

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.

FEDERAL AGENCIES 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 JERSEY, NEW YORK, PENNSYLVANIA, RHODE ISLAND, OR VERMONT, SEND APPLICATIONS TO:

U.S. NUCLEAR REGULATORY COMMISSION, REGION I
NUCLEAR MATERIAL SECTION B
831 PARK AVENUE
KING OF PRUSSIA, PA 19406

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

U.S. NUCLEAR REGULATORY COMMISSION, REGION II
MATERIAL RADIATION PROTECTION 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
MATERIAL RADIATION PROTECTION 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
☐ B. AMENDMENT TO LICENSE NUMBER _____
☐ C. RENEWAL OF LICENSE NUMBER _____

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

Department of Chemistry
Cornell College
Mt. Vernon, Iowa 52314

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

West Science Center
Cornell College, Mount Vernon, Iowa 52314

4. NAME OF PERSON TO BE CONTACTED ABOUT THIS APPLICATION

Dr. Jeffrey W. Cardon

TELEPHONE NUMBER

319-895-8811

SUBMIT ITEMS 5 THROUGH 11 ON 8 1/2 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. LICENSEE FEES (See 10 CFR 170 and Section 170.31)

FEE CATEGORY exempt AMOUNT ENCLOSED \$

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

Addison Ault

Addison Ault

Professor of Chemistry

6/28/85

14. VOLUNTARY ECONOMIC DATA

A. ANNUAL RECEIPTS

< \$250K	\$1M-3.5M
\$250K-500K	\$3.5M-7M
\$500K-750K	\$7M-10M
\$750K-1M	> \$10M

B. NUMBER OF EMPLOYEES (Total for entire facility excluding outside contractors)

C. NUMBER OF BEDS

D. WOULD YOU BE WILLING TO FURNISH COST INFORMATION (Dollar and/or staff hours) ON THE ECONOMIC IMPACT OF CURRENT NRC REGULATIONS OR ANY FUTURE PROPOSED NRC REGULATIONS THAT MAY AFFECT YOU? (NRC regulations permit it to protect confidential commercial or financial—proprietary—information furnished to the agency in confidence)

YES

FOR NRC USE ONLY

TYPE OF FEE	FEE LOG	FEE CATEGORY	COMMENTS
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AMOUNT REC	8512090283 850709 REG3 LIC30 14-03925-03	PDR	
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REGION III

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 313. 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, 32, 33, 34, 35 and 40 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 (a) provided to State health departments for their information and use; and (b) provided 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 an NRC decision or to an appropriate Federal agency to the extent relevant and necessary for that agency's decision about you.
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. A request that information be held from public inspection must be in accordance with the provisions of 10 CFR 2.790. Withholding from public inspection shall not affect the right, if any, of persons properly and directly concerned need to inspect the document.
5. **SYSTEM MANAGER(S) AND ADDRESS:** U.S. Nuclear Regulatory Commission
Director, Division of Fuel Cycle and Material Safety
Office of Nuclear Material Safety and Safeguards
Washington, D.C. 20555

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REGION III

5. Radioactive Materials

Element; mass number	Form	Amount
Hydrogen-3	solution	10 millicuries
Carbon-14	solution	10 millicuries
Phosphorus-32	solution	1 millicurie

6. Purposes For Which Licensed Material Will Be Used

In vitro research and teaching of radioisotope techniques to undergraduate students.

7. Individuals Responsible for Radiation Safety Program and Their Training and Experience

a. Jeffrey W. Cardon, Cornell College

Training

Type of Training	Where	Duration	On Job?	Formal Course?
Principles & Practice	UCLA	4 years	yes	no
	Cornell U.	3 years	yes	no
Radioactivity Measurement	UCLA	4 years	yes	no
	Cornell U.	3 years	yes	no
Standardization & Monitoring	UCLA	4 years	yes	no
	Cornell U.	3 years	yes	no
Mathematics & Calculation	UCLA	4 years	yes	no
	Cornell U.	3 years	yes	no

Experience

Isotope	Maximum Amount	Where	Duration	Use
H-3	1 mCi	UCLA	2 years	in vitro
		Cornell U.	3 years	in vitro
C-14	0.1 mCi	UCLA	6 months	in vitro
		Cornell U.	6 months	in vitro
P-32	20 mCi	UCLA	2 years	in vitro

b. William A. Deskin, Cornell College

Training

Type of Training	Where	Duration	On Job?	Formal Course?
Principles & Practice	Univ of Ia	4 months	no	yes
	Cornell C.	2 weeks	no	yes
Radioactivity Measurement	Univ of Ia.	4 months	no	yes
Standardization & Monitoring	Univ of Ia.	2 weeks	no	yes
Mathematics & Calculation	Univ of Ia.	4 months	no	yes
	Cornell C.	2 weeks	yes	yes

Experience

Isotope	Maximum Amount*	Where	Duration	Use
C-14	1 mCi	Cornell C.	2 years	in vitro
S-35	15 μ Ci	Cornell C.	5 years	in vitro
Ca-45	50 μ Ci	Cornell C.	5 years	in vitro
I-131	10 μ Ci	Cornell C.	2 years	in vitro

*At the time these materials were used, these were license exempt quantities.

c. Addison Ault, Cornell College

Training

Type of Training	Where	Duration	On Job?	Formal Course?
Principles & Practice	ANL*	1 year	yes	no
Radioactivity Measurement	ANL	1 year	yes	no
Standardization & Monitoring	ANL	1 year	yes	no
Mathematics & Calculation	ANL	1 year	yes	no
Biological Effects	ANL	1 week	no	yes

*ANF = Argonne National Laboratory

Experience

Isotope	Maximum Amount*	Where	Duration	Use
H-3	100 μ Ci*	Cornell C.	10 years	in vitro
H-3	1 mCi	ANL	1 year	in vitro
C-14	10 μ Ci*	Cornell C.	10 years	in vitro
C-14	1 mCi	ANL	1 year	in vitro
K-40	nat'l abund	Cornell C.	15 years	in vitro

*At the time these materials were used, these were license exempt quantities.

8. Training For Individuals Working In or Frequenting Restricted Areas.

Lesson Plan

I. Radioactivity and Radioisotopes

A. Types of Radioactivity

1. Radiation: Gamma, UV, X-rays

- a. Physical characteristics
- b. Biological effects

2. Particles: alpha, beta, neutron

- a. Physical characteristics
- b. Biological effects

B. Beta-emitting Isotopes

1. High energy beta sources: P-32 as a biological tracer

2. Low energy beta sources: H-3, C-14

- a. In biological molecules
- b. Physical characteristics of low energy betas
- c. Detection of low energy betas
 - 1) Geiger counters are not used
 - 2) Scintillation counters
 - a) principle of operation
 - b) efficiency and mathematics of counting

II. Permission to Use Isotopes

- A. Must be approved the faculty of Department of Chemistry

B. Must satisfactorily complete these lessons

C. Must follow safety rules at all times

III. Safety Rules

IV. Additional Materials Required by License

9. Facilities and Equipment

Facilities are all on the second floor of the West Science Center on the Cornell College campus. Research labs have bench space, sinks, and chemical hoods as diagrammed (Room 207). The biochemistry teaching lab (Room 206) has an integral cold room and an adjacent prep room (Room 204). The scintillation counter is in Room 207. The research lab will be used for the bulk of the work with radioisotopes. Radioisotopes (H-3 and C-14) may be used in all of these rooms. Initially, however, and until need arises, isotope use and storage will be restricted to Room 207. Waste material will be stored in Room 208, a stock room that is always kept locked.

The major radiation detection instrument is a Beckman Model CPM-100 liquid scintillation counter. It is located in the research laboratory, Room 207

10. Radiation Safety Program

The radiation protection officer will be responsible for teaching the orientation/safety course to all students who will be working with radioactive materials. In conjunction with the faculty of the Department of Chemistry, he will certify that students are eligible to work with radioisotopes. If violations of safety regulations are observed, he has the authority to decertify the student involved, or to remand the student to a second course in safety procedures. On second violation of the safety procedures, the student involved will be prohibited from working with radioisotopes at Cornell College. The RPO will also check the inventories of radiochemicals quarterly to insure that they are being kept up to date. The RPO will also be responsible for contacting the waste disposal service as necessary.

Because of the nature of the isotopes and limited quantities to be used under this license, film badges and dosimeters are not required.

In the laboratory, the attached set of safety rules will be adhered to in an effort to minimize the effects of accidents.

Survey of laboratories in which radiochemicals are used will be accomplished by wipe tests of areas of use on a weekly basis during times of active experimentation and at the end of any period of experimentation. The general lab area (including door sills, refrigerator, hood) will be subjected

to wipe tests on a monthly basis. Unacceptable level of contamination will be considered to be twice background on a 50 minute count on the scintillation counter, the Beckman CPM-100. If contamination goes that high, the area will be closed to further use until decontaminated.

SAFETY RULES AND REGULATIONS

- A. Radioactive material will be restricted to Room 207, and will be used only by students who have completed the safety orientation and who are working under the direct supervision of a faculty member. No other people should be in Room 207. The room should be locked whenever there is no one in it.
- B. Students shall not open stock solutions of radioactive materials. If you need some material for an experiment, ask the appropriate faculty member. This is necessary for inventory control purposes.
- C. Disposable plastic gloves shall be worn at all times when handling radioactive materials. Wash hands immediately after work.
- D. All work will be done at benches lined with plastic-backed absorbent paper. Thus if spills occur, they will be absorbed by the paper and will not contaminate the bench or floor.
- E. NO PIPETTING BY MOUTH. Always use a propipet.
- F. All material that might be contaminated by radioactive material must go into the radioactive waste barrel - not in the regular trash or down the sink. Use disposable glassware whenever possible in any procedure involving radioisotopes.
- G. No eating, drinking, smoking, or applying of cosmetics in the lab. No storage of food items in lab areas.
- H. In case of spills, warn people in the immediate area not to walk through the spill and spread it around. IMMEDIATELY notify your faculty advisor. Under your advisors direction, you will clean the area and check for residual contamination.
- I. Avoid any contact between your skin and radioactive material. If you spill it on you, wash thoroughly with detergent.

Radiation Safety Officer

Professor Cardon: West 315, Extension 309

home phone: 895-8708

11. Waste Management

Waste material will be collected and disposed of by:

Atomic Disposal Company
7221 Duvan Drive
Highland Park, Illinois 60477

NRC License Number 12-11286-1
Phone: 312-429-1660

CONVERSATION RECORD

TIME 3:00

DATE 5/20/85

TYPE

☐ VISIT

☐ CONFERENCE

☒ TELEPHONE

☐ INCOMING

☒ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU

A. Ault

ORGANIZATION (Office, dept., bureau, etc.)

Cornell College

TELEPHONE NO.

319-895 8811

SUBJECT

application for Renewal of License 14-03925-02

SUMMARY

No fee due - teaching/training EX 3A

License expired 4/30/85

ACTION REQUIRED

Fee Exempt No fee due strictly teaching & training

NAME OF PERSON DOCUMENTING CONVERSATION

SIGNATURE

DATE

Cheryl A. Phillips 5/20/85

ACTION TAKEN

SIGNATURE

TITLE

DATE