1a) \[
\frac{\text{ft}}{\text{sec}} = 2500 \times 10^6 \text{W} \times 1.54 \frac{1}{1 \text{W}} \times \frac{1}{195 \times 10^6 \text{eV}} \times 1.602 \times 10^{-19} \frac{\text{J}}{\text{eV}}
\]
\[
= 8.00 \times 10^{19} \text{ ft/sec}
\]

1b) \[
A = 2.2 \times 10^4 \times 10^{12} \text{Ci} \times 3.7 \times 10^{10} \text{Bq/Ci} = 814 \text{ Bq} \text{ in one liter}
\]
production \[A = N \phi (1 - e^{-2t}) \] but it is small so \[A \approx N \phi (2t) \]

\[
f = \frac{A}{N \phi \tau}
\]

\[
\tau = \frac{0.53 \text{ mb} \times 1 \times 10^{-27} \text{ cm}^2/\text{mb}}{1.78 \times 10^{-9}}
\]

\[
te = \frac{814}{12.3\text{yr} \times 3.15 \times 10^{13} \text{ s/yr}} = 1.78 \times 10^{-9}
\]

\[
te = 1.12 \times 10^4 \text{ s} = 186 \text{ min} = 3.11 \text{ h}
\]

1c) \[
A(10 \text{ days}) = N \phi (1 + t) = N \phi 7.259 \text{ (d)}^2 \times 10 \times 24 \text{ hr} \times 3600 \text{ s/hr}
\]

\[
A(10 \text{ days}) = 62,718 \text{ s}
\]

dilution factor = \[
\frac{\text{Dose A}}{\text{dose A}} = \frac{814 \text{ Bq}}{62,718 \text{ s}} = 1.3 \times 10^{-2}
\]

Note: This dilution factor does not seem very large - the water was probably in the reactor for a longer period and had a higher initial activity.