



DEPARTMENT OF THE NAVY

NAVAL HOSPITAL
PORTSMOUTH, VIRGINIA 23708-5000

IN REPLY REFER TO:

6470
7161
26 February 1986

From: Commanding Officer, Naval Hospital, Portsmouth, Virginia 23708-5000
To: Radioisotope License Branch, Division of Fuel Cycle and Material Safety,
Office of Material Safety and Safeguards, U. S. Nuclear Regulatory
Commission, Washington, D. C. 20555
Via: Commander, Naval Medical Command (MEDCOM21), Washington, D. C. 20372
Subj: USE OF XENON-133 IN NEW NUCLEAR MEDICINE DEPARTMENT
Ref: (a) NRC ltr FCML:PCV (019418) 030-0330 dtd 29 Jan 86
Encl: (1) Information for use of Xenon-133
(2) Air flow reading room 1-98, Nuclear Medicine Clinic

1. The information requested by reference (a) is forwarded in enclosures (1) and (2).

G. I. SNYDER
By direction

CC:
COMNAVMECOM MIDLANT (Code 35)

8603240309 860318
NMSS LIC30
45-01121-03 PDR

INFORMATION FOR USE OF XENON-133

1. The Xe-133 will be used in room 1-98, building 215, and stored in a shielded container in the ventilation hood in the hot locker, building 215. (See Appendix A for diagrams of use and storage areas.)
2. The air flow rates and location of exhaust and supply vents are shown on Appendix A. Approximately fifty percent (50%) of the air in room 1-98 is recirculated back into the room. Air from room 1-98 is not recirculated into any other parts of the hospital or Nuclear Medicine Clinic.
3. The air flow rates will be measured semi-annually by the hospital's Public Works Department, using an air flow measuring hood and pitot tube.
4. Appendix B contains the procedures for the routine use and disposal of Xe-133. The Pulmonex Xenon System is used for administration and collection of the Xe-133 gas.
5. In case of an accidental release of Xe-133 in room 1-98, personnel will be evacuated and the door closed. Personnel will not re-enter the room for thirty (30) minutes. Upon re-entry, the "XenAlert" will be checked to determine Xenon concentrations.
6. In case of an accidental release of Xe-133 in the hot locker, personnel will be evacuated, and no re-entry will be made for at least one (1) hours.
7. Air concentration of Xe-133 in restricted areas:
 - a. The maximum amount of activity used per week is 60 mci or 6×10^4 uc/wk.
 - b. The fraction lost is assumed to be a maximum of 20 percent.
 - c. Flow rate required is 117.6 cubic feet per minute (CFM).
 - d. Actual ventilation rate in room 1-98 is 270 CFM and in the hood in the hot locker is 390 CFM.

LUNG VENTILATION - Continued

NOTES

1. The room ventilation system will be turn on prior to the study and will remain on for at least one hour after the study.
2. Make a dry run of the study using plain O_2 to evaluate how well the patient will be able tolerate the study.
3. Leave the O_2 tank attached to the closed system in case the patient needs additional O_2 .
4. Change the CO_2 absorber when a change in color is noticed.
5. Clean the face mask with alcohol before each study.
6. The exahust of the Pulmonex Xenon System will be monitored by the XenAlert trap monitor to ensure that no Xenon is discharged into the room. The trap will be replaced when the XenAlert indicates that Xenon is being released.
7. Xe^{133} will be stored in a shielded container located in the ventilation hood in the hot locker in building 215. Unused portions of Xe^{133} will be transferred to the radioactive waste storage area.

Code 312

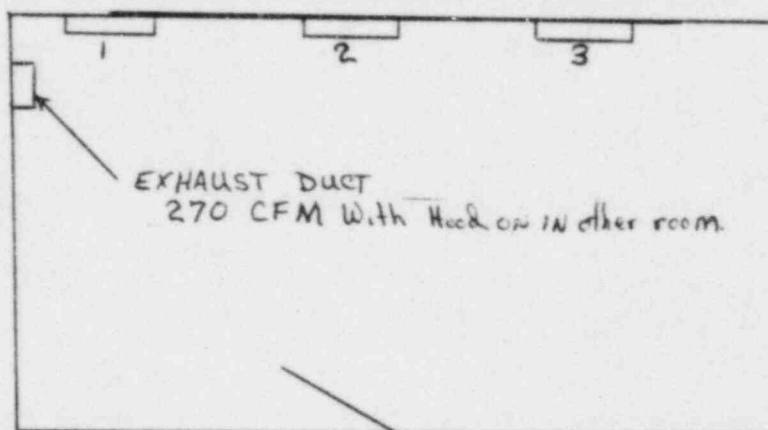
DATE: 21 FEB 86

FROM: Maintenance Control Director, Facilities Management Department

TO: Head, Radiation Safety, Nuclear Medicine

SUBJ: AIR FLOW READINGS IN NUCLEAR MEDICINE

1. On 13 FEB 86 the following air flow measurements was taken in Room 1-98, Building 215.



(a) Coil Induction Unit 1 supplying 200 CFM with 110 CFM being recirculated air, resulting in 90 CFM fresh air supply.

(b) Coil Induction Unit 2 supplying 90 CFM with 50 CFM being recirculated air, resulting in 40 CFM fresh air supply.

(c) Coil Induction Unit 3 supplying 160 CFM with 70 CFM being recirculated air resulting in 70 CFM fresh air.

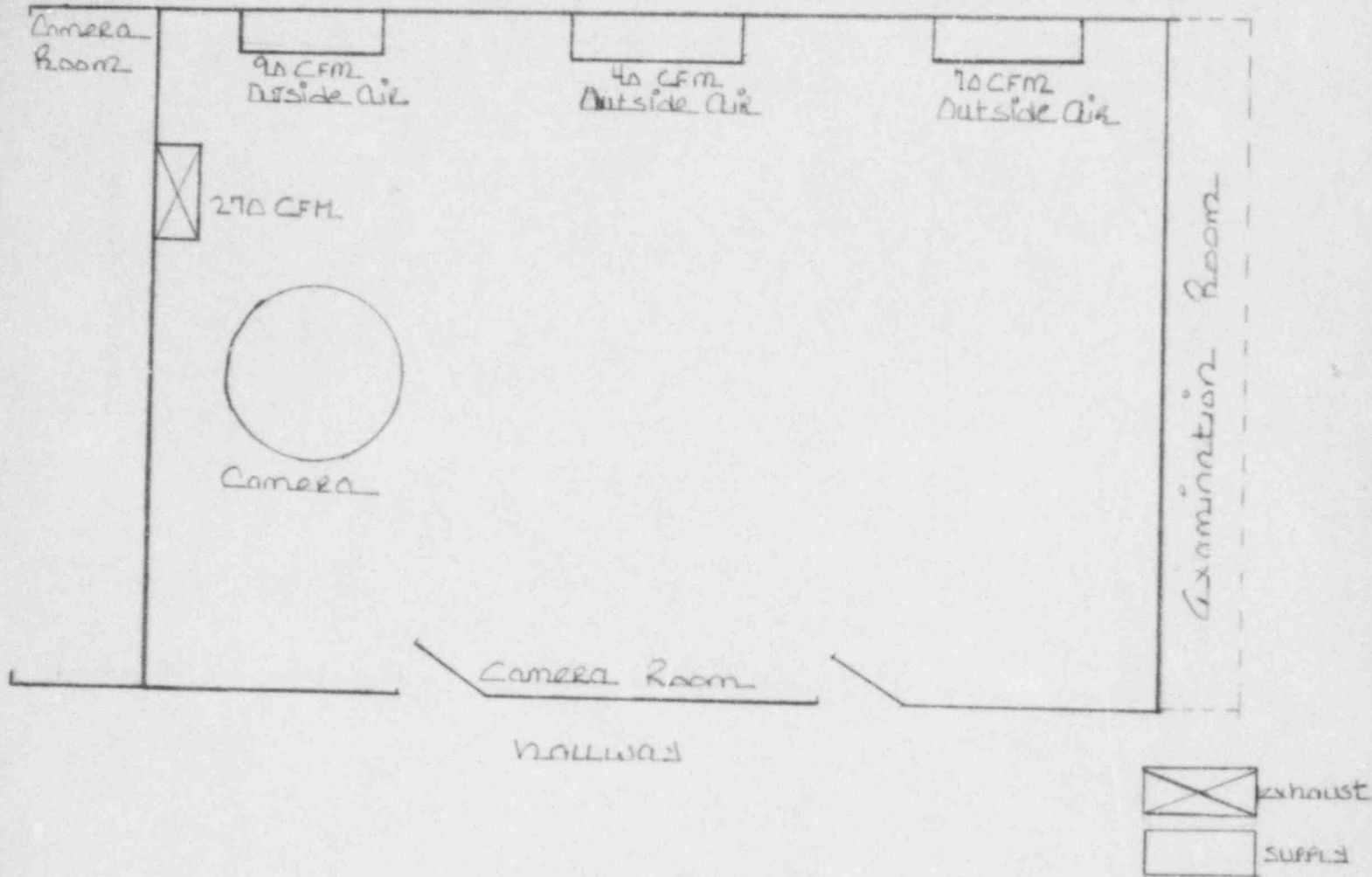
2. The combined air supply from the Coil Induction Unit minus the amount of recirculated air equals 200 CFM of fresh air being supplied to the room. Subtracting the 200 CFM of air supply from the 270 CFM of exhaust air results in the room being under negative pressure at a rate of 70 CFM. Based on the 2056 cubic feet of space in the room it takes 30 minutes for one complete air exchange in the room.

Cecil A. Goodwin
CECIL A. GOODWIN

ENCL (2)

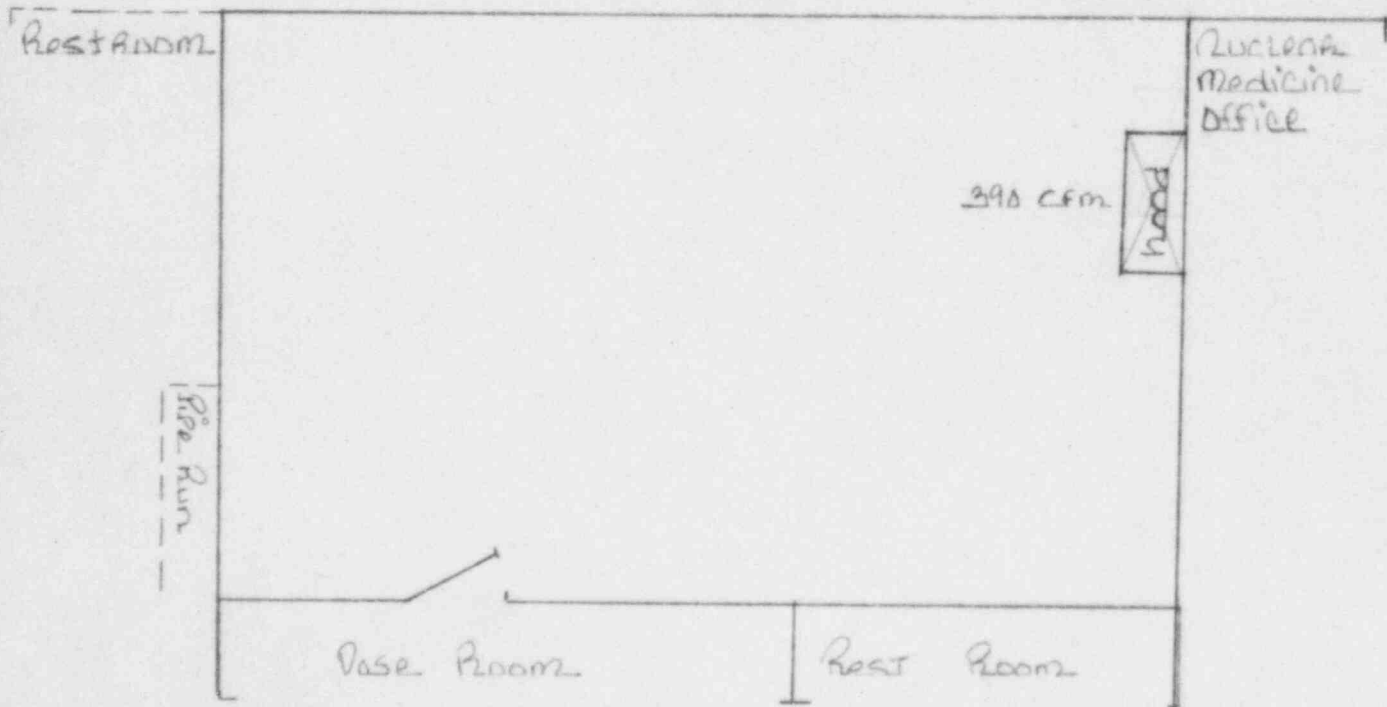
Room 1-90 Building 215 Nuclear Medicine Clinic

Building Exterior



Hot Locker Building 215

HALLWAY



LUNG VENTILATION

PURPOSE

To evaluate lung ventilation capacity, using radioactive gas in a closed breathing system.

RADIOPHARMACEUTICAL DOSE

10 - 25 mCi Xenon-133 gas

PREPARATION

None

EQUIPMENT

1. A low energy, parallel hole collimator with a large field of view camera.
2. Computer data storage (optional)

PROCEDURE

1. If the patient is physically able, he/she should be placed in a supine position with the camera head underneath the table. If not, the patient will be placed in a sitting position in front of the camera with his/her back against the collimator.
2. A mask will be tightly fitted over the patient's nose and mouth to prevent the escape of air from around the rim of the mask.
3. The Xenon ventilation system is attached to the mask and fed three liters of O₂.
4. The patient is instructed to take a deep breath and exhale.
5. The patient is then directed to take a second deep breath while the Xe¹³³ is injected into the system.
6. The valve is placed in the open position so the patient can breathe in the gas mixture. The patient is instructed to hold his/her breath and the first 15-second film is taken. This is labeled "wash in". If the quality of the first inspiration film is poor, a second film is then taken.
7. The patient now breathes the O₂ and Xe¹³³ gas mixture until an equilibrium is obtained in the lungs. When equilibrium is achieved, two films are recorded at twenty-second intervals.
8. The valve is then turned so that the patient breathes in room air and exhales the gas mixture into the closed system to clear the lungs.
9. Clearing continues while successive thirty-second films are taken until the Xe¹³³ is cleared from the lungs and no longer detected on the persistence scope. These films are labeled "wash out".