(21.7) In the example above, 1 t U as fuel elements is removed from the reactor after 2 years. Using Fig. 21.7, (a) what is the total radioactivity from the fission products after 1 y cooling time? (b) Which FP elements are the most radioactive ones at this time?

$Bq := sec^{-1}$ $PBq := 10^{15} \cdot Bq$

(a) Table 21.2 specifies 33 MWd/kg IHM as the basids for Fig. 21.7. We will assume that the production of fission products continued at a constant rate. Thus we can use the ratio of burn-ups to recalculate the data in Fig. 21.7 to the current lower burn-up case.

$B_{up} := 6000 \cdot 2$ $B_{upref} := 33000$ $Ratio := \frac{B_{up}}{B_{upref}}$ $m_{fuel} := 1000 \cdot kg$

Fig. 21.7 gives 5.4*1013 Bq/kg IHM at 33 000 MWd/tonne IHM and 1 y cooling, but we have only 12 000 MWD/tonne IHM, thus:

$A_{FPref} := 5.4 \cdot 10^{13} \cdot Bq \cdot kg^{-1}$ $A_{fuel} := A_{FPref} \cdot Ratio \cdot m_{fuel}$ $A_{fuel} = 1.964 \cdot 10^{16} \cdot Bq$

$A_{fuel} = 20 \cdot PBq$

(b) Ce-isotopes, Pr-isotopes, Cs-isotopes and Rh-isotopes; Fig. 21.7