



November 6, 1984

U.S. Nuclear Regulatory  
Commission  
Region I  
Materials Section B  
631 Park Avenue  
King of Prussia, PA 19406

Dear Sir,

This is in reference to the questions posed by Mr. John Miller of your section concerning the proposed amendment to license number 06-19661-01, Syncor Corp., West Hartford, CT.

1. We will sample air in both the restricted and unrestricted areas of the fume hood room. The charcoal filter on the glove box will be changed when our measurements show a concentration greater than  $1/2$  of the MPC for  $^{131}\text{I}$  or  $5 \times 10^{-11}$  uCi/ml.
2. The fume hood room has no force air supply. All the air traveling through this room and out the fume hood stack will be pulled in by the fume hood exhaust blower. The room has an exhaust only.
3. Check the enclosed calculations for the estimated fraction of  $^{131}\text{I}$  released to the unrestricted area.

NOTE: We do not work with open vials of  $^{131}\text{I}$ . Our  $^{131}\text{I}$  is contained in a stoppered vial. The  $^{131}\text{I}$  is transferred to other stoppered vials with a syringe. This method cuts out the bolus of  $^{131}\text{I}$  vapor released when a vial is open completely to the environment. Also the  $^{131}\text{I}$  is handled in a glove box that removes 90% of the iodine through charcoal filtration.

I hope this material answers your questions. Thank you for giving our amendment your prompt attention, it was greatly needed and appreciated.

Sincerely,

Frank Demeis  
Health Physicist

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06-19661-01MD PDR

Syncor International Corporation  
Medical Services Group  
10033-M George Palmer Highway  
Lanham, Maryland 20706  
(301) 459-8905

The following data is used to calculate the release of volatile I-131 to an unrestricted area.

1. 0.005 uCi/min vaporization rate per 30 mCi of NaI-131 therapeutic Solution, 1) OR  $0.005 \text{ uCi}/30 \text{ mCi} = 1.67 \times 10^{-4} \text{ uCi/mCi/min}$
2. Stock solution used = 50 mCi
3. Average time opening stock solution = 5 times/week
4. Average time the stock solution is open = 2 min (high estimate)

Therefore, if we assume a 50 mCi source being worked with for 2 min, 5 times a week, the following amount of I-131 could be released through the fume hood exhaust into an unrestricted area, (the atmosphere).

Calculations

1.  $1.67 \times 10^{-4} \text{ uCi/mCi/min} \times 5 \text{ times/week} \times 50 \text{ mCi} \times 2 \text{ min/time} = 8.35 \times 10^{-2} \text{ uCi/week}$
2.  $8.35 \times 10^{-2} \text{ uCi/week} \times 52 \text{ weeks/year} = 4.34 \text{ uCi/yr}$
3. Using example calculations from NRC Guide 10.8 for volatile substances:

$$C = \frac{A}{V} \leq 1 \times 10^{-10} \text{ uCi/ml}$$

$$A = 4.34 \text{ uCi/yr}$$

$$V = 475 \text{ CFM} \times 1.49 \times 10^{10} \frac{\text{ml/year}}{\text{ft}^3/\text{min}}$$

$$7.08 \times 10^{12} \text{ ml/year}$$

$$C = \frac{4.34 \text{ uCi/year}}{2.04 \times 10^{13} \text{ ml/year}} = 6.13 \times 10^{-13} \text{ uCi/ml}$$

$$7.08 \times 10^{12}$$

We anticipate no volatile I-131 being released into the pharmacy since all therapeutic I-131 will be stored in the fume hood and opened in a glove box with a charcoal filter.

Note: These calculations are based on work done on NaI-131 solutions as they were in 1979. Since that time reducing agents have been incorporated into therapeutic NaI-131 solutions which have reduced their volatility considerably.

1. Health Physics, Volume 36, Number 1, January 1979, Page 68.