NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

- [ ] a. NEW LICENSE
- [ ] b. AMENDMENT TO: LICENSE NUMBER
- [ ] c. RENEWAL OF: LICENSE NUMBER 29-07694-01

2. APPLICANT'S NAME *(Institution, firm, perron, etc.)*

American Cyanamid Company

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(609)-799-0400 Ext. 2356

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)

Agricultural Research Div.
P. O. Box 400
Princeton, New Jersey 08540

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*

Agricultural Research Division
Quakerbridge and Clarksville Roads
Clarksville, New Jersey 08540

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Mr. W. A. Steller	Chairman, Radioisotope Committee
b.	Dr. D. F. Barringer, Jr.	Radiological Control Officer
c.	Mr. A. I. Kleiner	Radiological Safety Officer

7. RADIATION PROTECTION OFFICER

Mr. A. I. Kleiner

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

See Appendix II

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)	Any by-product material between	Any		Not to exceed 5 millicuries per
(2)	Atomic Numbers 1 and 83 except alpha			nuclide except those listed in Appendix III
(3)	emitters			
(4)				

License Fee Information
see 2/25/83 ltr.
on Reverse Side

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	Research and development studies including synthetic chemistry, plant metabolism,
(2)	and metabolism in animals other than man.
(3)	
(4)	

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9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	None		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	See Appendix IV					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

XX b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
XX (1) FILM BADGE	Teledyne, Westwood, New Jersey 07675	☐ MONTHLY
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)	(For work with ^{131}I and ^{125}I only)	XX QUARTERLY
☐ (3) OTHER (Specify): _____		☐ OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

XX a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (Include filtration, if any), ETC.

☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (fixed and/or temporary), ETC.

☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

See Appendix V

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

Nuclear Diagnostic Laboratories Incorporated, Peekskill, New York 10566

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of parson or institution providing the training, duration of training, when training was received, etc.

    a. Principles and practices of radiation protection.

    b. Radioactivity measurement standardization and monitoring techniques and instruments.

    c. Mathematics and calculations basic to the use and measurement of radioactivity.

    d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, certify that this application is prepared in conformity with Title 10, Code of Federal Regulations, Part 30, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our 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.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)* $150.00	b. CERTIFYING OFFICIAL *(Signature)*
	c. NAME *(Type or print)* Robert H. Becker Robert H. Becker
(1) LICENSE FEE CATEGORY: 3K	d. TITLE Director, Agricultural Research Division
(2) LICENSE FEE ENCLOSED: $ 150.00	e. DATE 2/22/83

Appendix I

Individual Users

Use of radioisotopes is restricted to individuals designated by the Radioisotope Committee. The membership of this committee is as follows:

Mr. W. Steller	- Chairman
Mr. G. Mangels	- Assistant Chairman
Dr. D. Ingle*	- Secretary, Animal Industry
Mr. A. Kleiner	- Safety Officer, Chemical Research and Development
Dr. D. Barringer	- Control Officer
Mr. J. Shandrowsky	- Purchasing
Dr. G. Vinci	- Center Physician
Dr. P. Gatterdam*	- Product Development

*Technical representatives of departments using radioisotopes.

Appendix II

APPLICATION FOR GENERAL AUTHORIZATION TO USE RADIOISOTOPES

1. NAME	DEPARTMENT
Mr. Gary D. Mangels	Product Development

2. TYPE OF TRAINING

TYPE	WHERE TRAINED	DURATION OF TRAINING	FORMAL COURSE (CIRCLE ONE)		ON THE JOB (CIRCLE ONE)	
(a) Principles and Practices of Radiation Protection.	Rutgers	1 Semester	(Yes)	No	(Yes)	No
(b) Radioactivity measurement, monitoring techniques, and instruments.	Rutgers	1 Semester	(Yes)	No	(Yes)	No
(c) Mathematics and calculations basic to the use and measurement of radioactivity.	Rutgers	1 Semester	(Yes)	No	(Yes)	No
(d) Biological effects of radiation.	Rutgers	1 Semester	(Yes)	No	(Yes)	No

3. Formal Courses: (List all courses pertaining to isotopes, atomic and nuclear structure, radiochemistry, radiobiology, etc.)

TITLE OF COURSE	WHERE TRAINED	DURATION	COURSE CONTENT
(a) Physics II	RPI	1 Semester	Atomic, Nuclear Structure
(b) Radioactivity in the Environment	Rutgers	1 Semester	Atomic Structure, Radiation Effects
(c)			
(d)			

4. Experience: (Actual use of isotopes)

ISOTOPE	MAXIMUM AMOUNT (mc.)	WHERE EXPERIENCE GAINED	DURATION	TYPE OF USE
Carbon-14	100	American Cyanamid	4 Years	Synthesis, Tracer

Remarks:

5. I have read and understand the instruction and information in the Radioisotope Manual of the Agricultural Division including Title 10, Code of Federal Regulations, Part 20 "Standards for Protection Against Radiation".

Gary Mangels
SIGNATURE

Update → 2/15/83
DATE

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USE REVERSE SIDE FOR ADDITIONAL REMARKS

APPLICATION FOR GENERAL AUTHORIZATION TO USE RADIOISOTOPES Appendix II

NAME	DEPARTMENT
Arthur I. Kleiner	Product Development - Metabolism

2. TYPE OF TRAINING

TYPE	WHERE TRAINED	DURATION OF TRAINING	FORMAL COURSE (CIRCLE ONE)		ON THE JOB (CIRCLE ONE)	
(a) Principles and Practices of Radiation Protection.	American Cyanamid Co. Temple University Med. School	2-1/2 yrs. 2 yrs.	(Yes)	No	(Yes)	No
(b) Radioactivity measurement, monitoring techniques, and instruments.	Same as (a)		Yes	(No)	(Yes)	No
(c) Mathematics and calculations basic to the use and measurement of radioactivity.	Same as (a)		Yes	(No)	(Yes)	No
(d) Biological effects of radiation.	Temple University Med. School	1 semester	(Yes)	No	(Yes)	No

3. Formal Courses: (List all courses pertaining to isotopes, atomic and nuclear structure, radiochemistry, radiobiology, etc.)

TITLE OF COURSE	WHERE TRAINED	DURATION	COURSE CONTENT
(a) Nucleic Acids + Proteins	Temple Univ. Med. School	1 semester	effect of X-Rays on DNA, RNA Harmful Effects of γ-Radiation in Protein Nucleic Acids
(b)			
(c)			
(d)			

4. Experience: (Actual use of isotopes)

ISOTOPE	MAXIMUM AMOUNT (mc.)	WHERE EXPERIENCE GAINED	DURATION	TYPE OF USE
^{14}C and ^{3}H	1-2 mCi	American Cyanamid	2-1/2 years	Radiotracers in Analytical + Metabolism
^{125}I	0.5 mCi	Temple Univ. Med School	2 years	Radioimmunossay for Insulin.
^{3}H	100 mCi	American Cyanamid	1 year	Used to Prepare Tritiated Tracer used in RIA

Remarks:

Update of original application to reflect his experience with American Cyanamid Co.

H. Stelle

5. I have read and understand the instruction and information in the Radioisotope Manual of the Agricultural Division including Title 10, Code of Federal Regulations, Part 20 "Standards for Protection Against Radiation".

A I Kleiner
SIGNATURE

1-4-78
DATE

USE REVERSE SIDE FOR ADDITIONAL REMARKS

Appendix III

By-Product Material

(Elements and Mass Number of Each)

Radioisotopes	Any Chemical or Physical Form
Atomic Number 3 to 83	5 Millicuries of Any, But Not to Exceed 5 Millicuries Except:
H^3	100 Curies
C^{14}	5,000 Millicuries
S^{35}	50 Millicuries
P^{32}	50 Millicuries
Ni^{63}	200 Millicuries
Ca^{45}	20 Millicuries
Fe^{59}	10 Millicuries
I^{131}	10 Millicuries
I^{125}	10 Millicuries

Appendix IV

Add

3 - Packard TRI-CARB Model 306 Sample Oxidizer

2 - Intertechnique Liquid Scintillation Spectrometers (Models SL 30 and SL 300)

1 - SEARLE Mark III Model 6880 Liquid Scintillation Spectrometer

1 - Beckman Model SL 9800 Liquid Scintillation Spectrometer

1 - Technical Associates Model PUG-1 with P-11 Probe Portable Monitor

Calibration

All instruments with the exception of the portable monitor and the oxidizers are calibrated as recommended by the manufacturer with built-in external standards daily since these instruments are used for purposes of quantitization.

The oxidizers are checked for burning efficiency whenever they are used with approximately 0.001 microcurie of a carbon-14 compound.

The portable monitor is calibrated whenever it is used with a sealed source containing less tha 0.1 microcurie of beta-emitting material.

Appendix V

Facilities and Equipment

Previously submitted information with respect to our facilities.

Because of expanded metabolism projects and efforts to utilize laboratory space more efficiently the tracer experiments with plants and/or small animals are now conducted in Rooms C-112 to C-116 and A-106 to A-113. The combined total amounts of radioisotopes used or stored in these areas may exceed the limits designated for tracer laboratories. For this reason, these areas have been designated a "Hazard Area" (as defined in the Radioisotope Manual, Agricultural Center, American Cyanamid Section III, Page 2), appropriately posted and provided with locked storage facilities. This represents no significant change in the type or level of experiments conducted by the metabolism personnel.

Room C-118, designated a hazard area, is now used for the synthesis of radioactive compounds not available through regular commercial channels. Therefore, this room is used infrequently. This room has a stainless-steel hood (double size) and a nonporous vinyl tile floor.