

**Medical Physics Consultants, Inc.**

Room 12E

**AIRBORNE EFFLUENT CONCENTRATION**

Xenon-133

(Compliance with 10 CFR 20.1302)

**Current Exhaust Rate:** 325 cfm**Total exhaust per week:** 168 hr week =  $9.28 \times 10^{10}$  ml  
40 hr week =  $2.21 \times 10^{10}$  ml**Inhalation occupational DAC limit (Restricted Areas):**  $1 \times 10^{-4}$   $\mu\text{Ci/ml}$ **Effluent concentration limit (Unrestricted Areas):**  $5 \times 10^{-7}$   $\mu\text{Ci/ml}$ **ENVIRONMENTAL RELEASE**

Maximum allowed activity to be released per week:

$$A = (C)(V) \quad 5 \times 10^{-7} \mu\text{Ci/ml} \times 9.28 \times 10^{10} \text{ ml} = 46388 \mu\text{Ci}$$

Maximum activity to be used for patient studies per week is  $9 \times 10^4 \mu\text{Ci}$ Assuming 20% of the activity used is released the maximum activity likely to be released per week is 18000  $\mu\text{Ci}$ **OCCUPATIONAL EXPOSURE**

Assuming a patient volume of 6 patients per week and a maximum of 15 mCi/patient, the total activity released into the room is 18 mCi.

$$\text{The concentration will be: } 18000 \mu\text{Ci} / 2.21 \times 10^{10} = 8.14 \times 10^{-7} \mu\text{Ci/ml}$$

This value is below the regulatory limit of  $1 \times 10^{-4} \mu\text{Ci/ml}$  for restricted areas.