

WYANDOTTE GENERAL HOSPITAL
233 BIDDLE AVENUE
WYANDOTTE, MICHIGAN 48192

29 July 1985

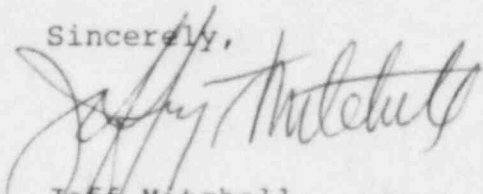
U.S. Nuclear Regulatory Commission, Region III
Materials Licensing Branch
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Please amend our materials license 21-12930-01 to reflect a room change for xenon procedures. Enclosed, please find the room diagram and ventilation calculations.

Since we are a municipal hospital, no licensing fees are required.

If you have any questions concerning this license amendment, please contact our physics consultant, James Tomlinson, at (313) 662-3197.

Sincerely,


Jeff Mitchell
Vice-President

RECEIVED
85 AUG 14 P3:46
U.S. N.R.C.
MATERIALS LICENSING BRANCH

8509110073 850820
REG3 LIC30
21-12930-01 PDR

RECEIVED BY LPMB	
Date	Aug 7 1985
Log	8/19/85
By	[Signature]
Orig To	[Signature]
Action Comp	[Signature]

RECEIVED
AUG 7 1985
REGION III

EX-111(16)
FEE EXEMPT

CONTROL NO. 7 952 1

AUG 7 1985

APPENDIX M

INFORMATION IN SUPPORT OF XE-133 USE

1. QUANTITIES TO BE USED

A. Patient information

- (1). 10 studies per week
- (2). 10 milliCuries (average) per study

B. 200 milliCuries possession limit

2. USE AND STORAGE AREAS

A. Xenon-133 will be stored in the Storage Area of the Hot Lab and used (i.e., administration, imaging, and trapping/exhaust) in the Imaging Area.

B. Ventilation: A 500 CFM exhaust fan delivers air directly to OUTSIDE air on the facility roof, carrying a major portion of any Xe-133 contamination, and is situated well away from any intake vents (30 feet minimum). Airflow will therefore come from the hallway via the door(s). No air is recirculated.

C. In the case of exhaust fan shutdown, Xe-133 studies will not be performed.

3. PROCEDURES FOR ROUTINE USE

A. When stored in the Hot Lab, Xe-133 is contained in unit dose ampules inside 1/8" lead shipping tubes behind lead bricks. Individual doses will be assayed in the dose calibrator and administered using the Pulmonix Gas Dispensing System. The seal will be broken only in the Imaging Area. Thus, no significant leakage is expected in the Hot Lab Area.

B. Xe-133 will be administered to the patient and collected using the Pulmonex deliver/trap system. For each patient study, the technologist will check the tubing of the xenon delivery system for defects and will familiarize the patient with the study.

C. Nose clamps will be used to reduce leakage.

4. EMERGENCY PROCEDURES

- A. Notify persons in the room that a release has occurred.
- B. All persons should vacate the room at once.
- C. Close the room door(s) to prevent entry.
- D. Notify the Radiation Safety Officer immediately.
- E. Re-enter the room(s) after 30 minutes (5 turnovers of room air).
- F. Perform an exposure rate survey with a GM survey meter.

5. AIR CONCENTRATIONS OF XE-133 IN RESTRICTED AREAS

$$\begin{aligned} \text{A. Activity used (A)} &= 10 \text{ mCi} \times 10 \text{ exams/wk} \times 1\text{E}3 \text{ uCi/mCi} \\ &= 1\text{E}5 \text{ uCi/wk} \end{aligned}$$

$$\text{B. Loss rate (f)} = 0.20$$

$$\begin{aligned} \text{C. Ventilation required (V)} &= (A \times f) / (1\text{E}-5 \text{ uCi/ml}) \\ &= \frac{1\text{E}5 \text{ uCi/wk} \times 0.20}{1\text{E}-5 \text{ uCi/ml}} \\ &= 2\text{E}9 \text{ ml/wk} \end{aligned}$$

Assuming a 40-hour week:

$$\begin{aligned} V &= \frac{(2\text{E}9 \text{ ml/wk}) / (40 \text{ h/wk})}{1.7\text{E}6 \text{ ml/h-CFM}} \\ &= 29.4 \text{ CFM} \end{aligned}$$

Thus, the airflow in the area of interest, 500 CFM exhaust, is adequate.

6. AIR CONCENTRATIONS OF XE-133 IN UNRESTRICTED AREAS

A. Charcoal-trap adsorption (Reg. Guide 10.8, Appendix M, 6.b) via the Pulmonex deliver/trap system.

$$\begin{aligned} \text{B. Ventilation required (V)} &= \frac{(1\text{E}5 \text{ uCi/wk}) (0.20)}{3\text{E}-7 \text{ uCi/ml}} \\ &= 6.7\text{E}10 \text{ ml/wk} \end{aligned}$$

Assuming a 168-hour week:

$$V = \frac{(6.7E10 \text{ ml/week}) / (168 \text{ h-wk})}{1.7E6 \text{ ml/h-CFM}}$$

$$= 233.4 \text{ CFM}$$

Thus, 500 CFM is adequate. Duct(s) on-time will be approximated from the following equation and recorded:

$$\text{Duct(s) On-Time} = \frac{(n/10) \times 168\text{h} \times 233.4 \text{ CFM}}{500 \text{ CFM}}$$

where:

n = number of 10 mCi-equivalent patient studies

C. Trap monitoring

(1) Effluent from the trap exhaust will be collected in a test balloon weekly and counted on a Gamma Camera with the collimator removed and the PHA set for Xe-133. The procedure for xenon trap evaluation is included. Care will be taken to assure that no extraneous radiation sources interfere with the measurements. Given a 10 mCi dose and assuming a 95% trapping efficiency and no residual Xe-133, a 500 uCi action level for trap removal is deemed reasonable. However, experience dictates that effluent is significantly less than 500 uCi in properly operating systems. Thus, an action level of 200 uCi will be set, which is a small fraction of the assumed 20% leakage from all sources.

(2) Saturated filters will be sealed (per manufacturer's instructions) to prevent leakage. These will be then stored in the "Decay-to-Background" Radioactive Waste Storage Area or returned to the supplier.

(3) An optional method for checking effluent from the trap exhaust will be used if a XenAlert Xe-133 Room Air and Trap Monitor System is purchased. This device will be used weekly and will be calibrated annually as outlined in the manual provided with each unit. A similar action level (mentioned above) will be used.

(4) Velometer readings will be taken semi-annually to assure air flow through the 500 CFM exhaust fan(s) has remained stable.

Xenon Imaging Facility - ROOM G 13

