutetium-176	100	Tantalum-176	100
Lutetium-177m	10	Tantalum-177	1,000
Lutetium-177	100	Tantalum-178	1,000
Lutetium-178m	1,000	Tantalum-179	100
Lutetium-178	1,000	Tantalum-180m	1,000
Lutetium-179	1,000	Tantalum-180	100
Hafnium-170	100	Tantalum-182m	1,000
Hafnium-172	1	Tantalum-182	10
Hafnium-173	1,000	Tantalum-183	100
Hafnium-175	100	Tantalum-184	100
Hafnium-177m	1,000	Tantalum-185	1,000
Hafnium-178m	0.1	Tantalum-186	1,000
Hafnium-179m	10	Tungsten-176	1,000
Hafnium-180m	1,000	Tungsten-177	1,000
Hafnium-181	10	Tungsten-178	1,000
Hafnium-182m	1,000	Tungsten-179	1,000
Hafnium-182	0.1	Tungsten-181	1,000
Hafnium-183	1,000	Tungsten-185	100
Hafnium-184	100	Tungsten-187	100
Tantalum-172	1,000	Tungsten-188	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Rhenium-177	1,000	Iridium-182	1,000
Rhenium-178	1,000	Iridium-184	1,000
Rhenium-181	1,000	Iridium-185	1,000
Rhenium-182 (12.7 h)	1,000	Iridium-186	100
Rhenium-182 (64.0 h)	100	Iridium-187	1,000
Rhenium-184m	10	Iridium-188	100
Rhenium-184	100	Iridium-189	100
Rhenium-186m	10	Iridium-190m	1,000
Rhenium-186	100	Iridium-190	100
Rhenium-187	1,000	Iridium-192m (1.4 min)	10
Rhenium-188m	1,000	Iridium-192 (73.8 d)	1
Rhenium-188	100	Iridium-194m	10
Rhenium-189	100	Iridium-194	100
Osmium-180	1,000	Iridium-195m	1,000
Osmium-181	1,000	Iridium-195	1,000
Osmium-182	100	Platinum-186	1,000
Osmium-185	100	Platinum-188	100
Osmium-189m	1,000	Platinum-189	1,000
Osmium-191m	1,000	Platinum-191	100
Osmium-191	100	Platinum-193m	100
Osmium-193	100	Platinum-193	1,000
Osmium-194	1	Platinum-195m	100

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Platinum-197m	1,000	Thallium-194	1,000
Platinum-197	100	Thallium-195	1,000
Platinum-199	1,000	Thallium-197	1,000
Platinum-200	100	Thallium-198m	1,000
Gold-193	1,000	Thallium-198	1,000
Gold-194	100	Thallium-199	1,000
Gold-195	10	Thallium-201	1,000
Gold-198m	100	Thallium-200	1,000
Gold-198	100	Thallium-202	100
Gold-199	100	Thallium-204	100
Gold-200m	100	Lead-195m	1,000
Gold-200	1,000	Lead-198	1,000
Gold-201	1,000	Lead-199	1,000
Mercury-193m	100	Lead-200	100
Mercury-193	1,000	Lead-201	1,000
Mercury-194	1	Lead-202m	1,000
Mercury-195m	100	Lead-202	10
Mercury-195	1,000	Lead-203	1,000
Mercury-197m	100	Lead-205	100
Mercury-197	1,000	Lead-209	1,000
Mercury-199m	1,000	Lead-210	0.01
Mercury-203	100	Lead-211	100
Thallium-194m	1,000	Lead-212	1

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Lead-214	100	Radium-223	0.1
Bismuth-200	1,000	Radium-224	0.1
Bismuth-201	1,000	Radium-225	0.1
Bismuth-202	1,000	Radium-226	0.1
Bismuth-203	100	Radium-227	1,000
Bismuth-205	100	Radium-228	0.1
Bismuth-206	100	Actinium-224	1
Bismuth-207	10	Actinium-225	0.01
Bismuth-210m	0.1	Actinium-226	0.1
Bismuth-210	1	Actinium-227	0.001
Bismuth-212	10	Actinium-228	1
Bismuth-213	10	Thorium-226	10
Bismuth-214	100	Thorium-227	0.01
Polonium-203	1,000	Thorium-228	0.001
Polonium-205	1,000	Thorium-229	0.001
Polonium-207	1,000	Thorium-230	0.001
Polonium-210	0.1	Thorium-231	100
Astatine-207	100	Thorium-232	100
Astatine-211	10	Thorium-234	10
Radon-220	1	Thorium-natural	100
Radon-222	1	Protactinium-227	10
Francium-222	100	Protactinium-228	1
Francium-223	100	Protactinium-230	0.1

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Protactinium-231	0.001	Neptunium-237	0.001
Protactinium-232	1	Neptunium-238	10
Protactinium-233	100	Neptunium-239	100
Protactinium-234	100	Neptunium-240	1,000
Uranium-230	0.01	Plutonium-234	10
Uranium-231	100	Plutonium-235	1,000
Uranium-232	0.001	Plutonium-236	0.001
Uranium-233	0.001	Plutonium-237	100
Uranium-234	0.001	Plutonium-238	0.001
Uranium-235	0.001	Plutonium-239	0.001
Uranium-236	0.001	Plutonium-240	0.001
Uranium-237	100	Plutonium-241	0.01
Uranium-238	100	Plutonium-242	0.001
Uranium-239	1,000	Plutonium-243	1,000
Uranium-240	100	Plutonium-244	0.001
Uranium-natural	100	Plutonium-245	100
Neptunium-232	100	Americium-237	1,000
Neptunium-233	1,000	Americium-238	100
Neptunium-234	100	Americium-239	1,000
Neptunium-235	100	Americium-240	100
Neptunium-236 (1.15E+5 y)	0.001	Americium-241	0.001
		Americium-242m	0.001
Neptunium-236 (22.5 h)	1	Americium-242	10

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
Americium-243	0.001	Californium-246	1
Americium-244m	100	Californium-248	0.01
Americium-244	10	Californium-249	0.001
Americium-245	1,000	Californium-250	0.001
Americium-246m	1,000	Californium-251	0.001
Americium-246	1,000	Californium-252	0.001
Curium-238	100	Californium-253	0.1
Curium-240	0.1	Californium-254	0.001
Curium-241	1	Einsteinium-250	100
Curium-242	0.01	Einsteinium-251	100
Curium-243	0.001	Einsteinium-253	0.1
Curium-244	0.001	Einsteinium-254m	1
Curium-245	0.001	Einsteinium-254	0.01
Curium-246	0.001	Fermium-252	1
Curium-247	0.001	Fermium-253	1
Curium-248	0.001	Fermium-254	10
Curium-249	1,000	Fermium-255	1
Berkelium-245	100	Fermium-257	0.01
Berkelium-246	100	Mendelevium-257	10
Berkelium-247	0.001	Mendelevium-258	0.01
Berkelium-249	0.1		
Berkelium-250	10	Any alpha-emitting radionuclide not listed above or mixtures of alpha	
Californium-244	100		

* To convert μCi to kBq, multiply the μCi value by 37.

QUANTITIES OF LICENSED OR REGISTERED MATERIAL REQUIRING LABELING

Radionuclide	Quantity (μCi)*	Radionuclide	Quantity (μCi)*
emitters of unknown composition	0.001	Any radionuclide other than alpha-emitting radionuclides not listed above, or mixtures of beta emitters of unknown composition	0.01

* To convert μCi to kBq, multiply the μCi value by 37.

(b) For purposes of K.A.R. 28-35-219a(f) and K.A.R. 28-35-228a where there is involved a combination of radionuclides in known amounts, the limit for the combination shall be derived by determining for each radionuclide in the combination, the ratio between the quantity present in the combination and the limit otherwise established for the specific radionuclide when not in combination. The sum of such ratios for all radionuclides in the combination may not exceed "1" -- that is, unity.