NRC FORM 313M (9-81) 10 CFR 35	U.S. NUCLEAR REGULATORY COMMISSION **APPLICATION FOR MATERIALS LICENSE – MEDICAL**	Approved by OMB 3150-0041 Expires 9-30-83

INSTRUCTIONS – *Complete Items 1 through 26 if this is an initial application or an application for renewal of a license. Use supplemental sheets where necessary. Item 26 must be completed on all applications and signed. Retain one copy. Submit original and one copy of entire application to: Director, Office of Nuclear Materials Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555. Upon approval of this application, the applicant will receive a Materials License. An NRC Materials License is issued in accordance with the general requirements contained in Title 10, Code of Federal Regulations, Part 30, and the Licensee is subject to Title 10, Code of Federal Regulations, Parts 19, 20 and 35 and the license fee provision of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 26 and the appropriate fee enclosed.*

1.a. NAME AND MAILING ADDRESS OF APPLICANT *(institution, firm, clinic, physician, etc.)* INCLUDE ZIP CODE

Tri-County Radiologists
1544 Lakewood
Bloomfield Hills, Michigan 48013

TELEPHONE NO.: AREA CODE (313) 851 1475

1.b. STREET ADDRESS(ES) AT WHICH RADIOACTIVE MATERIAL WILL BE USED *(If different from 1.a.)* INCLUDE ZIP CODE

See Addendum 1.b. attachment

2. PERSON TO CONTACT REGARDING THIS APPLICATION

Ray Kaczur, Consultant
Nuclear Medicine Associates

TELEPHONE NO.: AREA CODE (216) 641 5799

3. THIS IS AN APPLICATION FOR: *(Check appropriate item)*

a. ☐ NEW LICENSE
b. ☒ AMENDMENT TO LICENSE NO. 21-17974-01
c. ☐ RENEWAL OF LICENSE NO. _____

4. INDIVIDUAL USERS *(Name individuals who will use or directly supervise use of radioactive material. Complete Supplements A and B for each individual.)*

See Item #8 attached

5. RADIATION SAFETY OFFICER (RSO) *(Name of person designated as radiation safety officer. If other than individual user, complete resume of training and experience as in Supplement A.)*

Raymond Sneider, D.O. with consultation from Nuclear Medicine Assoc, Cleveland, Ohio 44125

6.a. RADIOACTIVE MATERIAL FOR MEDICAL USE

RADIOACTIVE MATERIAL LISTED IN:	ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
10 CFR 31.11 FOR IN VITRO STUDIES		
10 CFR 35.100, SCHEDULE A, GROUP I		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP II		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP III		
10 CFR 35.100, SCHEDULE A, GROUP IV		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP V		AS NEEDED
10 CFR 35.100, SCHEDULE A, GROUP VI		

ADDITIONAL ITEMS:	MARK ITEMS DESIRED "X"	MAXIMUM POSSESSION LIMITS *(In millicuries)*
IODINE-131 AS IODIDE FOR TREATMENT OF HYPERTHYROIDISM		
PHOSPHORUS-32 AS SOLUBLE PHOSPHATE FOR TREATMENT OF POLYCYTHEMIA VERA, LEUKEMIA AND BONE METASTASES		
PHOSPHORUS-32 AS COLLOIDAL CHROMIC PHOSPHATE FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
GOLD-198 AS COLLOID FOR INTRACAVITARY TREATMENT OF MALIGNANT EFFUSIONS.		
IODINE-131 AS IODIDE FOR TREATMENT OF THYROID CARCINOMA		
XENON-133 AS GAS OR GAS IN SALINE FOR BLOOD FLOW STUDIES AND PULMONARY FUNCTION STUDIES		

6.b. RADIOACTIVE MATERIAL FOR USES NOT LISTED IN ITEM 6.a. *(Sealed sources up to 3 mCi used for calibration and reference standards are authorized under Section 35.14(d), 10 CFR Part 35, and NEED NOT BE LISTED.)*

ELEMENT AND MASS NUMBER	CHEMICAL AND/OR PHYSICAL FORM	MAXIMUM NUMBER OF MILLICURIES OF EACH FORM	DESCRIBE PURPOSE OF USE
Authorization is requested to possess and use:			
Am-241 (to be used at 4435 East Davison Detroit, Michigan)	Sealed	12mCi	Patient Marker in sealed source model #AMC-24 from Amersham Searle.

ROL NO. 7870-4

INFORMATION REQUIRED FOR ITEMS 7 THROUGH 23

For Items 7 through 23, check the appropriate box(es) and submit a detailed description of all the requested information. Begin each item on a separate sheet. Identify the item number and the date of the application in the lower right corner of each page. If you indicate that an appendix to the medical licensing guide will be followed, do not submit the pages, but specify the revision number and date of the referenced guide: Regulatory Guide 10.8 , Rev. _____ Date: _____

7. MEDICAL ISOTOPES COMMITTEE	**15. GENERAL RULES FOR THE SAFE USE OF RADIOACTIVE MATERIAL** *(Check One)*
☐ Names and Specialties Attached; and	☐ Appendix G Rules Followed; or
☐ Duties as in Appendix B; or *(Check One)*	☐ Equivalent Rules Attached
☐ Equivalent Duties Attached	**16. EMERGENCY PROCEDURES** *(Check One)*
8. TRAINING AND EXPERIENCE	☐ Appendix H Procedures Followed; or
☐ Supplements A & B Attached for Each Individual User; and	☐ Equivalent Procedures Attached
☐ Supplement A Attached for RSO.	**17. AREA SURVEY PROCEDURES** *(Check One)*
9. INSTRUMENTATION *(Check One)*	☐ Appendix I Procedures Followed; or
X Appendix C Form Attached; or	☐ Equivalent Procedures Attached
☐ List by Name and Model Number	**18. WASTE DISPOSAL** *(Check One)*
10. CALIBRATION OF INSTRUMENTS	☐ Appendix J Form Attached; or
☐ Appendix D Procedures Followed for Survey Instruments; or *(Check One)*	☐ Equivalent Information Attached
☐ Equivalent Procedures Attached; and	**19. THERAPEUTIC USE OF RADIOPHARMACEUTICALS** *(Check One)*
☐ Appendix D Procedures Followed for Dose Calibrator; or *(Check One)*	☐ Appendix K Procedures Followed; or
☐ Equivalent Procedures Attached	☐ Equivalent Procedures Attached
11. FACILITIES AND EQUIPMENT	**20. THERAPEUTIC USE OF SEALED SOURCES**
X Description and Diagram Attached	☐ Detailed Information Attached; and
12. PERSONNEL TRAINING PROGRAM	☐ Appendix L Procedures Followed; or *(Check One)*
☐ Description of Training Attached	☐ Equivalent Procedures Attached
13. PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL	**21. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE GASES (e.g., Xenon – 133)**
X Detailed Information Attached	X Detailed Information Attached
14. PROCEDURES FOR SAFELY OPENING PACKAGES CONTAINING RADIOACTIVE MATERIALS *(Check One)*	**22. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL IN ANIMALS**
	☐ Detailed Information Attached
☐ Appendix F Procedures Followed; or	**23. PROCEDURES AND PRECAUTIONS FOR USE OF RADIOACTIVE MATERIAL SPECIFIED IN ITEM 6.b**
☐ Equivalent Procedures Attached	☐ Detailed Information Attached

24. PERSONNEL MONITORING DEVICES

TYPE (Check appropriate box)			SUPPLIER	EXCHANGE FREQUENCY
a. WHOLE BODY	X	FILM	R.S. Landauer Jr. & Sons	Monthly
		TLD		
		OTHER (Specify)		
b. FINGER		FILM		
	X	TLD	R.S. Landauer Jr. & Sons	Monthly
		OTHER (Specify)		
c. WRIST		FILM		
		TLD		
		OTHER (Specify)		

d. OTHER (Specify)

Applicant GPU 24
Check No. 24104
Amount Fee Category 120
Type of Fee
Date Check Rec'd 11/19/84
Received By

25. FOR PRIVATE PRACTICE APPLICANTS ONLY

a. HOSPITAL AGREEING TO ACCEPT PATIENTS CONTAINING RADIOACTIVE MATERIAL

NAME OF HOSPITAL

MAILING ADDRESS

CITY | STATE | ZIP CODE

b. ATTACH A COPY OF THE AGREEMENT LETTER SIGNED BY THE HOSPITAL ADMINISTRATOR.

c. WHEN REQUESTING THERAPY PROCEDURES, ATTACH A COPY OF RADIATION SAFETY PRECAUTIONS TO BE TAKEN AND LIST AVAILABLE RADIATION DETECTION INSTRUMENTS.

26. CERTIFICATE
(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 1a certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Parts 30 and 35, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)*

(1) LICENSE FEE CATEGORY: 7C

(2) LICENSE FEE ENCLOSED: $ 120.00

b. APPLICANT OR CERTIFYING OFFICIAL (Signature)
X Raymond B. Swider

(1) NAME (Type or Print)
X RAYMOND B. SWIDER

(2) TITLE
X V. President

c. DATE
X 4/5/85

CONTROL NO. 78704

PRIVACY ACT STATEMENT

Pursuant to 5 U.S.C. 552a(e)(3), enacted into law by section 3 of the Privacy Act of 1974 (Public Law 93-579), the following statement is furnished to individuals who supply information to the Nuclear Regulatory Commission on NRC Form 313M. This information is maintained in a system of records designated as NRC-3 and described at 40 Federal Register 45334 (October 1, 1975).

1. **AUTHORITY** Sections 81 and 161(b) of the Atomic Energy Act of 1954, as amended (42 U.S.C. 2111 and 2201(b)).

2. **PRINCIPAL PURPOSE(S)** The information is evaluated by the NRC staff pursuant to the criteria set forth in 10 CFR Parts 30-36 to determine whether the application meets the requirements of the Atomic Energy Act of 1954, as amended, and the Commission's regulations, for the issuance of a radioactive material license or amendment thereof.

3. **ROUTINE USES** The information may be used: (a) to provide records to State health departments for their information and use; and (b) to provide information to Federal, State, and local health officials and other persons in the event of incident or exposure, for their information, investigation, and protection of the public health and safety. The information may also be disclosed to appropriate Federal, State, and local agencies in the event that the information indicates a violation or potential violation of law and in the course of an administrative or judicial proceeding. In addition, this information may be transferred to an appropriate Federal, State, or local agency to the extent relevant and necessary for a NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you. A copy of the license issued will routinely be placed in the NRC's Public Document Room, 1717 H Street, N.W., Washington, D.C.

4. **WHETHER DISCLOSURE IS MANDATORY OR VOLUNTARY AND EFFECT ON INDIVIDUAL OF NOT PROVIDING INFORMATION** Disclosure of the requested information is voluntary. If the requested information is not furnished, however, the application for radioactive material license, or amendment thereof, will not be processed.

5. **SYSTEM MANAGER(S) AND ADDRESS** Director, Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety and Safeguards, U.S. Nuclear Regulatory Commission, Washington, D.C. 20555.

Item 1b Attachment

Amend to Add:

1) 36561 Harper Avenue
Mount Clemens, Michigan 48043
(Groups I,II,III)

2) 2709 Pontiac Lake Road
Pontiac, Michigan 48054
(Groups I,II,III,Xe-133)

3) 4435 E. Davison
Detroit, Michigan 48212
Groups I,II,III,Xe-133

4) 39880 Van Dyke Road
Sterling Hts, Michigan 48078
Groups I,II,III

Amend to Delete:

Delete any reference to 2590 North Monroe Street. The use of byproduct material has never been initiated nor shall it.

Authorization is requested to transport byproduct material between all places of use.

All applicable procedures will be followed as indicated in license application dated April 12, 1983 of license #21-17974-01.

CONTROL NO. 78704

Item #8

NAME OF AUTHORIZED USER	AUTHORIZATION
Stanley Halprin, D.O. ✓	All
Raymond Sneider, D.O. ✓	All
Lawrence B. Ratner, D.O. ✓	All
Virginia S. Ventura, M.D ✓	All
Benson Selitsky, D.O. ✓	All
Allen Russell, M.D. ✓	All
Chintana Paramagul, M.D. ✓	All

Delete:

Lewis Jones, M.D.

Nanjappa C. Sadasivan, M.D.

Steven Lewin, D.O.

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Prepared: 3/14/85
Lic. # 21-17974-01

APPENDIX C

INSTRUMENTATION

2709 Pontiac Lake Road
Pontiac, Michigan 48054

1. **Survey meters**

   a. **Manufacturer's name:** Picker

      Manufacturer's model number: 655-186

      Number of instruments available: One

      Minimum range: 0 **mR/hr to** 0.2 mR/hr

      Maximum range: 0 **mR/hr to** 2,000 mR/hr

   b. **Manufacturer's name:** Victoreen

      Manufacturer's model number: 493

      Number of instruments available: One

      Minimum range: 0 **mR/hr to** 0.5 mR/hr

      Maximum range: 0 **mR/hr to** 50 mR/hr

2. **Dose Calibrator(s)**

   Manufacturer's name: Capintec

   Manufacturer's model number: CRC-4

   Number of instruments available: One

3. **Instruments used for diagnostic procedures**

Type of Instrument	Manufacturer's Name	Model No.
Scintillation Camera	Picker	Dyna 3C

4. **Other (e.g., liquid scintillation counter, area monitor, velometer)**

APPENDIX C

INSTRUMENTATION

36561 Harper Avenue
Mount Clemens, Michigan 48043

1. Survey meters

   a. Manufacturer's name: Eberline

      Manufacturer's model number: E-520

      Number of instruments available: One

      Minimum range: 0 mR/hr to 0.2 mR/hr

      Maximum range: 0 mR/hr to 2,000 mR/hr

   b. Manufacturer's name: Atomic Products

      Manufacturer's model number: 069-701

      Number of instruments available: One

      Minimum range: 0 mR/hr to 0.5 mR/hr

      Maximum range: 0 mR/hr to 50 mR/hr

2. Dose Calibrator(s)

   Manufacturer's name: Capintec

   Manufacturer's model number: CRC-4

   Number of instruments available: One

3. Instruments used for diagnostic procedures

Type of Instrument	Manufacturer's Name	Model No.
Scintillation Camera	Technicare	Series 100

4. Other (e.g., liquid scintillation counter, area monitor, velometer)

APPENDIX C

INSTRUMENTATION

4435 E. Davison
Detroit, Michigan 48212

1. **Survey meters**

   a. **Manufacturer's name:** Victoreen

      Manufacturer's model number: 498

      Number of instruments available: One

      Minimum range: 0 **mR/hr to** .5 **mR/hr**

      Maximum range: 0 **mR/hr to** 1000 **mR/hr**

   b. **Manufacturer's name:**

      Manufacturer's model number:

      Number of instruments available:

      Minimum range: **mR/hr to** **mR/hr**

      Maximum range: **mR/hr to** **mR/hr**

2. **Dose Calibrator(s)**

   Manufacturer's name: Capintec

   Manufacturer's model number: CRC-4

   Number of instruments available: 1

3. **Instruments used for diagnostic procedures**

Type of Instrument	Manufacturer's Name	Model No.
Scintillation Camera	Searle	Pho Gamma V

4. **Other (e.g., liquid scintillation counter, area monitor, velometer)**

APPENDIX C

INSTRUMENTATION

39880 Van Dyke
Sterling Hts, Michigan 48078

1. **Survey meters**

   a. **Manufacturer's name:** Victoreen

   Manufacturer's model number: 491

   Number of instruments available: One

   Minimum range: 0 **mR/hr to** 0.1 **mR/hr**

   Maximum range: 0 **mR/hr to** 100 **mR/hr**

   b. **Manufacturer's name:** Victoreen

   Manufacturer's model number: 492

   Number of instruments available: one

   Minimum range: 0 **mR/hr to** 10 **mR/hr**

   Maximum range: 0 **mR/hr to** 1000 **mR/hr**

2. **Dose Calibrator(s)**

   Manufacturer's name: Capintec

   Manufacturer's model number: CRC-5

   Number of instruments available: One

3. **Instruments used for diagnostic procedures**

Type of Instrument	Manufacturer's Name	Model No.
Scintillation Camera	Searle	PhoGamma 37GP

4. **Other (e.g., liquid scintillation counter, area monitor, velometer)**

Facilities and Equipment

Diagram

Air Supply

Air Exhaust

___ Scanner

___ Uptake/Well

1 Camera

2 Lockable Door

3 Receipt Area

4 Generator

5 Kit Preparation

6 Isotope Storage

5 Dose Preparation

7 Waste Storage

8 Dose Calibrator

___ Refrigerator

Sink

Lead Castle

Adjacent Areas

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

Lead Shielding

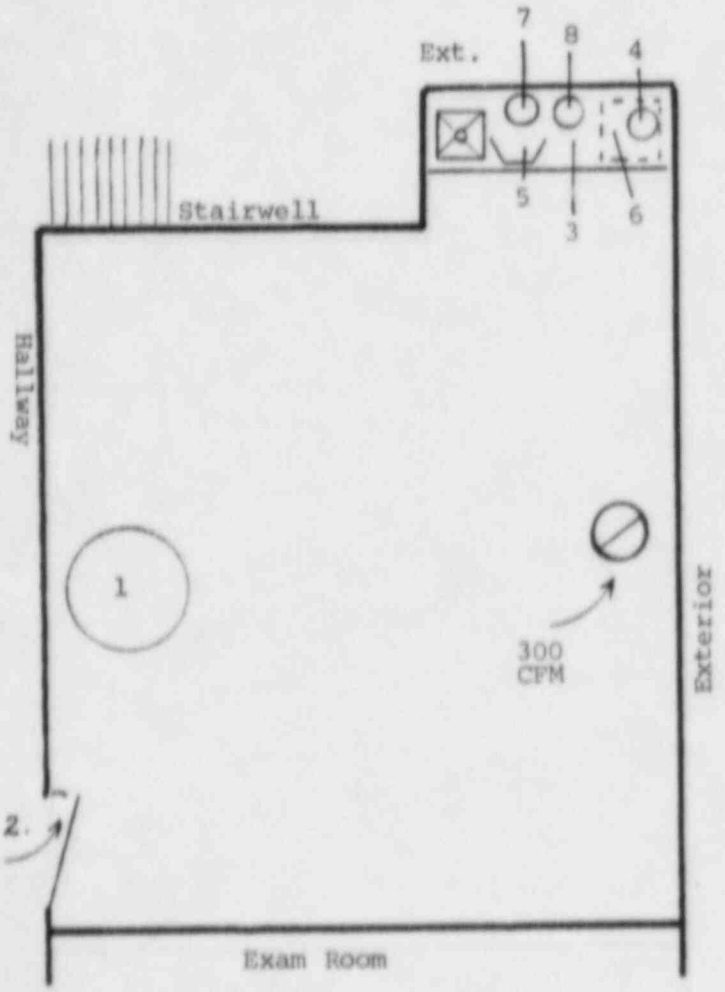
6 Lead Bricks
8"L x 4" W x ___H x 2"T

5 L-Shield
___L x ___W x ___H x ½"T

___
___L x ___W x ___H x ___T

___
___L x ___W x ___H x ___T

4435 East Davison
Detroit, Michigan 48212



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Prepared: 3/14/85
Licens#21-17974-01

CONTROL NO. 7 8 7 0 4

Facilities and Equipment

Diagram

Air Supply

Air Exhaust

___ Scanner
___ Uptake/Well
1 Camera
2 Lockable Door
3 Receipt Area
4 Generator
5 Kit Preparation
6 Isotope Storage
5 Dose Preparation
6 Waste Storage
7 Dose Calibrator
___ Refrigerator

Sink

Lead Castle

Adjacent Areas

A Lobby
B Hallway
C Exterior Wall
D Dressing Rooms

Lead Shielding

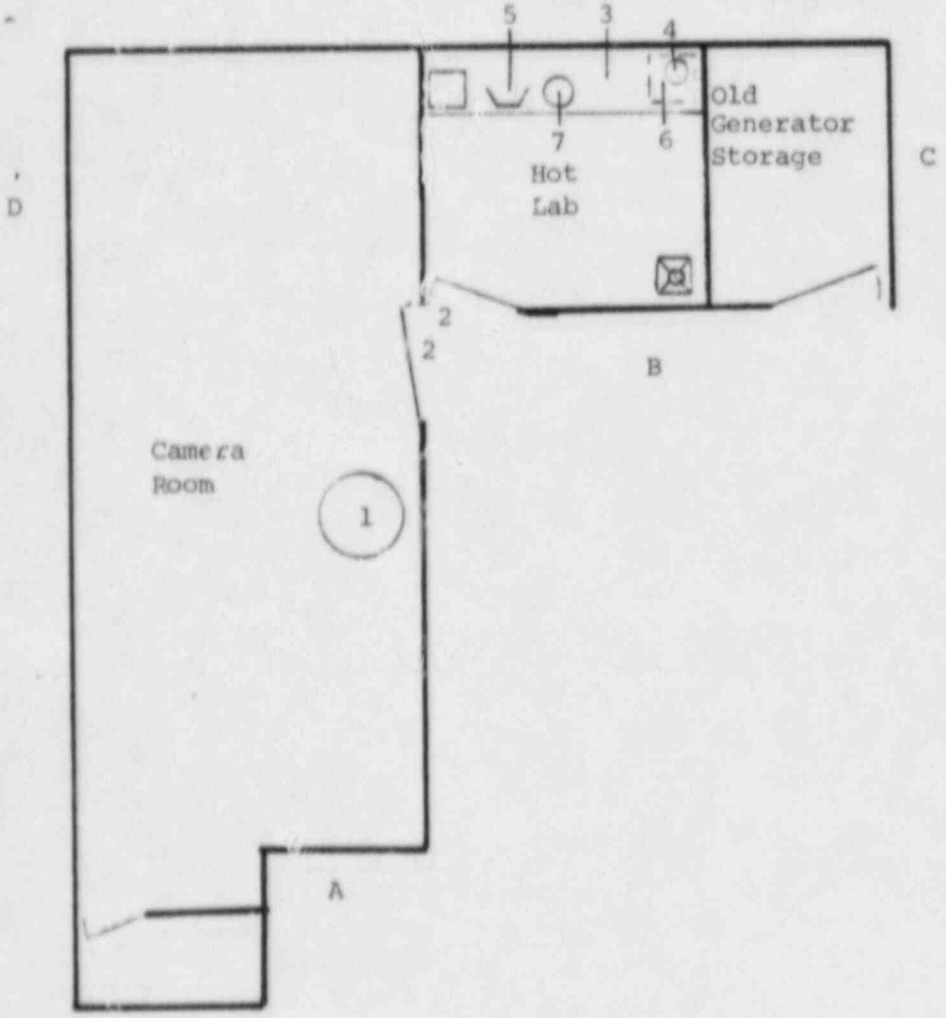
5 L-Shield
___L x 18"W x 20" H x ½" T

6
18"L x 20"W x 8" H x 2" T

___L x ___W x ___H x ___T

___L x ___W x ___H x ___T

35561 Harper Ave.
Mount Clemens, Michigan 48043



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Facilities and Equipment

Diagram

Air Supply

Air Exhaust

___ Scanner
___ Uptake/Well
1 Camera
2 Lockable Door
3 Receipt Area
4 Generator
5 Kit Preparation
6 Isotope Storage
5 Dose Preparation
6 Waste Storage
7 Dose Calibrator
___ Refrigerator

Sink

Lead Castle

Adjacent Areas

A	Hallway
B	Ultrasound
C	Exterior
___	___
___	___
___	___
___	___
___	___

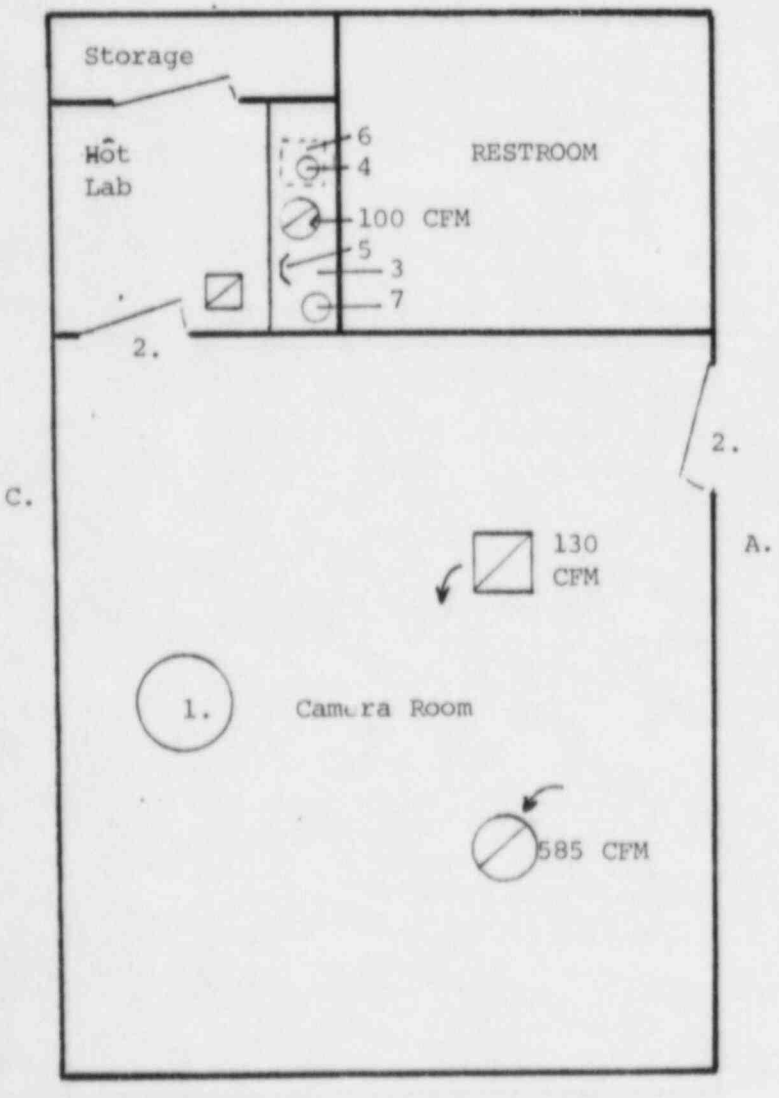
Lead Shielding

5
___ L x 18" W x 20" H x ½" T

6
18" L x 20" W x 8" H x 2" T

___
___ L x ___ W x ___ H x ___ T

___
___ L x ___ W x ___ H x ___ T



2709 Pontiac Lake Road
Pontiac, Michigan

Prepared: 3/14/85
Licens#21-17974-01

Facilities and Equipment

Diagram

☒ Air Supply
⊘ Air Exhaust
___ Scanner
___ Uptake/Well
1 Camera
2 Lockable Door
3 Receipt Area
4 Generator
5 Kit Preparation
6 Isotope Storage
5 Dose Preparation
7 Waste Storage
8 Dose Calibrator
___ Refrigerator

Adjacent Areas

___ _____
___ _____
___ _____
___ _____
___ _____
___ _____
___ _____
___ _____

⊠ Sink
⬚ Lead Castle

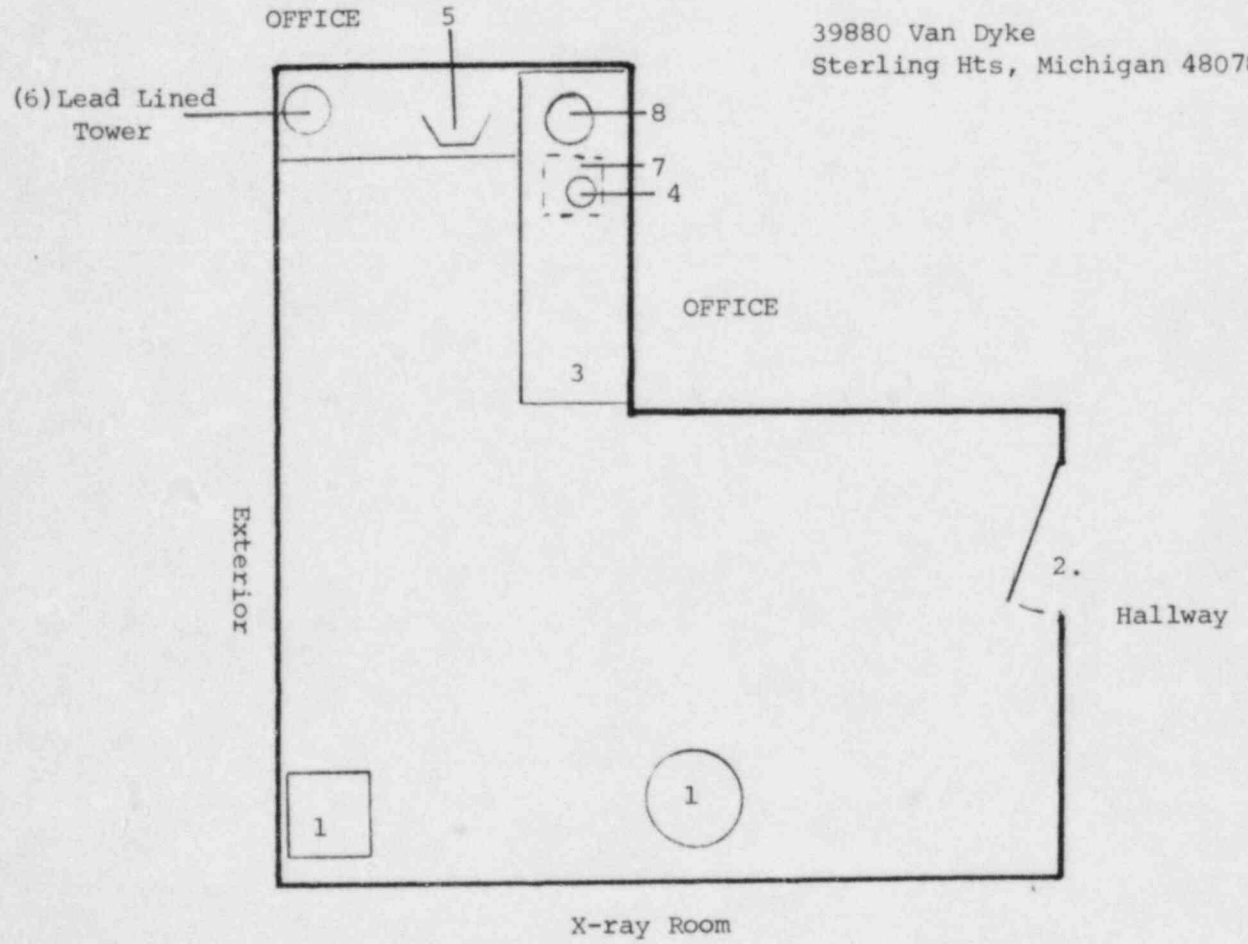
Lead Shielding

7 Lead Bricks
8" L x 4" W x ___ H x 2" T

6 Tower
___ L x ___ W x ___ H x ½" T

5 L-Shield (standard)
___ L x ___ W x ___ H x ½" T

___
___ L x ___ W x ___ H x ___ T



39880 Van Dyke
Sterling Hts, Michigan 48078

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CONTROL NO. 78704

PROCEDURES FOR ORDERING AND RECEIVING RADIOACTIVE MATERIAL

FACILITY: 4435 E. Davison, Detroit, Michigan

1. The chief nuclear medicine technologist of his/her designee will place all orders for radioactive material and will ensure that the requested materials and quantities are authorized by the license, and that possession limits are not exceeded. The receipt area identified in the Item #11 diagram is designed such that radiation levels in unrestricted areas do not exceed the limits specified in 10 CFR 20.105.

2. During normal working hours, carriers will be instructed to deliver radioactive packages directly to Nuclear Medicine. If this is not practical, responsible personnel(indicated in the memorandum below) will sign for packages containing radioactive materials and immediately take them to this location. Alternatively, trained nuclear medicine personnel will sign for and transport packages to the appropriate department.

3. During off-duty hours, supervisory personnel will arrange to have delivery of radioactive packages in accordance with the procedures outlined in the following directive:

MEMORANDUM FOR: Security Personnel

FROM : Administration

SUBJECT : Receipt Of Packages Containing Radiactive Material

Any packages containing radioactive material that arrive between 4:30 p.m. and 7:00 a.m. or on Sundays shall be signed for by the Security Guard on duty and taken immediately to the Nuclear Medicine Department. Unlock the door, place the package on top of the counter immediately to the right of the door, and relock the door.

If the package is wet or appears to be damaged immediately contact the Radiation Safety Officer. Ask the carrier to remain until it can be determined that neither he nor the delivery vehicle is contaminated.

**Radiation Safety Officer _____

**Office Phone _____

**Home Phone _____

**On the actual memo that is used, this information will be filled in and updated as necessary.

Item #13

Receipt Of Radioactive Materials During Off-Duty Hours

FOR: 36561 Harper Ave:

For delivery of packages containing radioactive materials during off-duty hours when the clinic is closed, the courier has been given a key to the building. Packages are placed on the floor at the designated site in the lobby and the building is relocked. The first clinic employee arriving after the delivery will carry the package to the nuclear medicine hot lab.

The lobby is locked during off-duty hours. Access is limited to employees and the delivering courier. The lobby should be considered a restricted area during these times.

FOR: 2709 Pontiac Lake Road:

During off-duty hours packages are delivered directly to the camera room. Materials are not left in the lobby.

This employee is to check the package for external damage or wetness. If damage or wetness is noted, he/she is to surround the package with over-turned chairs and call Dr. Halprin and/or the nuclear medicine technologist.

If he/she has touched the package and damage or wetness is noted, place the package on the countertop next to the hot sink and wash and dry your hands immediately. You should then put on a pair of rubber gloves, cover the package receipt location in the lobby with an over-turned chair and call the RSO or nuclear medicine technologist for assistance in determining the extent of contamination, if any.

The Radiation Safety Officer is Dr. Halprin

His home number is (313)338-8988

PROCEDURES FOR ORDERING AND RECEIVING

RADIOACTIVE MATERIAL

FACILITY: 39880 Van Dyke Road

ORDERING

All byproduct material will be ordered by authorized personnel in accordance with licensed possession limits and conditions.

RECEIVING

During normal working hours, carriers are instructed to deliver radioactive packages directly to the Nuclear Medicine Department. The package will then be monitored for leakage, contamination, or damage before opening.

During off-duty hours, carriers are instructed to deliver radioactive packages directly to the locked Nuclear Medicine Department. Carriers will be given the following instructions:

1. Take packages directly to the Nuclear Medicine Department.

2. Do not open or tamper with package in any way.

3. Place in designated area.

Carriers will lock the Nuclear Medicine Department door upon leaving and be instructed to remain in the Department if a damaged or contaminated package is suspected. At that point, the Radiation Safety Officer will be contacted.

PROPOSED PRECAUTIONS AND PROCEDURES

FOR THE USE OF XE-133

FACILITY: 2709 Pontiac Lake Road Pontiac, Michigan 48054

A. Quantities to be Used:

1. Patient information

a. 10 studies per week
b. 10 mCi per patient

B. Use and Storage Areas

1. Xenon doses will be stored and prepared in the hot lab. The hot lab has an exhaust rate of at least 100 cfm operating continuously when Xenon is in inventory.

The Xenon will be stored in its original shipping safe until used. Accessary lead shielding will be used (i.e., 1/8" - 1/4" lead vials or sheet) whenever survey measurements at the face of the hood are 2.0 mR/hr or more. The closest unrestricted area is the hallway, approximately 11' away.

2. The camera room has an exhaust flow rate of 585 cfm with a supply of 130 cfm. A duct carries this flow to the air intake. None of this air is recirculated.

3. With the blower in operation, the camera room is at negative pressure. Make up air comes from the hall and from the fresh air vent. The exhaust will be turned on whenever Xenon is used. The blower will be turned off whenever the Xenon in use is vented such that the camera room has returned to pre-Xenon use levels. The flow rates will be verified at approximately semi-annual intervals.

C. Procedure For Routine Use:

1. The camera room fan will be turned on. The door will be adjusted so a sensible draft is felt at opening. The patient will be fitted with the rebreathing apparatus, charcoal trap and instructed as to the procedure. A trial run will be conducted when possible.

The valving and tubing will be examined for continuity. The dose will be prepared and assayed in the dose calibrator, if possible.

The Xenon will be administered to the patient (intravenously) or into the tubing (airway) and three to four views obtained. The gas will be collected in the gas trap until practically no Xenon remains in the patient as evidenced by the camera persistence scope. The gas will be shielded at all times up to patient administration, except during times of transfer from the shielded vial to a shielded syringe. TLD finger badges and whole body film badges will be worn by all personnel handling Xenon. Whole body badges will also be worn by all other occupational personnel present during Xenon usage. Visitors to the Nuclear Medicine Department will be excluded from the camera room during the use of Xenon unless their presence is required or desired.

2. A Pulmonex Model #130-500 or equivalent activated charcoal gas trap will be used.

3. Face masks that cover both mouth and nose or nose clamps for use with the mouthpiece delivery systems will be employed to reduce leakage of the Xenon into the camera room.

D. Emergency Procedures:

In the event there is an accidental patient associated loss of Xenon into the camera room, the camera room will be evacuated for a period of 15 minutes with the blower remaining on provided patient safety and comfort can be assured. All unnecessary personnel will evacuate the room. The camera room door will be guarded against inadvertant entry during this time period.

"Prior to re-entry a measurement will be made using a low level G-M survey meter near the floor. A reading equivalent to background shall be considered as evidence that the ventilation has cleared the Xenon from the room".

E. Air Concentrations of Xe-133 in Restricted Areas:

1. It is estimated that 100mCi will be used per week (A).

2. The hot lab exhaust will operate at 100 cfm continuously when Xenon is in inventory. The use of the fan at this speed will reduce the concentration to values less than those shown below. It is assumed 20% of the activity will escape to room air.

3. Average concentration (C) will be:

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

$$C = \frac{100\text{mCi} \times 1 \times 10^3 \text{ uCi/mCi} \times .20}{100 \text{ cfm} \times 60 \text{ min/hr} \times 40 \text{ hrs/wk} \times 2.83 \times 10^4}$$

$$= \frac{100 \times 1 \times 10^3 \times .20}{100 \times 60 \times 40 \times 2.83 \times 10^4}$$

$$= \frac{2.0 \times 10^4}{6.792 \times 10^9}$$

$$= 2.9 \times 10^{-6} \text{uCi/ml}$$

This level is less than that permitted in restricted areas.

F. Methods of Xenon-133 Disposal:

1. All Xenon unused will be disposed of by decay in storage in the hot lab. Containers and apparatus will be surveyed unshielded with the low level survey meter held on contact with the source containing device. If levels are the same as background, the containers will be disposed after defacing the labels.

   Greater than 90% of the used Xenon will be trapped on the charcoal column and allowed to decay.

   All escaped Xenon will be vented through the exhaust system.

a. It is anticipated that 10mCi of Xenon will be vented to the atmosphere per week.

b. The air flow rate of 585 cfm will be included in the calculations. The high speed blower will be operated whenever Xenon studies are underway for approximately 30 minutes each and the 100 cfm blower will run continuously.

c. Air flow per week is: (V)

$V_1 = 585\text{cfm} \times 300\ \text{min/wk} \times 2.83 \times 10^4\ \text{ml/ft}^3$

$= 585 \times 300 \times 2.8 \times 10^4$

$V_1 = 4.97 \times 10^9\text{ml}$

$V_2 = 100\ \text{cfm} \times 60\ \text{min/hr} \times 168\ \text{hrs/wk} \times 2.83 \times 10^4/\text{ft}^3$

$= 100 \times 60 \times 168 \times 2.83 \times 10^4$

$= 2.85 \times 10^{10}\text{ml}$

$V_1 + V_2 = V = 3.35 \times 10^{10}\text{ml} = \text{Total Air Flow Per Week}$

d. The average concentration of air to the environment is: (C)

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

$= \frac{10^4\text{uCi}}{3.35 \times 10^{10}\text{ml}}$

$= 2.9 \times 10^{-7}\text{uCi/ml}$

This value does not exceed the quantity 3×10^{-7}uCi/ml permitted in 10 CFR 20.106 for unrestricted areas.

2. In order to detect a saturated charcoal trap, a survey will be conducted with the G-M probe held on contact with the trap inlet hose. The maximum levels will be recorded during the equilibrium phase. Immediately after maximum levels are reached, the probe will be palced on the discharge tube. If these levels reach 10% of the intake maximums, the trap will be considered less than 90% effective and will be replaced.

   This latter test will be conducted after every 20 procedures.

   Saturated filters will be stored for decay in the hood shielded such that levels do not exceed 2.0 mR/hr at the hood face. A survey will be conducted without the benefit of shielding and if levels are those of background, the filter may be discarded.

INFORMATION IN SUPPORT OF XE-133: PROCEDURES

FACILITY: 4435 E. Davison, Detroit, Michigan

A. Quantities to be used:

1. Patient information

   a. 10 studies per week
   b. 10 millicuries average activity per study

B. Use and Storage Areas:

1. Xenon-133 will be stored in the storage area of the hot lab and used (administered, imaged, trapped and exhausted) in the imaging area.

2. Ventilation: A 300 CFM exhaust fan and vent delivers air directly to outside air, carrying a major portion of any Xe-133 contamination, and is situated well away from any intake vents. Incoming air vents will be closed during patient studies. Air flow will therefore come from hallway. No air is recirculated.

3. The storage and use room is at negative pressure with respect to the hallway. Air flow measurements will be taken semiannually to ensure the maintenance of negative pressure during Xenon use conditions.

C. Procedures For Routine Use:

1. Xe-133, while stored in the hot lab, is contained in unit dose ampules inside their 1/8 inch thick lead shipping tubes behind lead bricks. Individual "doses" will be assayed in the "dose" calibrator and administered using the NEN Calidose Gas Dispensing System. Seal will only be broken in the Imaging Area. Therefore, any significant leakage of Xe-133 is not expected in the hot lab area.

2. Xe-133 will be administered to the patient and collected using the Pulmonex Xenon System, Model 130-500 (including both a delivery system and built-in gas trap). For each patient study, the technologist will check the tubing of the xenon delivery system for defects, familiarize patients with the study, and ensure that both the air supply vents and A/C system are closed.

3. Nose clamps will be used to reduce leakage.

D. Emergency Procedures:

In the event there is an accidental patient associated release of xenon into the camera room, the exhaust system will clear the room to levels of 1×10^{-5} uCi/ml in a time to be described. During this time period, the camera room will be evacuated provided patient safety and comfort can be assured. All unnecessary personnel will evacuate the room. The camera room door will be guarded aginst inadvertant entry during this time period.

1. Room Size: Approximately 1000 cu.ft. = 2.83×10^{7} ml

2. Room Clearance = 300 CFM

3. Standard Dose = 10,000uCi

Calculations:

a. Initial concentration $= \frac{10{,}000\text{uCi}}{2.83 \times 10^{7}\text{ml}}$

$= 3.53 \times 10^{-4}$ uCi/ml

b. Clearance Rate $= \frac{300\text{ CFM}}{1000\text{ cu.ft.}} = 30\%$ per minute

c. Desirable concentration factor $= \frac{1 \times 10^{-5}\text{uCi/ml}}{3.53 \times 10^{-4}\text{uCi/ml}} = .0283$

d. Time required to reduce the concentration to an acceptable level is calculated as follows:

Concentration Factor = e^{-Rt}

(Where: R = Clearance Rate; t = time)

$0.0283 = e^{-.3t}$

t = 12 minutes

Prior to re-entry, a measurement will be made using a low level G-M survey meter near the floor. A reading equivalent to background shall be considered as evidence that the ventilation has cleared the xenon from the room.

E. Air Concentrations of Xe-133 in Restricted Areas:

1. 10 mCi/patient x 10 patients/week x 1 x 10^3 uCi/mCi = 1 x 10^5 uCi/week (A)
2. Assume a loss rate of 20% (f).
3. Airflow rate = 300 CFM exhaust.
4. V (required) = (A x f)/1 x 10^{-5} uCi/ml

$$= \frac{1 \times 10^{-5} \text{ uCi/week} \times 0.20}{1 \times 10^{-5} \text{ uCi/ml}} = 2.0 \times 10^9 \text{ ml/week}$$

$$\frac{2.0 \times 10^9 \text{ ml/week}}{40 \text{ hr-week}} \times \frac{1 \text{ CFM}}{1.7 \times 10^6 \text{ ml/hr}} = 30 \text{ CFM}$$

Therefore: 300 CFM is adequate.

F. Methods of Xenon-133 Disposal:

All xenon unused will be disposed of by decay in storage or by adsorption and decay onto the Pulmonex Xenon System Gas Trap. Containers and apparatus will be surveyed unshielded with the low energy survey meter held on contact with the source containing device.

If levels are the same as background, conta ers will be disposed after defacing the labels. Escaped xenon will be vented through the exhaust system:

A. Considering 20% loss, it is anticipated that 20mCi of xenon will be vented to the atmosphere per week. This includes xenon liberated as accidental losses, and leakage.

B. An air flow of 300 CFM will be used in the calculations.

C. Assuming an average of 10 studies per week will be performed, the calculations are as follows:

Air flow per week (V)

$V = 300 \text{ CFM} \times 60 \text{ min/hr} \times 168 \text{ hrs/wk} \times 2.83 \times 10^{4} \text{ ml/cu.ft.}$

$= 300 \times 60 \times 168$

$= 8.5 \times 10^{10} \text{ ml/week}$

D. The average concentration of air to the environment is (C):

$C = A/V$

$$C = \frac{20{,}000 \text{uCi/week}}{8.5 \times 10^{10} \text{ml/week}}$$

$C = 2.35 \times 10^{-7} \text{uCi/ml}$

This value does not exceed the quantity 3×10^{-7} uCi/ml permitted in 10 CFR 20.106 for unrestricted areas.

Item #21
4 of 4 pages
Prepared: 3/15/85
License#21-17974-01

NRC FORM 314
(12-81)
10 CFR 30.34(f)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB
3150-0028
EXPIRES 5/31/82

CERTIFICATE OF DISPOSITION OF MATERIALS

(All Blocks MUST BE Completed)

LICENSEE NAME AND ADDRESS	LICENSE NUMBER
Harper Metro Radiology Center 36561 Harper Avenue Mount Clemens, Michigan 48043	21-16819-01
	LICENSE EXPIRATION DATE June 30, 1986

The licensee or any individual executing this certificate on behalf of the licensee certify that: *(Check and/or complete appropriate item(s) below.)*

☐ 1. No materials have been procured by licensee.

☐ 2. All materials procured and/or possessed by licensee under license number shown above, have been transferred to: Tri-County Radiologists (Formerly Cambridge Diagnostic Center)

which has NRC license number: 21-17974-01

☐ 3. All materials procured and/or possessed by licensee under license number shown above have been transferred to: _____

which has license number: _____ issued by _____.

an Agreement State pursuant to Section 274 of the Atomic Energy Act of 1954, as amended, and the Energy Reorganization Act of 1974.

☐ 4. Materials have been disposed of in the following manner. *(Describe specific disposal procedures – if additional space is needed, use reverse side.)*

30-11685

To be acted upon concurrently with amendment application submitted, the purpose being consolidation into one license.

D-PE
8505240537

PLEASE RETURN TO:
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

CERTIFYING OFFICIAL

SIGNATURE Raymond B Standley

DATE 4/8/85

NRC FORM 314 (12-81) SUPERSEDES PREVIOUS EDITIONS WHICH ARE OBSOLETE

CONTROL NO. 78704

NRC FORM 314
(12-81)
10 CFR 30.34(f)

U.S. NUCLEAR REGULATORY COMMISSION

APPROVED BY OMB
3150-0028
EXPIRES 5/31/82

CERTIFICATE OF DISPOSITION OF MATERIALS

(All Blocks MUST BE Completed)

LICENSEE NAME AND ADDRESS	LICENSE NUMBER
Raymond R. Sneider, D.O. 39880 Van Dyke Sterling Hts, Michigan 48078	21-17099-01
	LICENSE EXPIRATION DATE July 31, 1987

The licensee or any individual executing this certificate on behalf of the licensee certify that: *(Check and/or complete appropriate item(s) below.)*

☐ 1. No materials have been procured by licensee.

☒ 2. All materials procured and/or possessed by licensee under license number shown above, have been transferred to: Tri-County Radiologists (Formerly Cambridge Diagnostic Center)

which has NRC license number: 21-17974-01

☐ 3. All materials procured and/or possessed by licensee under license number shown above have been transferred to: _____

which has license number: _____ issued by _____,

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To be acted upon concurrently with amendment application submitted, the purpose being consolidation into one license.

DJP
8505170564

PLEASE RETURN TO:
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

CERTIFYING OFFICIAL

SIGNATURE Raymond R. Sneider DO

DATE 4/8/85

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