

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.) Diamond Ordnance Fuze Laboratories Washington 25, D. C.	(b) STREET ADDRESS(ES) AT WHICH BYPRODUCT MATERIAL WILL BE USED. (If different from 1 (a).) Same
2. DEPARTMENT TO USE BYPRODUCT MATERIAL Materials Branch 910	3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.)
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.) Edward Nelson, Organic Chemist	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.) Strontium-90	(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.) Strontium sulfate - 20 millicuries in sealed U. S. Radium Corp. foil type Lab 369. One source of 20 millicuries requested.
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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 source will be used to investigate the determination of the diffusion coefficient of water vapor through polymer film.

The sealed source will be used in a Barber-Colman model A-4150 ionization detector cell.

DUPLICATED
FOR DIV. OF COMPLIANCE/

41200

B-10

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		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.)

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
		See supplemental sheet		

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)
See supplemental sheet					

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

See supplemental sheet

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 provided by Lexington Signal Depot, Lexington, Ky.

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)

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

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. Waste disposal conducted by Health Physics Unit at N.B.S. under direction of Dr. A. Schrebel.

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.

Date 20 May '62 By Billy M. P. Hunter
 Approved: Gerald P. Hanson (RPO) Technical 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 NO. 1

Item 5. See item 8.

Item 8. Training of Radiation Protection Officer and User

<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. Argonne Nat'l Laboratory	1yr(school) 3 mos	No Yes	Yes No
b. Measurement	Univ. of Mich. Argonne Nat'l Laboratory	1 yr(school) 3 mos	No Yes	Yes No
c. Mathematics	Flint Jun. Coll. Univ. of Mich.	2 yrs(school) 5 yrs	No "	Yes Yes
d. Biological	Univ. of Mich. Argonne Nat'l Lab	1 yr 3 mos	No Yes	Yes No

Edward Nelson

a. Principles	DOFL	2½ yrs	Yes	No
b. Measurement	DOFL	2½ yrs	Yes	No
c. Mathematics	U of C/USC/DOFL	16 yrs	No/Yes	Yes/no
d. Biological	No	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>G. P. Hanson (Radiation Protection Officer)</u>				
Cobalt-60	2,500 c	Univ. of Michigan	½ mos	Lab Project
Cesium-137	100 mc	Univ. of Mich.	1 yr	Instrument Calibration
Iodine-131	40 mc	Univ. of Mich.	½ 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
<u>Edward Nelson</u>				
¹³⁷ Cs	4 mc	DOFL	2½ yrs	Lab

Item 10. Radiation Detection Instruments.

<u>Instrument</u>	<u>Number Available</u>	<u>Radiation Detected</u>	<u>Sens. Range mr/hr</u>	<u>Window Thickness mg/cm²</u>	<u>Use</u>
a. Prop Counter NMC - FC3A	1	alpha, beta gamma	-	-	Measure and smear Test Eval.
b. Anton CDV700	12	beta, gamma	0-50	30	survey
c. Tracerlab SUL4	3	beta, gamma	0-25	30	survey
d. Tracerlab SULH	1	beta, gamma	0-1500	2	survey
e. Nuclear Chicago 2586	1	beta, gamma	0-2500	1	survey
f. Radiac AN/PDR-39	1	gamma	0-50,000	-	survey
g. Labatron Rate- meter 1619A	1	alpha, beta gamma	-	1.4	monitor

Note: Several other instruments are presently on hand. However, these were not listed because they are either not working properly or not thought to be satisfactory and will probably be replaced (i.e.: Chatham 700 beta, gamma survey meter). This listing may also change somewhat as specific instruments are added if and when they are deemed necessary.

Item 11.

The calibration and/or constancy checks of the instruments will be done at DOFL by Mr. Hanson or by a person, laboratory or vendor specifically directed by Mr. Hanson to make the calibration. The appropriate calibrations will be made at intervals of no longer than six months on all instruments that are in use by DOFL. Calibrations may be made at more frequent intervals as required, depending on the particular instrument concerned, and constancy checks will be made frequently.

The following sources are available for calibration and constancy checks.

Cobalt-60 sources calibrated by the National Bureau of Standards

- a. 1 source 12.3 mr/hr at one meter, Jan. 26, 1961
- b. 1 source 1.07 mr/hr at one meter, Jan. 26, 1961
- c. 1 source 16.3 mr/hr at one meter, Jan. 26, 1959
- d. 1 source 16.7 mr/hr at one meter, Jan. 26, 1959

U²³⁰g check source

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

Radium (D+E) check source

approximately 28,000 counts/min alpha, plus beta

Item 13. Special facilities, etc.

a. The Barber-Coleman ionization detector cell will be used in a chemistry laboratory in the Components Research Laboratory of DOFL.

b. Shielding: The source is located on the inner surface of a cylinder (brass or stainless steel) with walls approximately 1/4 inch thick. This wall thickness is roughly four times that required to stop 2.2 Mev beta radiation. No additional storage container is anticipated.

c. No remote handling equipment is required.

d. The use of a fume hood is not planned; however a sintered glass plug will be used on the exit line from the ionization detector.

Item 14

Periodically, the Radiation Protection Officer will visit the Laboratory area and will consult with Mr. Nelson, on the use of the source. The source will be leak tested at periods of no longer than 6 months by Mr. Gerald Hanson, whose training and experience are given in items 8 and 9. If the source needs service, maintenance, or repair, it will be returned to the manufacturer or to some other vendor authorized to repair these sources.