

Medical Physics Consultants, Inc.

AIRBORNE EFFLUENT CONCENTRATION AEROSOLS

(Compliance with 10 CFR 20.1302)

Current Exhaust Rate: 882 cfm (Room 2)

Total exhaust per week: 168 hr week = 2.52×10^{11} ml
40 hr week = 5.99×10^{10} ml

Inhalation occupational DAC limit (Restricted Areas): 6×10^{-5} $\mu\text{Ci/ml}$

Effluent concentration limit (Unrestricted Areas): 2×10^{-7} $\mu\text{Ci/ml}$

ENVIRONMENTAL RELEASE

Maximum allowed activity to be released per week:

$$A = (C)(V) \quad 2 \times 10^{-7} \mu\text{Ci/ml} \times 2.52 \times 10^{11} \text{ ml} = 50356 \mu\text{Ci}$$

Maximum activity to be administered for patient studies per week is $4 \times 10^5 \mu\text{Ci}$

Assuming 15% of the activity administered is released, the maximum activity likely to be released per week is $18000 \mu\text{Ci}$

This is in below of the regulatory limit for environmental release.

OCCUPATIONAL EXPOSURE

Assuming a patient volume of 10 patient per week and a maximum of 40 mCi/kit, 5% administered/min for 6 minutes with 15% leakage, therefore the total activity released into the room is $18000 \mu\text{Ci}$.

$$\text{The concentration will be: } 18000 \mu\text{Ci} / 5.99 \times 10^{10} \text{ ml} = 3 \times 10^{-7} \mu\text{Ci/ml}$$

This value is below the regulatory limit of $6 \times 10^{-5} \mu\text{Ci/ml}$ for restricted areas.