



MacNeal Memorial Hospital

3249 S. OAK PARK AVENUE - BERWYN, ILLINOIS 60402 A.C. 312-797-3000

DEPARTMENT OF NUCLEAR MEDICINE

14 December 1978

John Cooper, PH.D.
Radioisotopes Licensing Branch
Division of Material Safety &
Fuel Cycle Licensing
U.S. Nuclear Regulatory Commission
799 Roosevelt Road
Glen Ellyn, Illinois 60137

Dear Dr. Cooper:

We request that you amend our By-product Material License No. 12-09155-01 to include the use of Xenon 133. The following information is submitted in support of this request. The format will follow the guide for supporting documentation for the use of Xe¹³³ from the Medical Licensing Guide. Also included is our check for \$40.00.

- A. 1. Patients to be studied per year, 520.
Average dose per patient will be 10 MCi.
- 2. We request possession limit of 500 MCi.
- B. 1. See attached No. 1
2. See attached No. 2
- C. 1. See attached No. 2
2. The Radax Ventil-Consytem for delivery and trapping of the Xenon will be used. The ADC RAD (Emergency Room Air Radiodecontaminator) will be used for additional trapping of the Xenon.
- 3. Full face masks or nose clamps will be used to help reduce any possible leakage. Also, the exams are performed close to the room exhaust vent which will ventilate any escaping gas.
- D. 1. A GM survey instrument is kept in the room at the time the procedures are performed to monitor for any leakage of gas.
- 2. Should any leakage be detected, the room is evacuated immediately and sufficient time allowed to pass to clear the room of Xenon gas.
- 3. A search is made to locate the source of the leak to prevent any further leakage.

8507120650 850614
REG3 LIC30
12-09155-01 PDR

DEC 22 1978

4. Routine procedures are not attempted until the room has been checked with an appropriate survey meter to determine the presence of contamination.
 5. The ADC-RAD is kept on during all Xenon procedures.
- E. 1. 100 MCi is the maximum activity to be used per week = 1×10^5 uCi/wk.
2. 20%
 3. Room volume is $45' \times 12' \times 8' = 4320 \text{ ft.}^3$
 4. Fresh air is available at the rate of 200 CFM. The ventilation system is a closed system. The ADC "RAD" room air radiodecontaminator will be used during all procedures. Each unit has a 100 CFM air flow rate.

$$\frac{1 \times 10^5 \text{ uCi/wk} \times .20}{1.359 \times 10^{10} \text{ ml/wk}} = .14 \times 10^{-5} \text{ uCi/ml}$$

- F. 1. A charcoal trap system will be used to trap the expelled Xenon gas.

Using the formula: $C = \frac{A}{V} = .3 \times 10^{-7} \text{ uCi/ml}$

$$A = \frac{10 \text{ Pts.}}{\text{WK}} \times \frac{10 \text{ MCi}}{\text{PT}} \times \frac{10^3 \text{ uCi}}{\text{MCi}} \times \frac{52 \text{ weeks}}{\text{YR.}} = 5.26 \times 10^6 \text{ uCi Per yr}$$

$$5.2 \times 10^6 \text{ uCi/yr} \times .20 = 1.04 \times 10^6 \text{ uCi/yr}$$

This is the estimated leakage from the patient and the trap system per year.

$$V = 1.484 \times 10^{10} \text{ ml/yr} \times 200 \text{ ft.}^3/\text{min.} = 2.96 \times 10^{13} \text{ ml/yr.}$$

$$C = \frac{1.04 \times 10^6 \text{ uCi/yr}}{2.96 \times 10^{13} \text{ ml/yr}} = .3 \times 10^{-7}$$

which will be absorbed by the ADC "RAD" from estimated leakage.

- 2.a. The leakage from the charcoal trapping device will be absorbed in the ADC-RAD. Calculations are shown in F-1.
- b. The trapping device will be checked weekly using a balloon to collect expelled Xenon gas. The balloon will then be checked using a GM survey meter for excessive activity. The level of saturation will be determined by this method. Also, when excessive levels of Xenon are collected in the balloon, the charcoal filters are replaced.



MacNeal Memorial Hospital

3249 S. OAK PARK AVENUE - BERWYN ILLINOIS 60402 A C 312-797-3000

DEPARTMENT OF NUCLEAR MEDICINE

-3-

F. 2.c. The saturated filters will be placed in containers which are then placed in the drum for routine disposal with the regular radioactive waste. This container is stored in a locked room and access to the room is by authorized personnel only.

Should you need any additional information, please let us know.

Very truly yours,

Sharad Mehta, M.D.
Dept. of Nuclear Medicine

SM/rjm
Attac. 2

PROCEDURES FOR USE OF GROUPS IV AND V RADIOPHARMACEUTICALS
FOR TREATMENT OF PATIENTS

1. All patients treated with iodine-131 or gold-198 will be placed in a private room with a toilet.
2. The patient's room will be properly posted in accordance with Section 20.203. 10 CFR Part 20.
3. Surveys of the patient's room and surrounding areas will be conducted as soon as practicable after administration of the treatment dose. Exposure rates will be measured at the patient's bedside, three feet away and the entrance to the room. The Radiation Safety Officer or his designate will then determine how long a person may remain at these positions and will post these times in the patient's chart and on his door. The results of daily surveys will be used to recalculate permitted times which will be posted on the patient's chart and on his door.
4. The form, Nursing Instructions for Patients Treated with Phosphorus-32, Gold-198, or Iodine-131, will be completed immediately after administration of the treatment dose. A copy will be posted in the patient's chart.
5. Radiation levels in unrestricted areas will be maintained less than the limits specified in Section 20.105(b), 10 CFR Part 20.
6. All linens will be surveyed for contamination before being removed from the patient's room and will, if necessary, be held for decay.
7. Disposable plates, cups, eating utensils, tissue, surgical dressings, and other similar waste items will be placed in a specially designated container. The material will be collected daily by the Radiation Safety Officer (or his designate) checked for contamination, and disposed of as normal or radioactive waste, as appropriate.

8. Non-disposable items used for these patients will be held in plastic bags in the patient's room, and checked for contamination by the Radiation Safety Officer or his designate. Items may be returned for normal use, held for decay or decontaminated, as appropriate.
9. Urine and vomitus, from iodine-131 therapy patients will be stored for decay in our radioactive waste storage area. When it has reached background levels as measured with a low-level survey meter, it will be released to the sanitary sewer system.
10. Before a therapy patient's room is reassigned to another patient, the room will be surveyed for contamination (and decontaminated if necessary) and all radioactive waste and waste containers will be removed.
11. Nursing Instructions
 - a. Nurses should spend only that amount of time near the patient required for ordinary nursing care. Special restrictions may be noted on the precaution sheet in the patient's chart. Nurses should read these instructions before administering to the patients. Call the Nuclear Medicine Department if you have any questions about the care of these patients.
 - b. Visitors will be limited to those 18 years of age or over, unless other instructions are noted on the precautions sheet in the patient's chart.
 - c. Patients must remain in bed while visitors are in the room and visitors should remain at least three feet from the patient.
 - d. Radioactive patients are to be confined to their rooms except for special medical or nursing purposes approved by the Nuclear Medicine Department.

- e. No nurse, visitor or attendant who is pregnant should be permitted in the room of a patient who has received a therapeutic amount of radioactivity until the patient no longer presents a radiation hazard. Female visitors should be asked whether they are pregnant.
- f. Attending personnel must wear rubber or disposable plastic gloves when handling urinals, bedpans, emesis basins or other containers having any material obtained from the body of the patient. Wash gloves before removing and then wash hands. The gloves must be left in the patient's room in the designated waste container. These gloves need not be sterile or surgical in type.
- g. Disposable items should be used in the care of these patients, whenever possible. These items should be placed in the designated waste container. Contact the Nuclear Medicine Department for proper disposal of the contents of the designated waste container.
- h. All clothes and bed linens used by the patient should be placed in the laundry bag provided and left in the patient's room to be checked by a member of the Nuclear Medicine Department.
- i. All non-disposable items should be placed in a plastic bag and left in the patient's room to be checked by a member of the Nuclear Medicine Department.
- j. Surgical dressings should be changed only as directed by physician. Gold-198 leaking from a puncture wound will stain the dressings dark red or purple. Such dressings should not be discarded but should be collected in plastic bags and turned over to the Nuclear Medicine Department. Handle these dressings only with tongs or tweezers. Wear disposable gloves.

k. For iodine-131 patients:

- (1) Urine from iodine-131 patients will be collected in special containers provided by the Nuclear Medicine Department. The patient should be encouraged to collect his own urine in the container. If the patient is bedridden, a separate urinal or bed pan should be provided. The urinal or bed pan should be flushed several times with hot soapy water after use.
- (2) If the nurse helps to collect the excreta, she should wear disposable gloves. Afterwards she should wash her hands with the gloves on and again after the gloves are removed. The gloves should be placed in the designated waste container for disposal by the Nuclear Medicine Department.
- (3) Disposable plates, cups, and eating utensils will be used by patients who are treated with iodine-131.
- (4) Vomiting within 24 hours after oral administration, urinary incontinence, or excessive sweating within the first 48 hours may result in contamination of linen and/or floor. In any such situations or if radioactive urine and/or feces is spilled during collection, call the Nuclear Medicine Department. Ext. 3095. Meanwhile, handle all contaminated material with disposable gloves and avoid spreading contamination.
- (5) All vomitus must also be kept in the patient's room for disposal by the Nuclear Medicine Department. Feces need not be routinely saved, unless ordered on the chart. The same toilet should be used by the patient at all times and it should be well flushed (3 times).

1. Utmost precautions must be taken to see that no urine or vomitus, is spilled on the floor or the bed. If any part of the patient's room is suspected to be contaminated, notify the Nuclear Medicine Department.
- m. If a nurse, attendant or anyone else knows or suspects that his skin, or clothing, including shoes, is contaminated, notify the Nuclear Medicine Department immediately. This person should remain in the patient's room and not walk about the hospital. If the hands become contaminated, wash immediately with soap and water.
- n. If a therapy patient should need emergency surgery or should die, notify the Nuclear Medicine Department immediately.
- o. When the patient is discharged call the Nuclear Medicine Department and request that the room be surveyed for contamination before remaking the room.

NURSING INSTRUCTIONS FOR PATIENTS TREATED WITH
PHOSPHORUS-32, GOLD-198, or IODINE-131

Patient's Name: _____

Room No.: _____ Physician's Name: _____

Radioisotope Administered: _____

Date and Time of Administration: _____

Dose Received: _____ Method of Administration: _____

Exposure Rates in mR/hr

Date _____ 3 feet from bed _____ 10 feet from bed _____

(Comply with all Check Items)

_____ 1. Visiting time permitted: _____

_____ 2. Visitors must remain _____ from patient.

_____ 3. Patient may not leave room.

_____ 4. Visitors under 18 not permitted.

_____ 5. Pregnant visitors not permitted.

_____ 6. Film badges must be worn.

_____ 7. Use and complete the following tags:

_____ door

_____ bed

_____ chart

_____ wrist

- _____ 8. Gloves must be worn while attending patient.
- _____ 9. Patient must use disposable utensils.
- _____ 10. All items must remain in room until okayed by
Radiation Safety Officer.
- _____ 11. Smoking is not permitted.
- _____ 12. Do not release room to admitting until okayed by
Radiation Safety Officer.
- _____ 13. Other instructions.

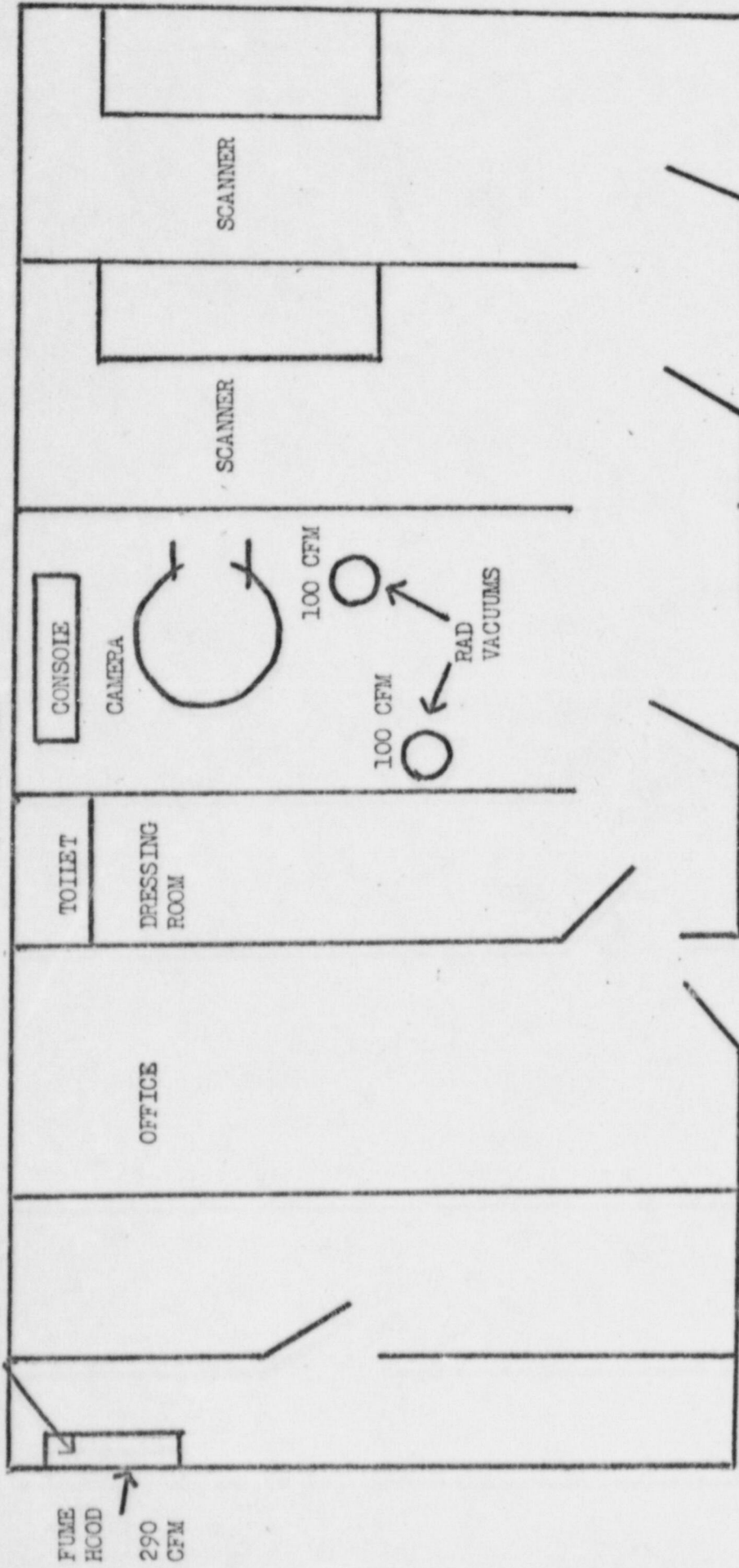
In case of an emergency contact:

RSO _____
name

on/off duty / telephone no.

STORAGE AREA
WITH LEAD BRICKS

OUTSIDE WALL



CORRIDOR

CORRIDOR

MAC NEAL MEMORIAL HOSPITAL
BERWYN, ILLINOIS