NRC FORM 313
(7-87)
10 CFR 30, 32, 33, 34, 35 and 40

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED BY OMB
3150-0120
Expires 6-30-90

APPLICATION FOR MATERIAL LICENSE

INSTRUCTIONS: SEE THE APPROPRIATE LICENSE APPLICATION GUIDE FOR DETAILED INSTRUCTIONS FOR COMPLETING APPLICATION. SEND TWO COPIES OF THE ENTIRE COMPLETED APPLICATION TO THE NRC OFFICE SPECIFIED BELOW.

APPLICATIONS FOR DISTRIBUTION OF EXEMPT PRODUCTS FILE APPLICATIONS WITH:

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

ALL OTHER PERSONS FILE APPLICATIONS AS FOLLOWS. IF YOU ARE LOCATED IN:

CONNECTICUT, DELAWARE, DISTRICT OF COLUMBIA, MAINE, MARYLAND, MASSACHUSETTS, NEW HAMPSHIRE, NEW JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIALS SAFETY SECTION B
631 PARK AVENUE
KING OF PRUSSIA, PA 19406

ALABAMA, FLORIDA, GEORGIA, KENTUCKY, MISSISSIPPI, NORTH CAROLINA, PUERTO RICO, SOUTH CAROLINA, TENNESSEE, VIRGINIA, VIRGIN ISLANDS, OR WEST VIRGINIA, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
NUCEAR MATERIALS SAFETY SECTION
101 MARIETTA STREET, SUITE 2900
ATLANTA, GA 30323

IF YOU ARE LOCATED IN:

ILLINOIS, INDIANA, IOWA, MICHIGAN, MINNESOTA, MISSOURI, OHIO, OR WISCONSIN, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION III
MATERIALS LICENSING SECTION
799 ROOSEVELT ROAD
GLEN ELLYN, IL 60137

ARKANSAS, COLORADO, IDAHO, KANSAS, LOUISIANA, MONTANA, NEBRASKA, NEW MEXICO, NORTH DAKOTA, OKLAHOMA, SOUTH DAKOTA, TEXAS, UTAH, OR WYOMING, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION IV
MATERIAL RADIATION PROTECTION SECTION
611 RYAN PLAZA DRIVE, SUITE 1000
ARLINGTON, TX 76011

ALASKA, ARIZONA, CALIFORNIA, HAWAII, NEVADA, OREGON, WASHINGTON, AND U.S. TERRITORIES AND POSSESSIONS IN THE PACIFIC, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION V
NUCLEAR MATERIALS SAFETY SECTION
1450 MARIA LANE, SUITE 210
WALNUT CREEK, CA 94596

PERSONS LOCATED IN AGREEMENT STATES SEND APPLICATIONS TO THE U.S. NUCLEAR REGULATORY COMMISSION ONLY IF THEY WISH TO POSSESS AND USE LICENSED MATERIAL IN STATES SUBJECT TO U.S. NUCLEAR REGULATORY COMMISSION JURISDICTION.

1. THIS IS AN APPLICATION FOR (Check appropriate item)

- [ ] A. NEW LICENSE
- [X] B. AMENDMENT TO LICENSE NUMBER 21-16754-01
- [ ] C. RENEWAL OF LICENSE NUMBER _____

2. NAME AND MAILING ADDRESS OF APPLICANT (Include Zip Code)

Radiology Associates, P.C.
#1 Ajax Drive, Suite 130
Madison Heights, MI 48071

3. ADDRESS(ES) WHERE LICENSED MATERIAL WILL BE USED OR POSSESSED

Please amend license condition #10 to include 700 South Main, Lapeer, MI, 48446 as a location of use. A room diagram, an equipment list and air concentration control procedures are enclosed.

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

David Close, Consultant, NMA - Cleveland, OH

TELEPHONE NUMBER: (216) 641-5799

SUBMIT ITEMS 5 THROUGH 11 ON 8½ x 11" PAPER. THE TYPE AND SCOPE OF INFORMATION TO BE PROVIDED IS DESCRIBED IN THE LICENSE APPLICATION GUIDE.

5. RADIOACTIVE MATERIAL
A. Element and mass number, B. chemical and/or physical form, and C. maximum amount which will be possessed at any one time

6. PURPOSE(S) FOR WHICH LICENSED MATERIAL WILL BE USED

7. INDIVIDUAL(S) RESPONSIBLE FOR RADIATION SAFETY PROGRAM AND THEIR TRAINING AND EXPERIENCE

8. TRAINING FOR INDIVIDUALS WORKING IN OR FREQUENTING RESTRICTED AREAS

9. FACILITIES AND EQUIPMENT

10. RADIATION SAFETY PROGRAM

11. WASTE MANAGEMENT

12. LICENSE FEES (See 10 CFR 170 and Section 170.31)
FEE CATEGORY: 7C
AMOUNT ENCLOSED: $120.00

13. CERTIFICATION (Must be completed by applicant)

THE APPLICANT UNDERSTANDS THAT ALL STATEMENTS AND REPRESENTATIONS MADE IN THIS APPLICATION ARE BINDING UPON THE APPLICANT.

THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATION ON BEHALF OF THE APPLICANT NAMED IN ITEM 2 CERTIFY THAT THIS APPLICATION IS PREPARED IN CONFORMITY WITH TITLE 10, CODE OF FEDERAL REGULATIONS, PARTS 30, 32, 33, 34, 35, AND 40 AND THAT ALL INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT TO THE BEST OF THEIR KNOWLEDGE AND BELIEF.

WARNING: 18 U.S.C. SECTION 1001 ACT OF JUNE 25, 1948, 62 STAT. 749 MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

SIGNATURE—CERTIFYING OFFICER	TYPED/PRINTED NAME	TITLE	DATE
X John Mellen	JOHN MELLEN	President	5/24/88

8810270144 880623
REG3 LIC30
21-16754-01 PNU

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS	APPROVED BY
Amd	Jun-3-11	7C	CONTROL NO. 85502	M. Parker
AMOUNT RECEIVED	CHECK NUMBER			DATE
$120	1004			6/7/88

RECEIVED
MAY 31 1988
REGION III

10.13.1 **Worker Dose from Nobel Gases 0.1:** We will collect spent noble gas in a shielded container and will check the trap effluent according to the procedure that follows. We will follow the model procedure for calculating worker dose from nobel gases that was published in Appendix 0.1 to Regulatory Guide 10.8, Revision 2.

We will follow the model procedure for checking trap effluent as described in Appendix 0.3 to Regulatory Guide 10.8, Revision 2. As an alternative, after every 20 procedures, the trapping efficiency of the charcoal trap will be evaluated. A low level G-M probe will be placed against the inlet tube of the trap during the equilibrium phase of the study and a reading taken. The probe will then be placed against the outlet from the trap at the initiation of the washout phase. If the maximum exhaust reading exceeds 10% of the inlet reading, taking background into consideratioin, the trap will be considered saturated and the cartridge will be replaced.

10.13.2 **Worker dose from aerosols:** We will collect spent aerosol in a shielded trap, and for reusable traps, monitor the traps effluent with an air contamination monitor that we will check regularly according to the manufacturer's instructions.

10.13.3 **Airborn Effluents:** We will not directly vent spent aerosols and gases to the atmosphere and therefore no effluent estimation is necessary.

10.13.4 **Clearance Time, Appendix 0.4:** We will calculate spilled gas clearance times according to the procedure only that was published in Appendix 0.1 to Regulatory Guide 10.8, Revision 2.

Individual Responsible for Radiation Safety Programs: Their Training and Experience

Authorized Users for Medical Use

ATT 7.1

Amend to add:

Authorized User	Authorization
Edmund Dennis Harris, M.D.	Material in 35.100 and 35.200

Refer to NRC license # 21-20440-01 for evidence of user qualification for the above physician.

Item #7
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Proposed 5/20/88
License # 21-16754-01

APPENDIX C

INSTRUMENTATION

700 South Main
Lapeer

1. Survey meters

   a. Manufacturer's name: Eberline

      Manufacturer's model number: E-520

      Number of instruments available: 1

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

      Maximum range: 0 mR/hr to 2000 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	G.E.	Maxicamera
Uptake Probe	Picker	Spectroscaler

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

Item #9
1 of 1 page
Prepared:5/20/88
Lic. #21-16754-01

Facilities and Equipment

Diagram

Air Supply

Air Exhaust

___ Scanner

1 Uptake/Well

2 Camera

3 Lockable Door

4 Receipt Area

___ Generator

5 Kit Preparation

5 Isotope Storage

5 Dose Preparation

5 Waste Storage

6 Dose Calibrator

___ Refrigerator

Sink

Lead Castle

Adjacent Areas

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

___ _____

Lead Shielding

5 L-Shield

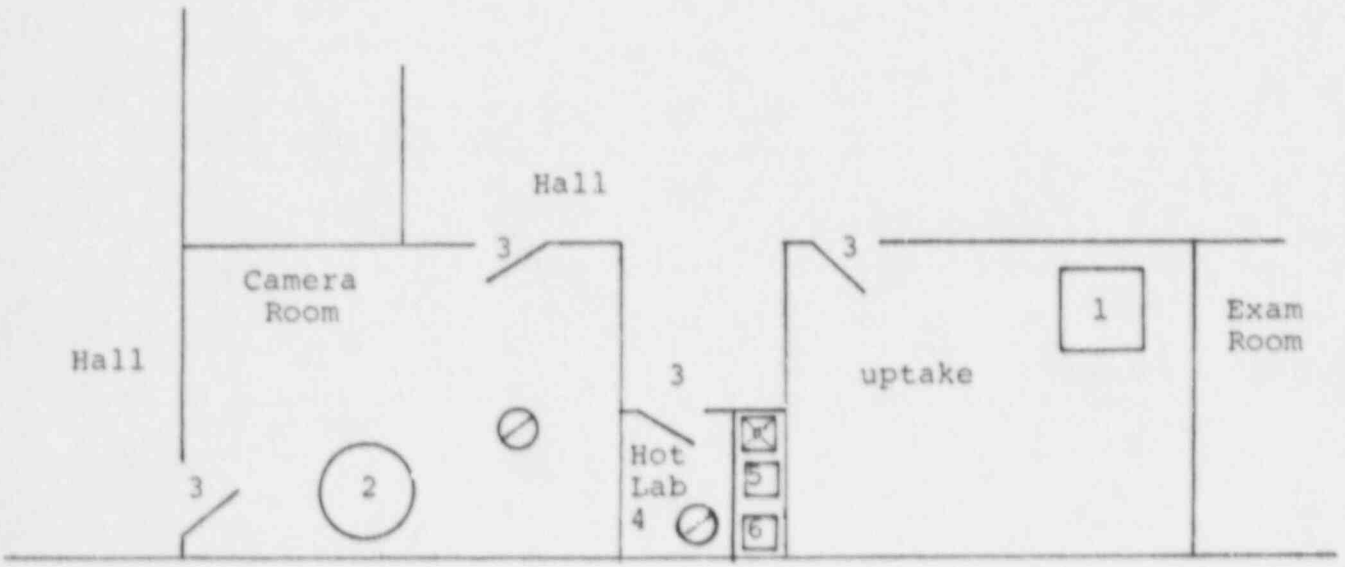
16" L x 16" W x 22" H x 1/2" T

___ L x ___ W x ___ H x ___ T

___ L x ___ W x ___ H x ___ T

___ L x ___ W x ___ H x ___ T

700 South Main
Lapeer, MI



Item #11
1 of 1 pages
Prepared 5/20/88
Lic: #21-16754-01

APPENDIX O

Model Procedure for Monitoring, Calculating, and Controlling Air Concentrations
(See §§ 20.103, 20.106, 20.201, 35.90, and 35.205.)

O.1 MODEL PROCEDURE FOR CALCULATING WORKER DOSE FROM CONCENTRATIONS OF GASES AND AEROSOLS IN WORK AREAS

1. Collect the following data:

   a. Estimated number of studies per week;

   b. Activity to be administered per study;

   c. Estimated activity lost to the work areas per study (you may assume 20 percent loss);

   d. Measured airflow supplied by each vent in the imaging room (if different during heating and cooling seasons, use the lesser value);

   e. Measured airflow exhausted by each vent in the imaging room (the exhaust should be vented and not recirculated within the facility);

   f. Measured airflow exhaust at the storage site (e.g., a fume hood); and

   g. Maximum permissible air concentrations in restricted and unrestricted areas. For Xe-133, the maximum permissible values are 1×10^{-5} μCi/ml in restricted areas and 3×10^{-7} μCi/ml in unrestricted areas. For soluble Tc-99m, the maximum permissible values are 4×10^{-5} μCi/ml in restricted areas and 1×10^{-6} μCi/ml in unrestricted areas. For other gases or aerosols, see Appendix B to 10 CFR Part 20.

2. The following calculations must be made:

   a. The sum of all measured exhaust rates and the sum of all measured supply rates. If the former is larger than the latter, this ensures that the imaging room is at negative pressure.

   b. The estimated average concentration in restricted areas.

      (1) The total activity released to the restricted area (activity used each week multiplied by estimated fractional loss per study) divided by the total air exhausted (sum of all exhaust rates multiplied by the length of the work week) must be less than the applicable maximum permissible value for a restricted area.

      (2) If this is not the case, plan for fewer studies. (An increase in the ventilation rate will not significantly reduce the downwind effluent concentration because it is primarily a function of the natural dispersion in the atmosphere.)

APPENDIX O

Model Procedure for Monitoring, Calculating, and Controlling Air Concentrations
(See §§ 20.103, 20.106, 20.201, 35.90, and 35.205.)

O.2 MODEL PROCEDURE FOR CALCULATING AIRBORNE EFFLUENT CONCENTRATION

1. Divide the total activity released to an unrestricted area (activity used each week that is released in an exhaust system) by the total volume of air exhausted over the week ("on" time multiplied by measured airflow rate). The quotient must be less than the applicable maximum permissible value for an unrestricted area.

2. If this is not the case, plan for fewer studies and do the calculation again. Alternatively, you may consider collection and decay-in-storage for waste, or restriction of access to the release point and calculation of concentration at the boundary of the restricted area.

APPENDIX O

Model Procedure for Monitoring, Calculating, and Controlling Air Concentrations
(See §§ 20.103, 20.106, 20.201, 35.90, and 35.205.)

O.3 MODEL PROCEDURE FOR MONITORING OR CHECKING TRAP EFFLUENT

Charcoal traps can significantly reduce air contamination. They can also become saturated or be spoiled by improper use, humidity, chemicals, or inadequate maintenance.

1. If the trap effluent is monitored by a radiation detector designed to monitor effluent gas, check the detector according to the manufacturer's instructions and keep a record of the checks.

2. If you do not monitor the trap effluent, check it on receipt and once each month. Collect the effluent from the trap during one patient study in a plastic bag and then monitor the activity in the bag by holding the bag against a camera, with the camera adjusted to detect the noble gas, and compare its counts per minute (cpm) to background cpm with no other radioactivity in the area. Keep a record of the date, background cpm, and bag cpm.

3. The RSO will establish an action level based on cpm or a multiple of background cpm. If you measure a significant increase in the bag cpm, the trap is breaking down and must be replaced.

4. Follow the trap manufacturer's instructions for replacing the trap.

APPENDIX O

Model Procedure for Monitoring, Calculating, and Controlling Air Concentrations
(See §§ 20.103, 20.106, 20.201, 35.90, and 35.205.)

SPILLED GAS CLEARANCE TIME (Item 10.13.4)

O.4 MODEL PROCEDURE FOR CALCULATING SPILLED GAS CLEARANCE TIME

1. Collect the following data:

   a. A, the highest activity of gas in a single container, in microcuries;

   b. Measured airflow supply from each vent in the room (if different during heating and cooling seasons, use the lesser value), in milliliters per minute;

   c. Q, the total room air exhaust determined by measuring, in milliliters per minute, the airflow to each exhaust vent in the room (the exhaust should be vented and not recirculated within the facility); this may be either the normal air exhaust or a specially installed gas exhaust system;

   d. C, the maximum permissible air concentrations in restricted and unrestricted areas. For Xe-133, the maximum permissible values are 1×10^{-5} μCi/ml in restricted areas and 3×10^{-7} μCi/ml in unrestricted areas. For other gases, see Appendix B to 10 CFR Part 20; and

   e. V, the volume of the room in milliliters.

2. For each room make the following calculations:

   a. The airflow supply should be less than the airflow exhaust to ensure the room is at negative pressure.

   b. The evacuation time $t = \frac{-V}{Q} \times \ln (C \times V/A)$.