

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application. If application is for renewal of a license, complete only Items 1 through 7 and indicate new information or changes in the program as requested in Items 8 through 15. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail three copies to: U. S. Atomic Energy Commission, Washington 25, D. C. Attention: Isotopes Branch, Division of Licensing and Regulation. Upon approval of this application, the applicant will receive an AEC Byproduct Material License. An AEC Byproduct Material 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, Part 20.

1. (a) NAME AND STREET ADDRESS OF APPLICANT. (Institution, firm, hospital, person, etc.)
 Harry Diamond Laboratories
 Connecticut Ave. & Van Ness St., N.W.
 Washington, D. C. 20438

(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1 (a).)

2. DEPARTMENT TO USE BYPRODUCT MATERIAL
 Mechanisms Branch (450)

3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)
 Renewal 8-2534-10

4. INDIVIDUAL USER(S). (Name and title of individual(s) who will use or directly supervise use of byproduct material. Give training and experience in Items 8 and 9.)
 Ira R. Marcus
 Duane E. Voeller

5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resume of his training and experience as in Items 8 and 9.)
 Gerald P. Hanson

6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each.)
 Americium 241

(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLICURIES OF EACH CHEMICAL AND/OR PHYSICAL FORM THAT YOU WILL POSSESS AT ANY ONE TIME. (If sealed source(s), also state name of manufacturer, model number, number of sources and maximum activity per source.)

1. Chemical Form - Pure Material
2. Deposited or plated on platinum or monel metal disk.
3. Quantity - 50 microcuries.

7. DESCRIBE PURPOSE FOR WHICH BYPRODUCT MATERIAL WILL BE USED. (If byproduct material is for "human use," supplement A (Form AEC-313a) must be completed in lieu of this item. If byproduct material is in the form of a sealed source, include the make and model number of the storage container and/or device in which the source will be stored and/or used.)

The Americium 241 will be used as an alpha particle source for laboratory experiments in the design and development of a timing mechanism.

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 FOR DIV. OF COMPLIANCE

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TRAINING AND EXPERIENCE OF EACH INDIVIDUAL NAMED IN ITEM 4 (Use supplemental sheets if necessary)

8. TYPE OF TRAINING	WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection.....	See supplemental sheet for changes		Yes No	Yes No
b. Radioactivity measurement standardization and monitoring techniques and instruments.....			Yes No	Yes No
c. Mathematics and calculations basic to the use and measurement of radioactivity..			Yes No	Yes No
d. Biological effects of radiation.....			Yes No	Yes No

9. EXPERIENCE WITH RADIATION. (Actual use of radioisotopes or equivalent experience.)

ISOPOE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
See supplemental sheet for changes.				

10. RADIATION DETECTION INSTRUMENTS. (Use supplemental sheets if necessary.)

TYPE OF INSTRUMENTS (Include make and model number of each)	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY RANGE (mr/hr)	WINDOW THICKNESS (mg/cm ²)	USE (Monitoring, surveying, measuring)
Nuclear Measurements Corporation PC-3A Gas Flow Internal Proportional Counter	1	Alpha, Beta, Gamma	-----	-----	measuring

11. METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED ABOVE.

See supplemental sheet for changes.

12. FILM BADGES, DOSIMETERS, AND BIO-ASSAY PROCEDURES USED. (For film badges, specify method of calibrating and processing, or name of supplier.)

Film Badge service is provided by Lexington Signal Depot, Lexington, Kentucky.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS

13. FACILITIES AND EQUIPMENT. Describe laboratory facilities and remote handling equipment, storage containers, shielding, fume hoods, etc. Explanatory sketch of facility is attached. (Circle answer) Yes No See supplemental sheet for changes.

14. RADIATION PROTECTION PROGRAM. Describe the radiation protection program including control measures. If application covers sealed sources, submit leak testing procedures where applicable, name, training, and experience of person to perform leak tests, and arrangements for performing initial radiation survey, servicing, maintenance and repair of the source. See supplemental sheet for changes.

15. WASTE DISPOSAL. If a commercial waste disposal service is employed, specify name of company. Otherwise, submit detailed description of methods which will be used for disposing of radioactive wastes and estimates of the type and amount of activity involved. See supplemental sheet for changes.

CERTIFICATE (This item must be completed by applicant)

16. THE APPLICANT AND ANY OFFICIAL EXECUTING THIS CERTIFICATE ON BEHALF OF THE APPLICANT NAMED IN ITEM 1, 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.

Gerald P. Hanson
 Date 22 January 1964
 Approved: Gerald P. Hanson (RPO)
 Harry Diamond Laboratories
 Applicant named in Item 1
 By: *How. Sisco*
 How. Sisco
 Associate Director
 Title of certifying official



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.

SUPPLEMENTAL SHEET 1

Item 5. (See item 8).

Item 8. Training of Radiation Protection Officer and Users.

<u>Type of Training</u>	<u>Where Trained</u>	<u>Duration of Training</u>	<u>On the Job</u>	<u>Formal Course</u>
<u>Gerald P. Hanson</u> (Radiation Protection Officer)				
a. Principles	Univ. of Mich.	1 yr	No	Yes
	Argonne Nat'l Lab	3 mos	Yes	No
b. Measurement	Univ. of Mich.	1 yr	No	Yes
	Argonne Nat'l Lab	3 mos	Yes	No
c. Mathematics	Flint Jun. Coll.	2 yrs	No	Yes
	Univ. of Mich.	5 yrs	No	Yes
d. Biological	Univ. of Mich.	1 yr	No	Yes
	Argonne Nat'l Lab	3 mos	Yes	No
<u>Ira R. Marcus</u>				
a. Principles	Nuclear Instrumentation	4 mos	No	Yes
b. Measurement	NBS Grad. School	4 mos	No	Yes
c. Mathematics	Brooklyn College	4 yrs	No	Yes
d. Biological	Army CBR Training	1 mo	No	Yes
<u>Duane E. Voeller</u>				
a. Principles	HDL	1 yr	Yes	No
b. Measurement	None			
c. Mathematics	No. Dakota Sch. of Forestry	2 yrs	No	Yes
	Iowa State University	6 mos	No	Yes
	George Washington Univ.	4 mos	No	Yes
d. Biological	None			

Item 9. Experience with Radiation for RPO and Users.

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Where Experience Was Gained</u>	<u>Duration of Experience</u>	<u>Type of Use</u>
<u>Gerald P. Hanson</u> (Radiation Protection Officer)				
Cobalt-60	2,500 c	Univ. of Michigan	4 mos	Lab Project
Cesium-137	100 mc	Univ. of Michigan	1 yr	Instrument Calibration
Iodine-131	40 mc	Univ. of Michigan	4 mos	Field Project
Misc (3-94)	Various amts (few micro - several hundred mc)	Argonne Nat'l Lab	3 mos	On the Job training - instrument calibration, waste disposal, de-contamination.

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Supplemental Sheet 2

Item 9. Experience with Radiation for RPO and Users, Cont'd

In addition, during approximately one and one half years with the Kansas State Board of Health he worked in a supervisory capacity as Supervisor of Radiation Hygiene Services. In this capacity his responsibilities were in the areas of registration of radioactive sources, promulgation of radiation protection regulations, consultation with users of radiation sources and radioactive materials, and co-inspection of licensees with A.E.C. inspectors.

Since February 1962 he has worked as the Health Physicist and Radiation Protection Officer for the Harry Diamond Laboratories.

Ira R. Marcus

College Physics laboratory experiments to determine half-life of unknown radioactive sample.

One year at HDL using Am²⁴¹ and Po²¹⁰ to test solid state nuclear particle detectors. Maximum amount: .05 and .02 microcuries respectively.

Duane E. Voeller

One year at HDL using Am²⁴¹ and Po²¹⁰ to test solid state nuclear particle detectors. Maximum amount: .2 and .02 microcuries respectively.

Item 11. Method, Frequency, and Standards Used in Calibrating Instruments.

The instrument is not calibrated in an absolute sense, however its constancy is checked prior to each use by inserting a check source in the counting chamber and observing the number of counts registered during a measured interval of time.

The following sources obtained from the National Bureau of Standards are available.

Radium (D+E) check source, approximately 28,000 counts per minute alpha plus beta, March 23, 1962.

U₃O₈ check sources

- a. 578 Alpha/min, March 23, 1962
- b. 1,739 Alpha/min, March 23, 1962
- c. 3,115 Alpha/min, March 23, 1962

Item 13. Facilities and Equipment.

The Americium ²⁴¹ sources are used in a laboratory area for the development of a timing mechanism. In most cases, only one source will be in use at any given time. When a source is not in use it will be stored in a drawer of a metal bench which has been set aside especially for this use. The drawer is equipped with a combination lock, the combination of which is known only to the users.

Supplemental Sheet 3

Item 14. Radiation Protection Program.

There is in HDL a Radiation Control Board composed of the Radiation Protection Officer, Medical Officer, a representative of the administrative office, and several technical members trained or experienced in the use of radioactive materials. The Chief Health Physicist of the National Bureau of Standards is a consulting member. This Board is responsible for the formulation of rules and procedures necessary to (1) minimize hazards due to ionizing radiation (2) insure compliance with all applicable regulations. The use of the requested material will be under the cognizance of this Board.

Periodically, the Radiation Protection Officer will visit the laboratory area and will consult with the users. Smears will be taken in the area of use and will be counted in the NMC - PC 3A described in Item 10. Since the source will be used for statistical type experimental measurements, any significant deviation in the number of counts observed will be noticed by the users. This will serve as an additional warning device in case of loss of Americium from the disk.

Item 15. Waste Disposal.

Waste disposal will be handled by the U. S. Army Edgewood Arsenal Depot Operations Division - AEC License No. 19-1826-6.