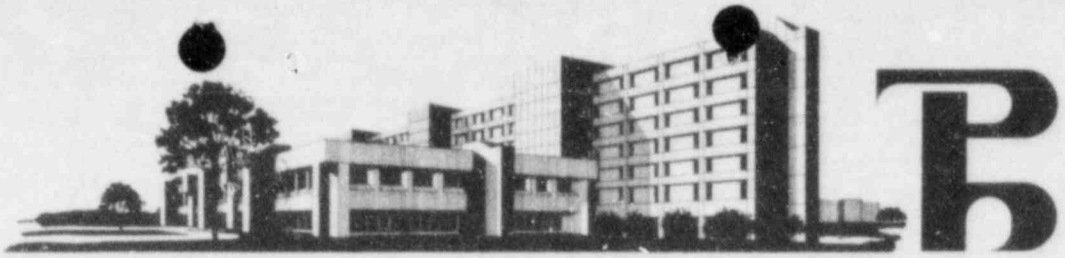

Presbyterian hospital
Northeast 13th Street
at Lincoln Boulevard
Oklahoma City, Oklahoma 73104
405/271-5100

Applicant
Check No. 24308
Amount/Fee Category 240 (7B)
Type of Fee Amendment
Date Check Rec'd. DEC. 21 1978
Received By Brown

December 8, 1978

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Date DEC 21 1978
By Brown
Action Code 12/22/78

Dec P&S Amend

U.S. Nuclear Regulatory Commission
Radioisotopes Licensing Branch
Division of Fuel Cycle and Material Safety
Washington, D.C. 20555

Gentlemen:

We would like to amend Materials License #35-12091-01 to include the use of Xenon 133 for Perfusion and Ventilation studies. The following is submitted in support of this request. The items are indexed to the November 1977 Guide, Appendix M.

A. 1. 150 patients per year - Average 3 per week with 10 millicuries per patient.
2. 400 millicuries including activity held for decay.

B. 1. Storage will be in the Radiological Hood of room 1B081 behind lead bricks.
Use will be in the Camera Rooms 1B093/1B080, now one room. The nearest unrestricted area is the elevator, which is approximately 60 feet horizontally (refer air diagram) or 30 feet vertically to roof of 2nd floor, where the exhaust of the hood is located.
2. During ventilation studies, electrically operated dampers will do the following:
(1) Stop supply and return air to rooms 1B093, 1B080, and 1B074.
(2) Start exhaust fan for the Radiological Hood in 1B081. The hood door will be closed for these studies.
3. A proposed 12" duct is to be connected from the hood to Rooms 1B080/93 with the input register located near the floor on the east side of room 1B080. With the doors into the scanning rooms closed, or almost closed, this should produce a flow of approximately 1000 CFM at a pressure below that of the rooms outside the scanning area.

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C. 1. The breathing apparatus will be checked for operation with the patient in position prior to the injection of the XE-133.
2. We propose to use the Atomic Products Corp. Economy Xenon System (brochure enclosed).
3. The Atomic Products Corp. 130-600 mouthpiece with felt covered nose clamp.

D. Should the entire Xenon-133 dose be released in the camera room, the patient and all personnel will leave the room immediately and leave the doors closed. With an exhaust of 1000 CFM and a room volume of approximately 2400 cubic feet, the flow to volume is 1000/2400 or .417 per minute which is equivalent to a half time clearance of 1.7 minutes. The room activity will be checked after 10 minutes of exhausting with an EON PSM 500 Survey Meter, and if over 1.5 times background, exhausting will continue for an additional 10 minutes.

E. Air Handling Unit 103 supplies 7340 CFM to the entire area which has a total exhaust of 1960 CFM. The total volume of area 1-Interstitial North is approximately 75,000 cubic feet. This produces a half time clearance for the entire area of 24.4 minutes. The mixing flow/volume for the entire area is 7340/75,000 or .098 per minute, which corresponds to a mixing half time of 7.1 minutes. While not considered likely, the area could be evacuated before much of the unrestricted portion would be involved. As long as the exhaust of the Radiological Hood is functioning, the likelihood of spread is essentially zero.
The roof is not occupied except for occasional maintenance. The engineering department will notify Nuclear Medicine each time access is necessary.
The nearest building which could have open windows is over 800 feet.

F. 1. A - Maximum assumed 6 patients/week or $6X10^4$ uCi/week.
2. F - Assumed to be .25.
3. Air flow - 1000 CFM.
Not included in the balance sheet of area 1-B is the measured exhaust of the Radiological Hood of 1458 CFM through a 8X35 opening. The measurements were done 12/6/78 by D. Vandenburg, P.H. of the Engineering Dept. with a Alnor 8100 Velometer.

$$A \times F = 1.5 \times 10^4 \text{ uCi/week}$$

$$V = \frac{1.5 \times 10^4}{1 \times 10^{-5}} = 1.5 \times 10^9 \text{ ml/week}$$

$$V = \frac{1.5 \times 10^9}{40} = 3.75 \times 10^7 \text{ ml/hr}$$

$$V = 22.06 \text{ CFM required}$$

Estimated CFM available = 1000 CFM

G. Exhaust from Area 1-Interstitial North is 1960 CFM. Assuming the charcoal traps to be only 50% efficient, this would produce a yearly average concentration of

$$3 \times 10^{4} \times 52 = 1.56 \times 10^{6} \text{ uCi/year}$$

$$\times .5 = 7.8 \times 10^{5} \text{ uCi/year to be exhausted}$$

$$1960 \text{ CFM} = 2.908 \times 10^{13} \text{ ml/year}$$

$$\text{Avg conc} = \frac{7.5 \times 10^{5}}{2.908 \times 10^{13}} = 2.58 \times 10^{-8} \text{ uCi/ml}$$

The charcoal trap will be tested each time the unit is used by measuring the activity in the top of the input column of charcoal and at the top of the exit column of charcoal. When the output to input ratio is greater than 0.2, the trap will be replaced. Used traps are stored in the hood behind lead bricks until essentially complete decay.

We will appreciate prompt review of the request since our Pulmonary Function group is anxiously waiting for this capability.

Yours truly,

John W. Turner
Vice President

JWT:slh