5230 South Sixth Street
Springfield, Illinois
62703
Telephone 217 529-7151

Humana Hospital Springfield

Bruce Mallett, Ph.D.
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Dr. Mallett: reference: 12-16777-01

We request that you amend our NRC By-Product Materials License to add Group IV and Group V to our license. Supportive information for this request is listed below.

Also please add Nicola L. Chiaradonna, M.D. as the authorized user of Group IV and Group V materials. The training and experience for Dr. Chiaradonna is contained in Preceptor Statements already on file with your department.

Supportive information:

1. Radioiodine administered for therapeutic purposes will be in capsule form, for the most part. If liquid is utilized, procedures from the NRC reference guide for bioassay procedures for use of liquid radioiodine will be followed.
2. All patients receiving thirty or more millicuries of radioiodine will be hospitalized, in a private room. The room will be posted with required warning signs and will be kept restricted to authorized personnel only.
3. Procedures contained in Appendix K of Regulatory Guide 10.8 wi be followed.
4. Any contaminated items, such as bed linens, clothing, etc. will be held in storage until the radiation levels have reached background, when measured with a GM survey instrument in an area of natural background. The materials will then be reutilized as needed.
5. Records will be kept of all radiation surveys performed in conjunction with any therapeutic procedures.

Enclosed please find a check for $120.00 to cover the amendment fee. We authorize Mr. Ronald D. Edwards, physicist, Radiation Protection Connsultants, LTD., Aurora, IL, to answer any questions or provide any additional information you may need regarding this amendment request.

Thank you for your cooperation in this matter.

Very truly yours,

Richard C. Waters

Richard C. Waters
Associate Executive Director

An Affiliate Of
The Hospital Company
Humana

P. C. Box 4060
Springfield, Illinois
62708
(217) 529-7151

12-16777-01
030-11625

Springfield Community Hospital

December 10, 1982

Bruce Mallet, Ph.D.
Section Chief Licensing Section
U.S. Nuclear Regulartory Commission
799 Roosevelt Road
Glen Ellen, IL 60137

Dear Dr. Mallett:

We request that you ammend our NRC license number 12-16777-01 to include the use of Xenon-133 gas for ventilation studies.

Attached please find information to suppliment our request. We also authorize Mr. Ronald Edwards, physicist from Radiation Protection Consultants, Naperville, Illinois to act on our behalf to answer any questions or supply any additional information with regards to our licenses or this ammendment.

Enclosed please find the check for $40.00 to cover the ammendment fee.

We would like to thank you in advance for your cooperation in this matter, should you have any questions, please contact Mr. Edwards.

Sincerely,

Charles L. Baker
Executive Director

MM/go

RECEIVED BY LFMB
Date 12/23/82
Log Dec-17 III
By go
Orig. To
Action Compl 2/27/84

Applicant Humana
Check No. 003961
Amount/Fee Category $40.00
Type of Fee Amendment
Date Check Rec'd 12/23/82
Received By

DEC 15 1982

CONTROL NO. 07242

Supportive Information for Xenon 133 Amendment Request
Springfield Community Hospital
Springfield, Illinois
NRC License #12-16777-01

The below list of supportive information will follow the sequence as listed in Appendix M, Page 10.8-51 of the NRC Licensing Guide-Revision 1.

1.A. Number of studies per week - 10
Average activity per patient - 20 millicuries

B. Possession limit - 500 millicures

2.A. See attached diagram. The Xenon will be stored in the radionuclide storage area of the hot lab in the fume hood as noted on the diagram. These viles will be kept in their lead storage containers, which are stored behind lead bricks.

B. The air flow rates to the imaging storage room where the supply is 310 CFM and the exhaust is 125 CFM.

The air exhaust system is an isolated system which does not recirculate any air. The air flow is released at the roof top from the fume hood. No air intake structures, windows, etc. are within 35 feet of the release point. No air flow rate changes are anticipated between heating or cooling seasons.

C. The room will be under negative pressures shown by the supply and exhaust rate in 2B of this section. The air flow rates will be checked on a semi-annual basis, using an air flow velometer.

3.A. See attached for routine procedures using Xenon 133.

B. A Pulmanex delivery and trap system from Atomic Products will be utilized.

4. Emergency procedures are as follows:
A. GM survey instrument kept in the room at the time the procedures are performed to monitor for any leakage of gas. A background determination with no radiation sources present is taken at first to determine normal background then with a patient in position for the study, having inhaled the dose of Xenon gas. Readings which are twice the value noted when the patient had inhaled the Xenon are utilized as criteria for clearing the room of personnel. The GM unit is placed in the same place each time.

4.B. Should any leakage be detected, the room is evacuated immediately and sufficient time allowed to pass to clear the room of Xenon.

C. A search is made to locate the source of the leak of the Xenon to prevent any further leakage.

D. Routine procedures are not attempted until the room has been checked with an appropriate survey instrument to determine any existing presence of Xenon gas.

5. As noted, the measured exhaust rate is 625 CFM, which would allow greater than 340 millicuries to be released in the restricted area per 40 hour week. This ventillation rate, therefore, meets the requirement of 20.103 of 10 CFR part 20.

6.A. The following calculations show that the quantity of Xenon 133 exhausted into the unrestricted area of the roof top meets the requirement to keep concentrations below 3×10^{-7} microcuries per milliliter. As noted, the loss rate is assumed at 20% and the concentration value is 2.23 micocuries per ml.

B. (1) The Xenon trap system will be checked at least weekly, utilizing a Xenalarm System, Model #136-250 Xenon Trap Monitor. As previously described, all leakage from the Xenon procedures and the trap system will be vented through the fume hood devise.

(2) The Xenon trap system will be checked initially and at least monthly thereafter with the Xenon trap monitor system to determine the trapping capacity of the trap system. The Xenon monitor will be checked at least annually according to the manufacturer's directions.

(3) Any filters that do become saturated will be removed from the unit, placed into a plastic bag, which is then sealed and placed in storage behind shielding in the fume hood. After the elapse of 10 half lives, the trap will be surveyed with a survey instrument before disposal.

RDE:pam

LUNG IMAGING - VENTILATION WITH Xe-133

Purpose: To evaluate pulmonary ventilation, diagnose and quantitate obstructive airways disease, and determine whether there is ventilation/perfusion match or mismatch in patients with suspected pulmonary embolism.

Radiopharmaceutical: Xe-133 gas

Dose: Adult: 10-20 mCi
Pediatric: 10 mCi

Route of Administration: Inhalation

Patient Preparation: None. Patient must be able to breathe from the face mask of the Xe-133 delivery apparatus. Study should precede a pulmonary perfusion study if both are to be done. A resident or attending physician will determine whether the patient may safely receive supplemental oxygen.

Instrumentation: LFOV camera with LEAP collimator, Xe-133 delivery apparatus, oxygen source

Procedure:

1. Calibrate camera for Xe-133 (81 keV photopeak) with 20% window.
2. Explain procedure and allow patient to become familiarized with apparatus. Clean face mask. Check all tubing and connections.
3. Seat patient with back to the collimator so a posterior projection is obtained.
4. Press "fill" button to fill reservoir with air.
5. Check with a resident or attending physician to make sure that the patient may safely receive supplemental oxygen. Then connect O_2 delivery tubing to O_2 intake part if the patient may receive oxygen.
6. Place mask on the patient and secure with straps for an air-tight seal. The quality of this procedure is highly dependent on the care exercised by the technologist. It is imperative that you make sure the face mask fits tightly and that there are no leaks present.
7. Press "equilibrium" button. Instruct patient to exhale completely. Inject Xe-133 into system while patient takes in a deep breath and holds it.
8. Obtain a single breath image for 350K or as long as the patient can hold his breath, whichever comes first. Use "8" format.

9. When patient can no longer hold breath, have him exhale into the closed system and continue normal breathing.

10. Turn on the O_2 flow (usual flow rate is approximately 2 liters/minute). After 2 minutes of re-breathing, begin the equilibrium image for an additional 3 minutes or 600K, whichever comes first. Continue wash-in for a total of 5 minutes.

11. Press "wash-out" button, turn on timer and xenon trap.

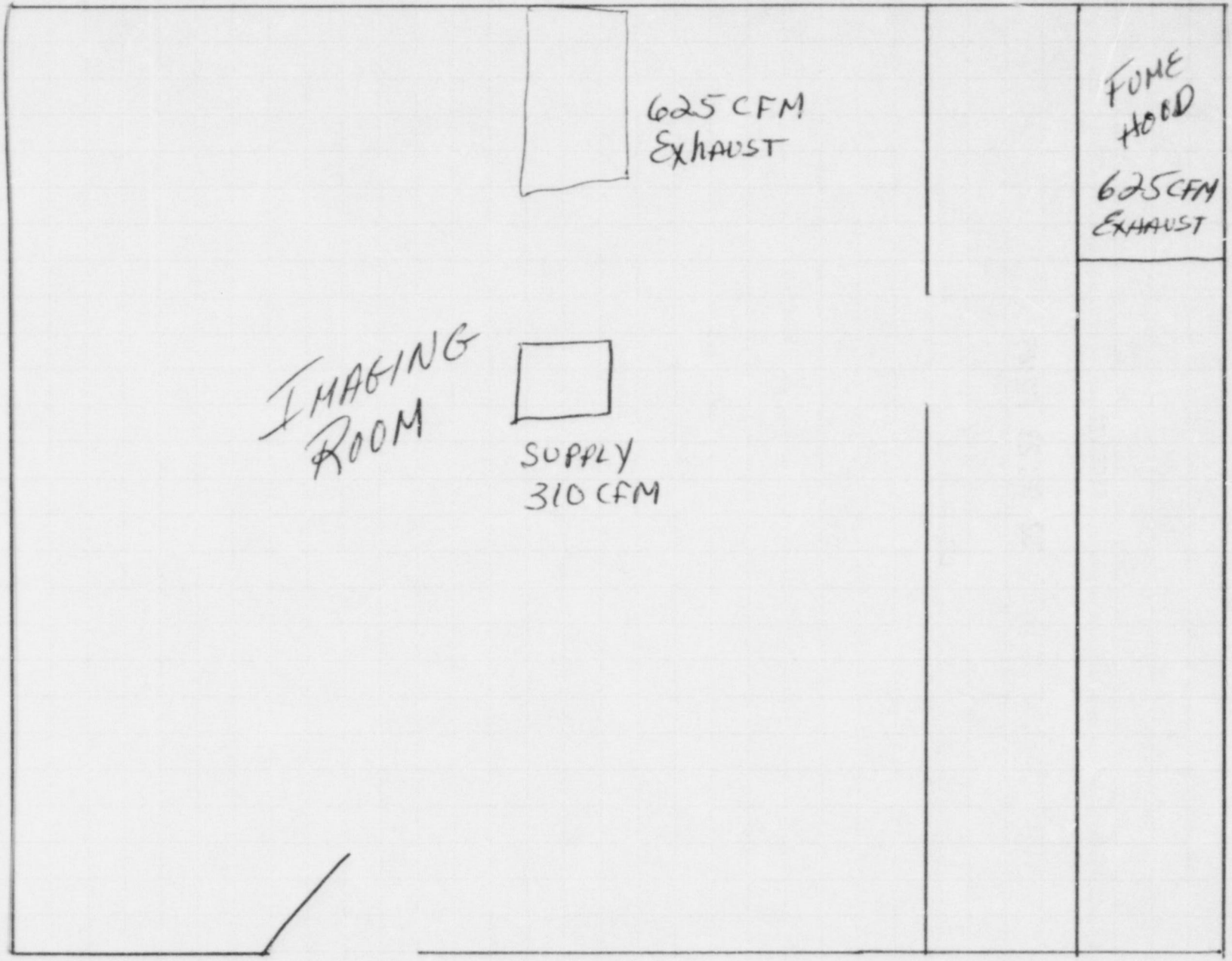
12. Obtain serial 60 second images for 6 minutes ("8" format):

0-1 minute	Posterior
1-2 minutes	Posterior
2-3 minutes	45^{o} RPO
3-4 minutes	45^{o} LPO
4-5 minutes	Posterior
5-6 minutes	Posterior

13. Additional 60 second images should be obtained in the posterior projection until the count falls below 20K/second.

14. When the study is completed, remove the mask and then push the "system wash-out" button.

15. The moisture and CO_2 absorbers should be changed after each <u>two</u> exams.



SPRINGFIELD COMMUNITY HOSP.
SPRINGFIELD, ILL.

12-16777-01