NRC Form 314
(11-82)
10 CFR 30.35(d)(1)(iv)
10 CFR 40.42(d)(1)(iv)
10 CFR 70.38(d)(1)(iv)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB
3150-0028

CERTIFICATE OF DISPOSITION OF MATERIALS

(All items MUST be completed, please print)

LICENSEE NAME AND ADDRESS

BROWN COUNTY GENERAL HOSPITAL
425 HOME STREET
GEORGETOWN, OHIO 45121

LICENSE NUMBER: 34-18884-01

LICENSE EXPIRATION DATE: 03/31/85

THE LICENSEE OR ANY INDIVIDUAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE LICENSEE CERTIFIES THAT: *(Check and/or complete the appropriate item(s) below.)*

A. MATERIALS DATA *(Check one and complete, as necessary)*

☐ 1. NO MATERIALS HAVE EVER BEEN POSSESSED OR PROCURED BY THE LICENSEE UNDER THIS LICENSE.

OR

☐ 2. ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN TRANSFERRED ON

DATE | TO | WHICH HAS NRC LICENSE NUMBER

OR

☐ 3. ALL MATERIALS PROCURED AND/OR POSSESSED BY THE LICENSEE UNDER THE LICENSE NUMBER CITED ABOVE HAVE BEEN TRANSFERRED ON

DATE | TO | WHICH HAS LICENSE NUMBER | ISSUED BY THE STATE OF

AN AGREEMENT STATE PURSUANT TO SECTION 274 OF THE ATOMIC ENERGY ACT OF 1954, AS AMENDED, AND THE ENERGY REORGANIZATION ACT OF 1974

OR

☒ 4. MATERIALS HAVE BEEN DISPOSED OF IN THE FOLLOWING MANNER. *(Describe specific disposal procedures—if additional space is needed, use the reverse of this form, or provide attachments)*

Radioactive materials are all sent back to Syncor, Inc Blue Ash Ohio, 45236.

Xenon tubing is stored until reading is at background level seven half-lives and is then disposed of in regular trash

B. OTHER DATA

☐ 1. OUR LICENSE HAS NOT YET EXPIRED. PLEASE TERMINATE IT.

2. WAS A RADIATION SURVEY CONDUCTED TO CONFIRM THE ABSENCE OF LICENSED RADIOACTIVE MATERIALS AND TO DETERMINE WHETHER ANY CONTAMINATION REMAINS ON THE PREMISES COVERED BY THE LICENSE? *(Check one)*

☐ NO

☐ YES, THE RESULTS *(Check one)*

☐ ARE ATTACHED, OR

☐ WERE FORWARDED TO NRC ON *(Date)*

3. THE PERSON TO BE CONTACTED REGARDING THE INFORMATION PROVIDED ON THIS FORM

NAME: TAMMY L. NEWMAN, JULIE ANN FARRELL M.D., KATHY FULTZ

TELEPHONE NUMBER: 513-378-6121

4. MAIL ALL FUTURE CORRESPONDENCE REGARDING THIS LICENSE TO

8507150102 850621
REG3 LIC30
34-18884-01 PDR

CONTROL NO. 3425

RETURN TO:

DIRECTOR, DIVISION OF FUEL CYCLE AND MATERIAL SAFETY
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS
U.S. NUCLEAR REGULATORY COMMISSION
WASHINGTON, DC 20555

CERTIFYING OFFICIAL

SIGNATURE: Robert E. Burkett

DATE: 2-28-85

PRINTED NAME AND TITLE

ROBERT E. BURKETT, ASSISTANT ADMINISTRATOR

BROWN COUNTY GENERAL HOSPITAL
GEORGETOWN, OHIO

JUN 18 1985

NUCLEAR MEDICINE SERVICES

Under I. Available conveniently, please delete part C.

Nuclear Medicine procedures are not performed outside the hospital.

BROWN COUNTY GENERAL HOSPITAL
GEORGETOWN, OHIO

XENON SYSTEM

I. PULMONEX

A. Concerning the xenon, the door to the imaging room is closed at all times during the study, as stated in the Federal Register.

The door to the imaging room is closed during imaging when needed or as suggested.

NUCLEAR MEDICINE LABORATORY
BROWN COUNTY HOSPITAL
GEORGETOWN, OHIO

PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES

1. Qualities to be used:

   a. 10 patients/week at 10 mCi/patient
   b. Possession limit of 500 mCi of Xe-133 as a gas

2. Use and Storage Areas:

   Xe-133 2ill be received as needed in unit dose vials (inside lead cylinders) the day of use. The used and unusued vials will be picked up daily by commercial supplier; there will be no storage of xenon-133.

   Camera Room has a room air supply rate of 175 cfm and an air exhaust rate of 320 cfm,

   Exhaust airflow rate in camera room will be measured semi-annually to determine that system performance meets specifications indicated.

3. Procedure for Routine Use:

   a. The Xe-133 will be delivered to the patient with an appropriate Xenon "Gun" into an enclosed and shielded system (Pulmonex) which contains a rebreathing apparatus, CO_2 and H_{20} absorbers and a Xenon trap. The patient will be connected to the system by means of a short section of flexible tubing and an anesthesia mask covering both nose and mouth. The rebreathing system will be filled with O_2 and connected to the patient prior to injection the Xenon.

4. Emergency Procedures:

   1. Remove patients and all personnel from area
   2. Close door to room and seal bottom of door
   3. Notify Radiation Safety Officer
   4. Allow exhaust system to operate for at least one hour
   5. Open door and monitor close to the floor with Geiger-Mueller Survey Meter at progressing into the room.

5. Air Concentration of Xenon-133 in Restricted Areas:

   a. A = 10 patients/week x 10 mCi/patient = 100 mCi week
   b. f = 20% leakage of xenon during storage, use and disposal

   c. $$V = \frac{A \times F}{1 \times 10^{-5}\ \mu Ci/ml} = \frac{1 \times 10^{5}\ \mu Ci/week \times 0.20}{1 \times 10^{-5}\ \mu Ci/ml}$$

   $$= 2.0 \times 10^{9}\ ml/week$$

5. Air Concentration of Xenon-133 in Restricted Areas: (continued)

Required ventilation rate is:

$$\frac{2.0 \times 10^{9} \text{ ml/week}}{40 \text{ hrs/week}} \times 1.7 \times 10^{6} \frac{\text{cmf}}{\text{ml/hr}} = 30 \text{ cfm}$$

Room exhaust rate in camera room is adequate.

6. a. Calculation of Concentration of Xenon in Air in Unrestricted Areas

Camera Room

$A = 10 \text{ patients/week} \times 10 \text{ mCi/patient} \times 10^{3} \mu\text{Ci/mCi} \times 52 \text{ weeks/year}$

$= 1.04 \times 10^{6} \mu\text{Ci/year}$

$= 320 \text{ ft}^3\text{/min} \times 1.49 \times 10^{10} \frac{\text{ml/yr}}{\text{ft}^3\text{/min}}$

$= 4.77 \times 10^{12} \text{ ml/yr}$

$C = \frac{A}{V}$

$= \frac{1.04 \times 10^{6} \mu\text{Ci/yr}}{4.77 \times 10^{12} \text{ ml/yr}}$

$= 2.1 \times 10^{-7} \mu\text{Ci}$ (Concentration of Xenon in Air in Unrestricted Areas)

Hence, air concentrations averaged over a year in unrestricted areas will not exceed 3×10^{-7} µCi/ml

b. Unit dose vials of Xenon-133 will be returned immediately after use to commercial supplier.

An air sampler will be used for monitoring Xenon-133 charcoal trap efficiency. This sampler uses a 3 liter plastic specimen bottle and one-way valves available from a disposable ventilation kit. The trap exhaust is pumped through the sampler for a few minutes; then the sampler is removed and checked with a GM survey meter (window open) placed against surface of bottle. Calibration is accomplished by using a known amount of Xenon-133 in the specimen bottle and the count rate observed with the detector (window open) placed against the surface of the bottle. After this calibration, the observed count rate observed provides a measure of Xenon-133 concentration in the trap exhaust. Knowledge of the volume of air pumped through the trap per ventilation study combined with the assay of the Xenon-133 concentration allows trapping efficiency to be estimated. This trapping efficiency is compared to a predetermined minimum acceptable value of 95%. The routine quality control procedure is reduced to comparing the observed survey instrument reading to a decision point reading.

RADIOACTIVE WASTE (SEWERAGE)
PERMISSIBLE DAILY DISPOSAL (mCi)

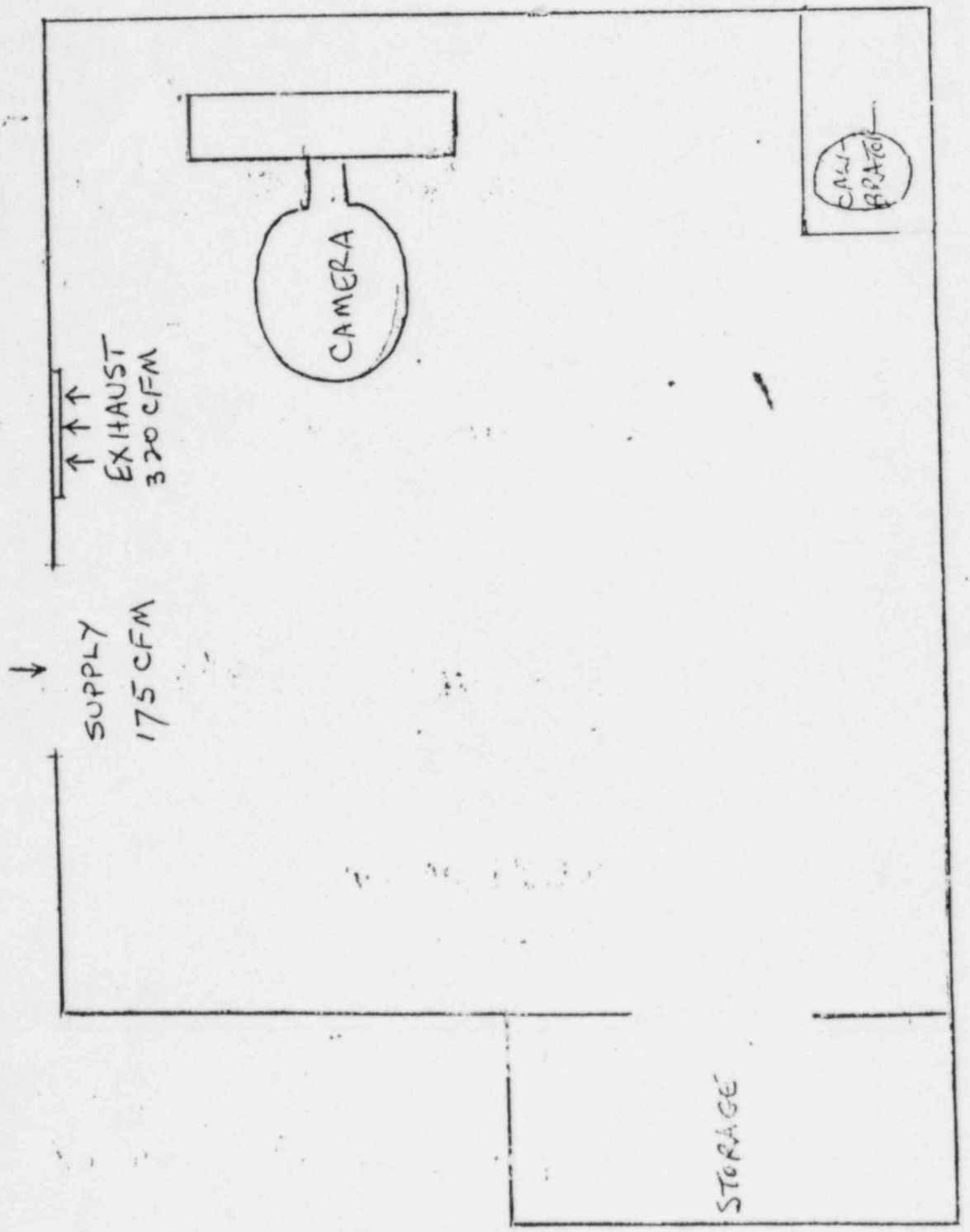
Assume: Average water flow of 500 liters per day per bed, 100 bed hospital, daily flow of 100000 liters per day

RADIONUCLIDE	PERMISSIBLE DAILY WATER CONCENTRATION µCi/ml	PERMISSIBLE DAILY DISPOSAL mCi
H 3	1×10^{-1} (S)	0.5×10^{4}
	1×10^{-1} (I)	0.5×10^{4}
C 14	2×12^{-2} (S)	1.0×10^{3}
P 32	5×10^{-4} (S)	2.5×10^{-1}
	7×10^{-4} (I)	3.5×10^{1}
Cr 31	5×10^{-2} (S)	2.5×10^{3}
	5×10^{-2} (I)	2.5×10^{3}
Co 57	2×10^{-2} (S)	1.0×10^{3}
	1×10^{-2} (I)	0.5×10^{3}
Co 60	1×10^{-3} (S)	0.5×10^{2}
	1×10^{-3} (I)	0.5×10^{2}
Fe 55	2×10^{-2} (S)	1.0×10^{3}
	7×10^{-2} (I)	3.5×10^{3}
Fe 59	2×10^{-3} (S)	1.0×10^{2}
	2×10^{-3} (I)	1.0×10^{2}
Se 75	9×10^{-3} (S)	4.5×10^{2}
	8×10^{-3} (I)	4.0×10^{2}
Mo 99	5×10^{-3} (S)	2.5×10^{2}
	1×10^{-3} (I)	0.5×10^{2}
Tc 99m	2×10^{-1} (S)	1.0×10^{4}
	8×10^{-2} (I)	4.0×10^{3}
IN 113m	4×10^{-2} (S)	2.0×10^{3}
	4×10^{-2} (I)	2.0×10^{3}
I 125	4×10^{-5} (S)	2
	6×10^{-3} (I)	3.0×10^{2}
I 313	6×10^{-5} (S)	3
	2×10^{-3} (I)	1.0×10^{2}
Cs 137	4×10^{-4} (S)	2.0×10^{1}
	1×10^{-3} (I)	0.5×10^{2}
Au 198	2×10^{-3} (S)	1.0×10^{2}
	1×10^{-3} (I)	0.5×10^{2}
Tl 201	9×10^{-3} (S)	4.5×10^{2}
	5×10^{-3} (I)	2.5×10^{2}

*permissible daily disposal at institutional sewerage outfall (based on 10 CFR Part 20.303)

TOTAL ANNUAL DISPOSAL OF ALL ISOTOPES INTO SEWER MUST NOT EXCEED 1 CURIE PER YEAR

12/11/1979


CAMERA
EXHAUST
320 CFM
SUPPLY
175 CFM
STORAGE

18. WASTE DISPOSAL PROCEDURES

1. Liquid Waste is disposed of:

____ By commercial waste disposal service (see also No. 4 below)

_X_ In the sanitary sewer system in accordance with Section 20.303 of 10 CFR Part 20. (See enclosed)

____ Other (specify): _____

2. Mo-99/Tc generators is:

_X_ Returned to the supplier for disposal for disposal (Pharmatopes, Inc., Cincinnati, Ohio)

____ Held for decay until radiation levels as measured with a low-level survey meter and with all shielding removed, reach background levels. All radiation labels are removed or obliterated and the generators disposed of as normal trash.

____ Disposed of by commercial waste disposal service (see also No. 4 below)

____ Other (specify): _____

_____

3. Other Solid Waste is:

(Check as appropriate)

_X_ Held for decay until radiation levels (as measured with a low-level survey meter and with all shielding removed) reach background levels. All radiation labels are removed or obliterated and the waste disposed of in normal trash.

____ Disposed of by commercial waste disposal service

____ Other (Specify): _____

4. The commercial waste disposal service used is: _____

_____

(Name) (City, State)

NRC/Agreement State License No. _____

13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

Radiopharmaceuticals will be delivered and packed (in claibrated individual patient doses) contained in syringes housed in lead shield) by Pharmatopes. Inc., Cincinnati, Ohio at all times directly to the Nuclear Medicine Laboratory. These radiopharmaceuticals will be delivered and picked up by Pharmatopes, Inc. personnel.

Packing surveys will follow references Appendix F-10.8.

11. FACILITIES & EQUIPMENT

Equipment includes L lead shield, lead bricks, remote handling equipment, syringe shields.

Gamma Camera

Pulmonary System

Ion Chamber Survey Meter (Cutie Pie) Calibrated Procedure

1. Cutie Pie is calibrated annually and calibrated following repair or battery replacement.

2. Calibration is accomplished by taking readings at various points from the calibration source and adjusting the meter readings to within ± 10% of the calculated exposure rates for those points. The points are chosen so that two readings, which are separated by at least 50% of the scale, are taken in each scale.

3. The calibration source used is an EON Corporation Gamma Survey Instrument Calibrator, Model 64-764, Serial number 123, marketed by Nuclear Associates, Inc. The calibrator contains 100 mCi, and the design and manufacture meet NRC requirements (cf. enclosure)

4. Calibration done by James G. Kereiakes, Ph.D., Radiological Physicist, at the University of Cincinnati Medical Center.

G-M Survey Meter Calibration Procedure

1. G-M survey meter is calibrated annually and following repair or battery replacement.

2. Calibration is accomplished by taking readings at various points from the calibration source and adjusting the meter readings to within + 10% of the calculated exposure rates for those points. The points are chosen so that two readings, which are separated by at least 50% of the scale, are taken in each scale.

3. The calibration source used is a 1 mg ^{226}Ra needle manufactured by the Radium Chemical Company, Inc. Filtration is 0.5 mm Pt equivalent and the calibration of the source activity is traceable to NBS standards.

4. Calibration is done by James G. Kereiakes, Ph.D., Radiological Physicist, at the University of Cincinnati Medical Center.

9. INSTRUMENTATION

1. Survey Meters

   a. Manufacturer's name: Victoreen Instrument Division
   Manufacturer's model number: 493
   Ranges: 0-1, 0-10, 0-100 mR/hr and 1 R/hr

   b. Manufacturer's name:
   Manufacturer's model number:
   Ranges:

   c. Manufacturer's name:
   Manufacturer's model number:
   Ranges:

2. Dose calibrator

   Manufacturer's name: Capintec Company
   Manufacturer's model number: CRC-5

3. Diagnostic Instruments

Type of Instrument	Manufacturer's Name	Model No.
Gamma Camera	Picker Corporation	- - 5

4. Other (monitor)

   Manufacturer's name:
   Manufacturer's model number:
   Ranges:

10. CALIBRATION OF INSTRUMENTS

A. Survey Instruments

Check appropriate items

__X__ 1. Survey instruments will be calibrated at least annually and following repair.

__X__ 2. Calibration will be performed at two points on each scale. The two points will be approximately 1/3 and 2/3 full scale. A survey instrument may be considered properly calibrated when the instrument readings are within ± 10% of the calculated or known values for each point checked. Readings within ± 20% are considered acceptable if a calibration chart or graph is prepared and attached to the instrument.

_____ 3. Sufvey instrument will be calibrated

_____ a. By the manufacturer

_____ b. At the licensee's facility

(i) Calibrated source
Manufacturer's name _____
Model no. _____
Activity in millicuries _____
Accuracy _____
Traceability to primary standard _____

(ii) The calibration procedures in Appendix D, Section I will be used

or

(iii) The step-by-step procedures, including radiation safety procedures are attached.

__X__ c. By a consultant or outside firm

(i) Name: James G. Kereiakes, Ph.D.

(ii) Location: University of Cincinnati Medical Center

(iii) Procedures and sources

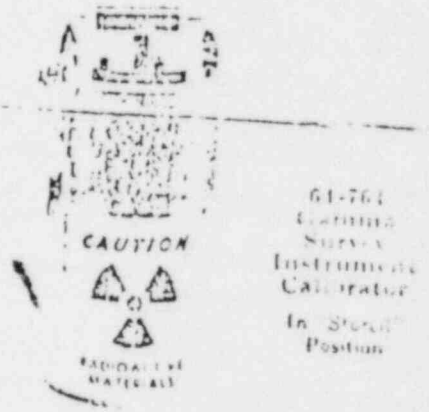
_____ have been approved by NRC and are on file in License No. _____

__X__ are attached

GAMMA ^{14} SURVEY INSTRUMENT CALIBRATOR

Gamma Survey Instrument Calibrator

- For use in radiation fields from 2 mR to 1 R/hr.
- Non-removable Cesium-137 source: long half-life.
- Automatic timer limits exposure periods.
- Container meets requirements of the A.E.C. and Agreement States.



This safe, sturdy, easy-to-use device permits the fast and accurate calibration of instruments used for surveying gamma radiation. It enables users of the required equipment to perform routine checks at will or as necessary to meet the regulations of the A.E.C. and Agreement States. This simple, fool-proof system is a time- and money saver . . . it does away with the expense, inconvenience and work-time lost when sending such instruments to an outside calibration service.

Consists of a heavy-duty container that holds 100 mc of Cesium-137 encapsulated at one end of a control rod. Since Cs-137 has a long half-life of 29 years, there is no need to calculate a correction factor for at least 1 or 2 years after the instrument has been received in the laboratory.

The source is kept in either of 2 positions: stored or exposed. In the fully-shielded "stored" position, radiation at the container's surface is less than 60 mr/hr, at 6 inches away it is less than 15 mr/hr. In the "exposed" position, the source faces a 6" port at the side of the shield, and the field can vary from 2 mr to 1 R/hr. The source is moved from "stored" to "exposed" merely by raising the control rod. For safety, the Cs-137 source cannot be removed from its shield except by the manufacturer.

For safety, the Calibrator includes a preset timer which limits the source's exposure period (1 to 60 minutes). At the expiration of the selected period, the source automatically drops to its safe storage position. Therefore, the source cannot remain exposed accidentally after an instrument has been calibrated.

Includes a built-in tape measure which helps accurately determine the distance from the Cs-137 source to the instrument being calibrated. A key lock prevents any unauthorized use of the equipment. Convenient carrying handle. Measures 14" high x 7" D. Weighs 75 lbs.

61-761 Gamma Survey Instrument Calibrator

NUCLEAR ASSOCIATES, INC.
Subsidiary of RADIATION DEVICES PRODUCTS CORP.
35 URBAN AVENUE WESTBURY N.Y. 11590
PHONE (516) 333-9444 • TWX 510-222-8908

PATIENT DOSING

The patient receives the recommended doseage allowable. Doseage is given if in the +/- 10% level as suggested.

RADIATION SAFETY COMMITTEE

1. The Committee shall meet at least quarterly with all records of the meetings kept by the chairman.
2. The committee of Nuclear Medicine Technologist and the Radiologist shall meet with the Hospital Safety Committee monthly.

   The Hospital Committee does consists of two registered nurses, which has been brought to my attention is now a requirement for the Radiation Safety Committee.

VI. ADEQUATE SPACE PROVIDED

A. One certain room for Nuclear Medicine Services

NUCLEAR MEDICINE SERVICES are provided four days per week.

A NUCLEAR MEDICINE TECHNOLOGIST is on CALL and AVAILABLE when needed.

BROWN COUNTY GENERAL HOSPITAL
GEORGETOWN, OHIO