

UNITED STATES ATOMIC ENERGY COMMISSION  
**APPLICATION FOR BYPRODUCT MATERIAL LICENSE**

6140e  
Form approved.  
Budget Bureau No. 38-8027.

INSTRUCTIONS.—Complete Items 1 through 16 if this is an initial application or an application for renewal of a license. Information contained in previous applications filed with the Commission with respect to Items 8 through 15 may be incorporated by reference provided references are clear and specific. Use supplemental sheets where necessary. Item 16 must be completed on all applications. Mail two copies to: U.S. Atomic Energy Commission, Washington, D.C., 20545, Attention: Isotopes Branch, Division of Materials Licensing. 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. Include ZIP Code.) Department of the Army Harry Diamond Laboratories Connecticut Avenue & 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). Include ZIP Code.)	
2. DEPARTMENT TO USE BYPRODUCT MATERIAL Project Branch 700		3. PREVIOUS LICENSE NUMBER(S). (If this is an application for renewal of a license, please indicate and give number.) Amendment 8-2534-11	
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.) Thomas B. Grucci		5. RADIATION PROTECTION OFFICER (Name of person designated as radiation protection officer if other than individual user. Attach resums of his training and experience as in Items 8 and 9.)	
6. (a) BYPRODUCT MATERIAL. (Elements and mass number of each) Promethium-147  Promethium-147		(b) CHEMICAL AND/OR PHYSICAL FORM AND MAXIMUM NUMBER OF MILLCURIES 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) Plastic Plug Microsphere - 1 Curie-Nuclear Products Department Luminous Materials Section 2501 Hudson Road, St. Paul 19, Minnesota Plastic Plug Microsphere - 1c - 2 series register - 3M backfilled self luminating source  Glow Tubes each containing 2 mc Raytheon Co., Bristol, Tenn. Total possession - 1 curie	
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.) Plastic Plug Microsphere - storage in Bldg. 135. Glow Tubes - Pre-production non-destructive testing. It is expected that these items will be stored after testing in Bldg. 135 prior to disposal.			

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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 1		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 1		

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 <sup>2</sup> )	USE (Monitoring, surveying, measuring)
See Supplemental Sheet 2					

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

See Supplemental Sheet 3

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

Beta-Gamma and Neutron film badges are supplied by Lexington-Blue Grass Army Depot, Lexington, Kentucky.

INFORMATION TO BE SUBMITTED ON ADDITIONAL SHEETS IN DUPLICATE

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 3

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 4

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 5

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 April 1967

Approved: Thomas B. Grucci (CRPO)

Harry Diamond Laboratories

Applicant named in item 1

By: J. H. Campaigne  
J. H. Campaigne  
Associate Director

Title of certifying official

WARNING.— 18 U. S. C., Section 1001, Act of June 25, 1948, 62 Stat. 449, 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.

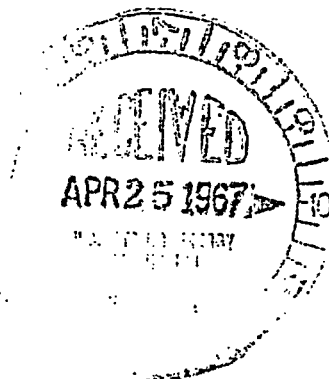
SUPPLEMENTAL SHEET 1

Item 8. Training of Radiation Protection Officer

<u>Type of Training</u>	<u>Where Trained</u>	<u>Duration of Training</u>	<u>On the Job</u>	<u>Formal Course</u>
Thomas B. Grucci (Radiation Protection Officer)				
a. Principles	Univ. of Pittsburgh	3 yrs	Yes	Yes
	Univ. of Cinn.	1 yr	No	Yes
b. Measurement	Univ. of Pittsburgh	3 yrs	Yes	Yes
	Univ. of Cinn.	1 yr	No	Yes
c. Mathematics	Univ. of Pittsburgh	3 yrs	Yes	Yes
	Univ. of Cinn.	1 yr	No	Yes
d. Biological	Univ. of Pittsburgh	3 yrs	Yes	Yes
	Univ. of Cinn.	1 yr	No	Yes

Item 9. Experience with Radiation

<u>Isotope</u>	<u>Maximum Amount</u>	<u>Where Experience Was Gained</u>	<u>Duration of Experience</u>	<u>Type of Use</u>
Thomas B. Grucci (Radiation Protection Officer)				
(Cobalt-60	(600 curies	(Wayne State Univ.	(3 yrs	(Calibration &
(Cesium-137	(350 curies	(Wayne State Univ.	(3 yrs	-(Dosimetry Stud-
(Iodine-131	300 millicuries	" " "	2 yrs	(ies Ingestion Stud-
Misc (3-94)	Various amts (from microcuries to several 100 millicuries)	Univ. of PGH General Electric	5 yrs	Biological Studies; routine health physics, etc.

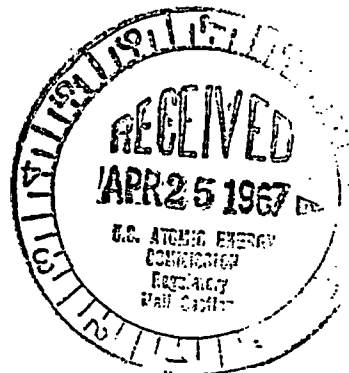


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SUPPLEMENTAL SHEET 2

Item 10. Radiation Detection Instruments

<u>Type of Instruments</u>	<u>Number Available</u>	<u>Radiation Detected</u>	<u>Sensitivity Range (Mr/Hr)</u>	<u>Window Thickness (mg/cm<sup>2</sup>)</u>	<u>Use</u>
Nuclear Measurements Corp. PC-3A Gas Flow I.P.C.	1	Alpha, Beta Gamma	-	-	Measuring
Tracerlab SU-1H Ionization Chamber Survey Meter	1	Beta, Gamma	0-1500	2-3	Surveying
Nuclear Chicago Model 2586 Ionization Chamber Survey Meter	1	Beta, Gamma	0-2,500	1	Surveying
Anton CD V-700 G-M Survey Meter	6	Beta, Gamma	0-50	30	Monitoring
Victoreen Model 440 Low Energy Ionization Chamber Survey Meter	1	Beta, Gamma	0-300	1	Surveying



SUPPLEMENTAL SHEET 3

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

Calibration consists of the following:

1. Instrument is placed at specific distances from a standard reference source.
2. The calculated values at various distances from the standard reference source will be compared with the observed meter readings.
3. Calibration correction curves will be affixed to each instrument.
4. Frequency of calibration for all instruments will be at intervals of three months.

Standard Reference Sources:

Cobalt-60	12.3 mr/hr at one meter	N.B.S. (1-26-61)
Cobalt-60	1.07 mr/hr at one meter	N.B.S. (1-26-61)
U <sub>3</sub> O <sub>8</sub>	3,115 $\alpha$ /min	N.B.S. (8-10-61)
Radium (D+E)	28,000 $\alpha$ c/min plus beta	N.B.S. (3-23-62)

Item 13. Facilities and Equipment.

Byproduct materials will be used in standard laboratory areas. Handling tools, containers, shielding materials, etc. will be furnished by the Radiation Protection Officer.



## SUPPLEMENTAL SHEET 4

### Item 11. Radiation Protection Program.

#### General

There is in HDL a Radiation Control Board composed of the Radiation Protection 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.

Specifically the Board will:

- a. Advise the Commanding Officer on the status of radiation hazards.
- b. Prepare, amend, and/or review rules and regulations pertaining to the safe use and storage of radiation sources.
- c. Review and approve proposed locations of radiation sources.
- d. Provide for the review of and authorization for all uses of existing and proposed radiation sources within the Laboratories.
- e. Serve as a reviewing committee for incidents involving sources of radiation which could result in injury or overexposure.
- f. Recommend whether disciplinary action should be taken when individuals using radiation sources fail to observe safety recommendations, rules or regulations.
- g. Maintain a record of actions taken.
- h. Prepare and maintain minutes of the Radiation Control Board's proceedings.
- i. As required, and at least annually, advise the HDL Central Safety Board regarding RCB activities and developments, or problems requiring HDL Central Safety Board guidance or action.

Specific detailed procedures of the HDL radiation protection program are given in the HDL Radiological Safety Manual, Administrative Circular 032-1.

Leak testing will be done by Mr. Thomas B. Grucci whose training and experience are given in items 8 and 9.

Sealed sources containing byproduct materials shall be leak tested at intervals not to exceed 6 months.

The leak test will be made in the following manner: The source will be wiped with a filter paper and the filter paper will be counted in an internal gas-flow proportional counter.

SUPPLEMENTAL SHEET 5

Item 15. Waste Disposal.

Waste pickup and ultimate disposal will be done by U. S. Army Edgewood Arsenal Operations Division - A.E.C. License No. 19-1826-6.

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