

BAPE Memoire ~ Exhibit B**Partial List of
Radionuclides
in 10-year-old CANDU fuel
irradiated in a power
reactor****Source:**

AECL-9881. J. C. Tait, I. C. Gould, and G. B. Wilkin.
Derivation of Initial Radionuclide Inventories for the
Safety Assessment of the Disposal of Used CANDU
Fuel.
AECL Whiteshell Nuclear Research Establishment,
August, 1989.

Standard Chemical Symbol	Chemical Name of element
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Radioactive Hydrogen

H-3 (a.k.a tritium)	Hydrogen-3
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Radioactive Beryllium

Be-10	Beryllium-10
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Radioactive Carbon

C-14	Carbon-14
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Radioactive Silicon

Si-32	Silicon-32
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Radioactive Phosphorus

P-32	Phosphorus-32
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Radioactive Sulphur

S-35	Sulphur-35
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Radioactive Chlorine

Cl-36	Chlorine-36
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Radioactive Argon Gas

Ar-39	Argon-39
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Ar-42	Argon-42
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Radioactive Potassium

K-40	Potassium-40
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K-42	Potassium-42
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Radioactive Calcium

Ca-41 Calcium-41
Ca-45 Calcium-45

Radioactive Scandium

Sc-46 Scandium-46

Radioactive Vanadium

V-50 Vanadium-50

Radioactive Manganese

Mn-54 Manganese-54

Radioactive Iron

Fe-55 Iron-55
Fe-59 Iron-59

Radioactive Cobalt

Co-58 Cobalt-58
Co-60 Cobalt-60

Radioactive Nickel

Ni-59 Nickel-59
Ni-63 Nickel-63

Radioactive Zinc

Zn-65 Zinc-65

Radioactive Selenium

Se-79 Selenium-79

Radioactive Krypton Gas

Kr-81 Krypton-81
Kr-85 Krypton-85

Radioactive Rubidium

Rb-87 Rubidium-87

Radioactive Strontium

Sr-89 Strontium-89
Sr-90 Strontium-90

Radioactive Yttrium

Y-90 Yttrium-90
Y-91 Yttrium-91

Radioactive Zirconium

Zr-93	Zirconium-93
Zr-95	Zirconium-95

Radioactive Niobium

Nb-92	Niobium-92
Nb-93m	Niobium-93m
Nb-94	Niobium-94
Nb-95	Niobium-95
Nb-95m	Niobium-95m

Radioactive Molybdenum

Mo-93	Molybdenum-93
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Radioactive Technetium

Tc-99	Technetium-99
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Radioactive Ruthenium

Ru-103	Ruthenium-103
Ru-106	Ruthenium-106

Radioactive Rhodium

Rh-103m	Rhodium103m
Rh-106	Rhodium106

Radioactive Palladium

Pd-107	Palladium-107
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Radioactive Silver

Ag-108	Silver-108
Ag-108m	Silver-108m
Ag-109m	Silver-109m
Ag-110	Silver-110
Ag-110m	Silver-110m

Radioactive Cadmium

Cd-109	Cadmium-109
Cd-113	Cadmium-113
Cd-113m	Cadmium-113m
Cd-115	Cadmium-115

Radioactive Indium

In-113	Indium-113m
In-114	Indium-114
In-114m	Indium-114m
In-115	Indium-115

Radioactive Tin

Sn-113	Tin-113
Sn-117m	Tin-117m
Sn-119m	Tin-119m
Sn-121m	Tin-121m
Sn-123	Tin-123
Sn-125	Tin-125
Sn-126	Tin-126

Radioactive Antimony

Sb-124	Antimony-124
Sb-125	Antimony-125
Sb-126	Antimony-126
Sb-126m	Antimony-126m

Radioactive Tellurium

Te-123	Tellurium-123
Te-123m	Tellurium-123m
Te-125m	Tellurium-125m
Te-127	Tellurium-127
Te-127m	Tellurium-127m

Radioactive Iodine

I-129	Iodine-129
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Radioactive Cesium

Cs-134	Cesium-134
Cs-135	Cesium-135
Cs-137	Cesium-137

Radioactive Barium

Ba-137m	Barium-137m
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Radioactive Lanthanum

La-138	Lanthanum-138
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Radioactive Cerium

Ce-142	Cerium-142
Ce-144	Cerium-144

Radioactive Praseodymium

Pr-144	Praseodymium-144
Pr-144m	Praseodymium-144m

Radioactive Neodymium

Nd-144 Neodymium-144

Radioactive Promethium

Pm-147 Promethium-147

Radioactive Samarium

Sm-147 Samarium-147

Sm-148 Samarium-148

Sm-149 Samarium-149

Sm-151 Samarium-151

Radioactive Europium

Eu-152 Europium-152

Eu-154 Europium-154

Eu-155 Europium-155

Radioactive Gadolinium

Gd-152 Gadolinium-152

Gd-153 Gadolinium-153

Radioactive Terbium

Tb-157 Terbium-157

Tb-160 Terbium-160

Radioactive Dysprosium

Dy-159 Dysprosium-159

Radioactive Holmium

Ho-166m Holmium-166m

Radioactive Thulium

Tm-170 Thulium-170

Tm-171 Thulium-171

Radioactive Lutetium

Lu-176 Lutetium-176

Lu-177 Lutetium-177

Lu-178 Lutetium-178

Radioactive Hafnium

Hf-175 Hafnium-175

Hf-181 Hafnium-181

Hf-182 Hafnium-182

Radioactive Tantalum

Ta-180	Tantalum-180
Ta-182	Tantalum-182

Radioactive Tungsten

W-181	Tungsten-181
W-185	Tungsten-185
W-188	Tungsten-188

Radioactive Rhenium

Re-187	Rhenium-187
Re-188	Rhenium-188

Radioactive Osmium

Os-194	Osmium-194
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Radioactive Iridium

Ir-192	Iridium-192
Ir-192m	Iridium-192m
Ir-194	Iridium-194
Ir-194m	Iridium-194m

Radioactive Platinum

Pt-193	Platinum-193
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Radioactive Thallium

Tl-206	Thallium-206
Tl-207	Thallium-207
Tl-208	Thallium-208
Tl-209	Thallium-209

Radioactive Lead

Pb-204	Lead-204
Pb-205	Lead-205
Pb-209	Lead-209
Pb-210	Lead-210
Pb-211	Lead-211
Pb-212	Lead-212
Pb-214	Lead-214

Radioactive Bismuth

Bi-208	Bismuth-208
Bi-210	Bismuth-210
Bi-210m	Bismuth-210m
Bi-211	Bismuth-211

Bi-212	Bismuth-212
Bi-213	Bismuth-213
Bi-214	Bismuth-214

Radioactive Polonium

Po-210	Polonium-210
Po-211	Polonium-211
Po-212	Polonium-212
Po-213	Polonium-213
Po-214	Polonium-214
Po-215	Polonium-215
Po-216	Polonium-216
Po-218	Polonium-218

Radioactive Astatine

At-217	Astatine-217
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Radioactive Radon Gas

Rn-219	Radon-219
Rn-220	Radon-220
Rn-222	Radon-222

Radioactive Francium

Fr-221	Francium-221
Fr-221m	Francium-221m

Radioactive Radium

Ra-223	Radium-223
Ra-224	Radium-224
Ra-225	Radium-225
Ra-226	Radium-226
Ra-228	Radium-228

Radioactive Actinium

Ac-225	Actinium-225
Ac-227	Actinium-227
Ac-228	Actinium-228

Radioactive Thorium

Th-227	Thorium-227
Th-228	Thorium-228
Th-229	Thorium-229

Th-230	Thorium-230
Th-231	Thorium-231
Th-232	Thorium-232
Th-234	Thorium-234

Radioactive Protactinium

Pa-231	Protactinium-231
Pa-233	Protactinium-233
Pa-234	Protactinium-234
Pa-234m	Protactinium-234m

Radioactive Uranium

U-232	Uranium-232
U-233	Uranium-233
U-234	Uranium-234
U-235	Uranium-235
U-236	Uranium-236
U-237	Uranium-237
U-238	Uranium-238
U-240	Uranium-240

Radioactive Neptunium

Np-237	Neptunium-237
Np-238	Neptunium-238
Np-239	Neptunium-239
Np-240	Neptunium-240
Np-240m	Neptunium-240m

Radioactive Plutonium

Pu-236	Plutonium-236
Pu-238	Plutonium-238
Pu-239	Plutonium-239
Pu-240	Plutonium-240
Pu-241	Plutonium-241
Pu-242	Plutonium-242
Pu-243	Plutonium-243
Pu-244	Plutonium-244

Radioactive Americium

Am-241	Americium-241
Am-242	Americium-242

Am-242m	Americium-242m
Am-243	Americium-243
Am-245	Americium-245

Radioactive Curium

Cm-242	Curium-242
Cm-243	Curium-243
Cm-244	Curium-244
Cm-245	Curium-245
Cm-246	Curium-246
Cm-247	Curium-247
Cm-248	Curium-248
Cm-250	Curium-250

Radioactive Berkelium

Bk-249	Berkelium-249
Bk-250	Berkelium-250

Radioactive Californium

Cf-249	Californium-249
Cf-250	Californium-250
Cf-251	Californium-251
Cf-252	Californium-252

These are just some of the many different radioactive poisons that are found in irradiated nuclear fuel, even after 10 years of radioactive decay. Each one of these 211 radioactive elements has its own chemical and biological properties; each one behaves differently in the environment and in the human body. They all damage living cells.