(16.5) ^{244}Pu decays through spontaneous fission with a half-life of 6.6*10^{10} y. Estimate the number of neutrons emitted per fission if the measured n-emission rate is 1890 n s^{-1} g^{-1}.

First constants, known values, and units:

$N_A := 6.022137 \cdot 10^{23} \cdot mole^{-1}$ $\quad$ $M_{Pu} := 244 \cdot gm \cdot mole^{-1}$

Then the data from the text:

$t_{halffiss} := 6.6 \cdot 10^{10} \cdot yr$ $\quad$ $A_{nPu} := 1890 \cdot sec^{-1} \cdot gm^{-1}$

Calculations based on 1 gram of Pu:

$m_{Pu} := 1 \cdot gm$ $\quad$ $\lambda_{fiss} := \frac{ln(2)}{t_{halffiss}}$

$N_{Pu} := \frac{m_{Pu}}{M_{Pu}} \cdot N_A$

$A_{fiss} := \lambda_{fiss} \cdot N_{Pu}$ $\quad$ $n_{perfiss} := \frac{m_{Pu} \cdot A_{nPu}}{A_{fiss}}$ $\quad$ $n_{perfiss} = 2.30$