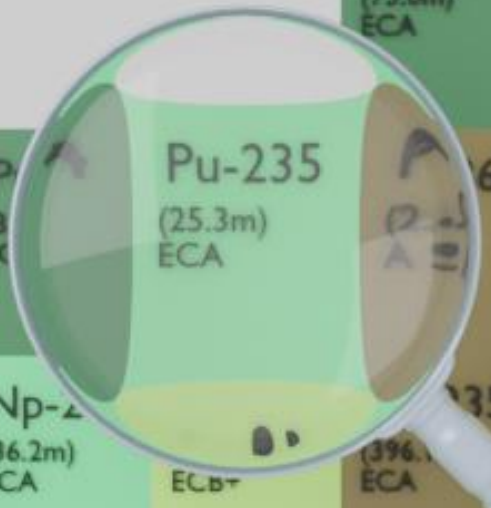




Pu-232 (33.7m) ECA	Pu-233 (4.67h) EC	Pu-235 (25.3m) ECA	Pu-236 (2.34E+5y) ECB+	Pu-237 (45.2d) ECA	Pu-238 (87.7y) A SF	Pu-239 (2.411E+4y) A
Np-232 (14.7m) ECB+	Np-233 (36.2m) ECA	Np-234 (4.4d) ECB+	Np-235 (396.1d) ECA	Np-236 (1.54E+5y) ECB-A	Np-237 (2.144E+6y) A	Np-238 (2.117d) B-
Am-237 (73.0m) ECA	Am-238 (98m) ECB+A	Am-239 (11.9h) ECA	Am-240 (50.8h) ECA			

PLUTONIUM-235

SUMMARY DATA

GENERAL

CLASSIFICATION

Isotope: Pu-235
Atomic number (Z): 94
Mass number (A): 235
Neutron number (N): 141

RADIOACTIVE DECAY

Decay modes: α , Electron capture
Half-life: 25.3 [m]
Decay constant: 4.5662e-04 [1/s]
Daughters: Np-235 (100.0%), U-231 (0.0027%)
Radioactive daughters: Np-235, U-231

DOSIMETRIC CONSTANTS

Mean alpha energy: 0.0001 [MeV]
Mean electron energy: 0.02279 [MeV]
Mean photon energy: 0.09572 [MeV]
Air kerma rate constant, Γ_{10} : 1.567e-17 [Gy·m²/Bq·s]
Air kerma coefficient, K_{air} : 1.567e-17 [Gy·m²/Bq·s]
Equilibrium dose constant for weakly-penetrating radiations (α and/or electrons), Δ_{wp} : 3.667e-15 [Gy·kg/Bq·s]
Equilibrium dose constant for alphas, Δ_{α} : 1.602e-17 [Gy·kg/Bq·s]

Equilibrium dose constant for betas/electrons, $\Delta_{\beta-\beta+,e-}$: 3.651×10^{-15} [Gy·kg/Bq·s]

Equilibrium dose constant for photons, Δ_p : 1.534×10^{-14} [Gy·kg/Bq·s]

DOSE POINT KERNELS (PLOT)

Dose point kernel source: **Graves, et al. Medical Physics. 2019 Nov.; 46(11):5284-5293.**

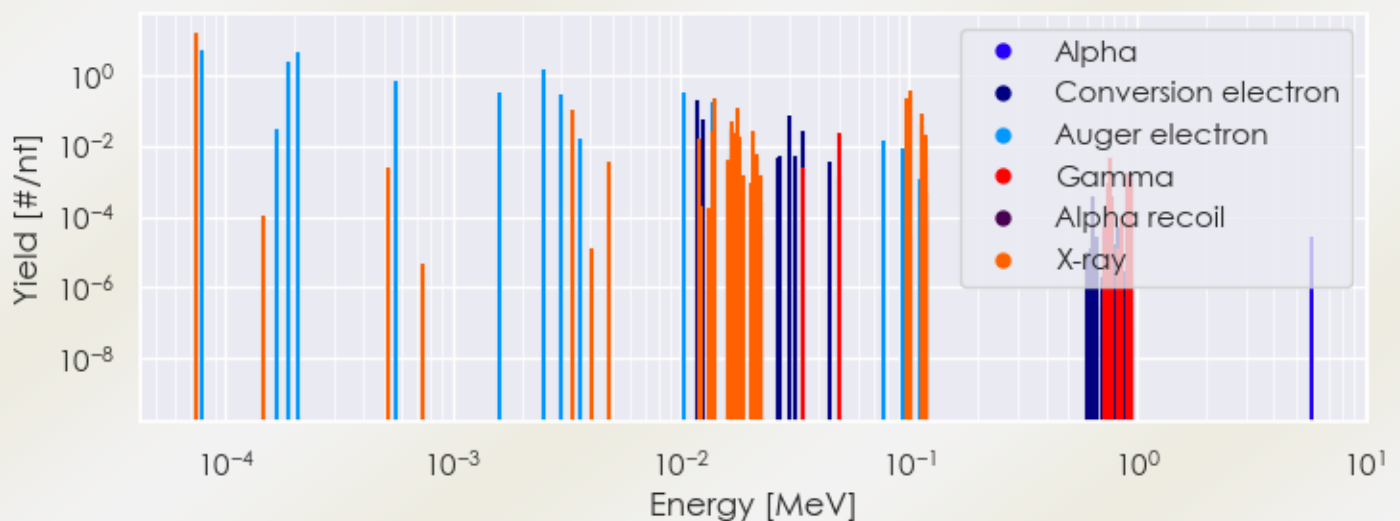
Note: Bins are spaced every 0.1 mm until a radius of 10 cm, and every 1 mm until a radius of 2 m.



Download tabulated dose point kernel file here: www.mirdsoft.org/products/MIRDspecs/Pu-235 DPK.csv

SUMMARY SPECTRA (PLOT)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**



Download tabulated summary spectra file here: www.mirdsoft.org/products/MIRDspecs/Pu-235 Summary Spectrum.csv

TABULATED DATA

SUMMARY SPECTRA (TABLE)

Spectra source: **ICRP Publication 107: Nuclear Decay Data for Dosimetric Calculations. Ann. ICRP 2008, 38 (3).**

Note: Radiations with yield < 0.01 are excluded from the table, but are available in the linked *.csv data.

Download tabulated summary spectra file here: [www.mirdsoft.org/products/MIRDspecs/Pu-235 Summary Spectrum.csv](http://www.mirdsoft.org/products/MIRDspecs/Pu-235%20Summary%20Spectrum.csv)

Energy [MeV]	Yield [#/(nt)] if > 0.01	Radiation type
7.44234e-05	1.599e+01	X-ray
3.34699e-03	1.006e-01	X-ray
1.19138e-02	1.587e-02	X-ray
1.37668e-02	2.554e-02	X-ray
1.39579e-02	2.243e-01	X-ray
1.68587e-02	4.739e-02	X-ray
1.70745e-02	2.174e-02	X-ray
1.78427e-02	1.190e-01	X-ray
1.80184e-02	1.838e-02	X-ray
2.08890e-02	2.721e-02	X-ray
4.91000e-02	2.360e-02	Gamma
9.74979e-02	2.185e-01	X-ray
1.01574e-01	3.476e-01	X-ray
1.13834e-01	4.020e-02	X-ray
1.14778e-01	7.869e-02	X-ray
1.17881e-01	1.009e-02	X-ray
1.18129e-01	2.049e-02	X-ray
7.90053e-05	4.677e+00	Auger electron
1.69913e-04	2.781e-02	Auger electron
1.90360e-04	2.433e+00	Auger electron
2.08593e-04	4.203e+00	Auger electron
5.63781e-04	6.587e-01	Auger electron
1.61289e-03	3.368e-01	Auger electron
2.48774e-03	1.378e+00	Auger electron
2.98743e-03	2.696e-01	Auger electron
3.62525e-03	1.606e-02	Auger electron
1.03691e-02	3.379e-01	Auger electron

1.17600e-02	1.974e-01	Conversion electron
1.24980e-02	5.221e-02	Conversion electron
1.38027e-02	1.734e-01	Auger electron
1.65740e-02	2.993e-02	Conversion electron
1.72747e-02	2.093e-02	Auger electron
2.97784e-02	7.020e-02	Conversion electron
3.42000e-02	2.532e-02	Conversion electron
7.72522e-02	1.475e-02	Auger electron

USEFUL LINKS

Isotope decay characteristics are periodically updated as better measurements can be made - changes that may not be reflected on this page. Please see useful links:

National Nuclear Data Center (NNDC): <https://www.nndc.bnl.gov/nudat3/mird/>

International Atomic Energy Agency (IAEA) Livechart: <https://www-nds.iaea.org/relnsd/vcharthtml/VChartHTML.html>

REFERENCE LINKS

ICRP Report 107: <https://www.icrp.org/publication.asp?id=ICRP%20Publication%20107>

Graves et al. Dose Point Kernels: <https://doi.org/10.1002/mp.13789>

MIRD Decay Schemes 2nd Edition: https://sites.snmmi.org/SNMML-MAIN/iCore/Store/StoreLayouts/Item_Detail.aspx?iProductCode=0-932004-80-6