Form AEC-313
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved
Budget Bureau No. 38-R027

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.

34-3930

1. (a) NAME AND STREET ADDRESS OF APPLICANT (Institution, firm, hospital person, etc. Include ZIP Code)

Department of the Army
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). Include ZIP Code.)

Diamond Ordnance Radiation Facility
Forest Glen Section
Walter Reed Army Medical Center
Forest Glen, Maryland

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Nuclear Vulnerability Branch (230)

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

Renewal of 8-2534-9

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.)

Walter L. Gieseler
James M. McGarrity
Ernert D. McGarry
Robert B. Oswald, Jr.

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.)

Thomas B. Grucci

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

AMERICIUM-241
STRONTIUM-90
GOLD-198

(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.)

See Supplemental Sheet 1

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.)

See Supplemental Sheet 2

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(Continued on reverse side)

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 3		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 4		

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/cm²)	USE (Monitoring, surveying, measuring)
See Supplemental Sheet 5					

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

See Supplemental Sheet 6

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, Ky.

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 7

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 8

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 8

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.

Harry Diamond Laboratories
Applicant named in item 1

Date 12 June 1967

By: J. H. Campagna
J. H. Campagna
Associate Director
Title of certifying official

Approved: Thomas B. Crucci (RPO)

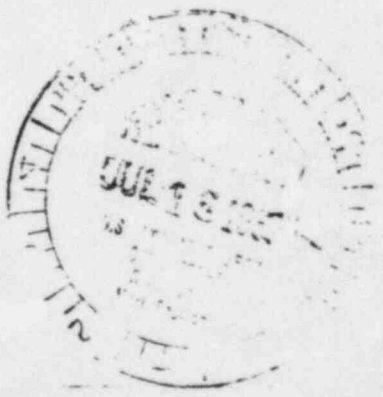
WARNING.—18 U. S. C., Section 1001; Act of June 25, 1948; 62 Stat. 749; makes it a criminal offense to make a willfully false statement or representation to any department or agency of the United States as to any matter within its jurisdiction.

* U.S. GOVERNMENT PRINTING OFFICE : 1964 O—745-581

SUPPLEMENTAL SHEET 1

Item 1

a. Isotope and Material	b. Chemical and/or Physical Form
[illegible]-241	1 source of 10 curies Vendor: Nuclec, Apollo, Pa. Serial No. 3000 AM 248
STRONTIUM-90	A. Victoreen Model BB-500A sealed source - 30 microcuries contained in two sources of 15 microcuries each. B. Victoreen Model BB-1010A sealed source - one source of 5 microcuries. C. U.S. Radium Corporation Model Lab - 277 sealed sources - 2.1 microcuries contained in 7 sources of .3 microcuries each. D. U.S. Radium Corporation Custom sealed source - one source of 10 microcuries. E. Amersham Model SIC-2 sealed source - one source of 300 microcuries.
GOLD-198 (New material requested in Amendment)	A. Auric Chloride-liquid form - one source of 5 millicuries. B. Sealed Sources - ten sources of 10 millicuries each. Vendors: National Bureau of Standards Oak Ridge National Laboratory Naval Research Laboratory N.D.L. Edgewood Arsenal



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SUPPLEMENTAL SHEET 2

Item 7. Purpose for which Byproduct Material will be used.

Americium-241 for Triga Mark F reactor at the Diamond Ordnance Radiation Facility.

Strontium 90
Refer to item 6 above:

A. For use as a check source in Victoreen "Radector" Model AGD-500B-SR survey instrument.

B. For use as check source in Victoreen "Radgun" Model AGB-10-XG-SR survey instrument.

C. For use as check sources in sensing elements in Victoreen Model 716 A Remote Area Monitor.

D. For use as check source in sensing element in modified Victoreen Model 716A - Remote Area Monitor.

E. For use as a check source in EXCO Model N578B Slow Neutron Monitor.

Gold-198
Reference sources for use in conjunction with Triga dosimetry studies.

SUPPLEMENTAL SHEET 3

Item 5. (see item 8)

Item 8. Training of Radiation Protection Officer and Users.

Type of Training	Where Trained	Duration of Training	On the Job	Formal Course
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.			
Walter L. Gieseler				
a. Principles	American University	1 yr	No	Yes
	HDL	2 yrs	Yes	No
b. Measurement	HDL	2 yrs	Yes	No
c. Mathematics	HDL/Univ. of Colo.	3 yrs	No	Yes
d. Biological	HDL	1 yr	Yes	No
Emmert D. McGarry				
a. Principles	Penn State Univ.	2 yrs	No	Yes
	Univ. of Pittsburgh	2 yrs	No	Yes
	AFSWP, Sandia, N.Mex.	10 mos	Yes	Yes
b. Measurement	Univ. of Pittsburgh	1 yr	No	Yes
	BAPL, Pittsburgh	8 yrs	Yes	No
c. Mathematics	Penn State Univ.	3 yrs	No	Yes
	Univ. of Pittsburgh	2 yrs	No	Yes
	BAPL, Pittsburgh	8 yrs	Yes	No
d. Biological	Univ. of Pittsburgh	6 mos	No	Yes
Robert B. Oswald, Jr.				
a. Principles	Univ. of Michigan	1 yr	Yes	Yes
b. Measurement	Univ. of Michigan	1 yr	Yes	Yes
c. Mathematics	Univ. of Michigan	1 yr	Yes	Yes
d. Biological	HDL	1 mo	Yes	No
James M. McGarrity				
a. Principles	Univ. of Maryland	4 yrs	No	Yes
	Univ. of Maryland	1 yr	Yes	No
b. Measurement	Univ. of Maryland	3 yrs	No	Yes
	Univ. of Maryland	1 yr	Yes	No
c. Mathematics	HDL	1 yr	Yes	No
	Univ. of Maryland	4 yrs	No	Yes
d. Biological Effects	Univ. of Maryland	1 yr	Yes	No
	HDL	1 yr	Yes	No

SUPPLEMENTAL SHEET 4

Item 9. Experience with Radiation for RPO and Users.

Material	Maximum Amount	Where Experience Was Gained	Duration of Experience	Type of Use
Thomas B. Crucci (Radiation Protection Officer)				
Cobalt-60	600 curies	Wayne State Univ.	3 yrs	Calibration &
Cesium-137	350 curies	Wayne State Univ.	3 yrs	Dosimetry Studies
Iodine-131	300 millicuries	" " "	2 yrs	Ingestion Studies
Misc (3-94)	Various amts (from microcuries to several 100 millicuries)	Univ. of PGH General Electric	5 yrs	Biological Studies; routine health physics, etc.
Walter L. Gieseler				
Misc. Isotopes	100 mc	DORF-TRIGA General Atomics	3½ yrs	Research
Polonium 210 (Po-Be neutron source)	20 c	DORF	3 yrs	Research
Cesium-137	10 mc	HDL	6 mos	Research
Emmert D. McGarry				
Cobalt-60	100 curies	BAPL	5 yrs	Calibration, Dosimetry
Plutonium	1 curie	Air Force	18 mos	Research
Misc 3-83	50 microcuries	BAPL	8 yrs	Research
Robert B. Oswald, Jr.				
Cobalt-60	15,000 c	Univ. of Mich.	4 yrs	Radiation Damage Studies
Gold-198	1 mc	Univ. of Mich.	3 yrs	Neutron Dosimetry
(Cadmium-115 (Cadmium-117	microcurie Amts	Univ. of Mich.	3 yrs	Radiation Damage) Studies)
Sulfur-35	1 microcurie	Univ. of Mich.	3 yrs	Radiation Damage Studies
James M. McGarrity				
Cobalt-60	5000 curies	Univ. of Maryland	2 yrs	Calibration & Research
Strontium-90	Several microcuries	HDL	3 yrs	Instrument Calibration
Cesium-137	Several microcuries	HDL		
Plutonium	1 curie	Univer. of Maryland	4 yrs	Instrument Calibration & sub-critical Assembly

SUPPLEMENTAL SHEET 5

Item 10. Radiation Detection Instruments

Type of Instruments	Number Available	Radiation Detected	Sensitivity Range (mr/hr)	Window Thickness (mg/cm^2)	Use
Nuclear Measurements Corp. PC-3A Gas Flow Proportional Counter	2	Alpha, Beta Gamma	---	---	Measuring
Baird Atomic Model 135 Scaler-Timer with shield & end window G-M Tube	1	Beta, Gamma	---	1.4	Measuring
Nuclear Chicago Model 2586 Ionization Chamber Survey Meter	2	Beta, Gamma	0-2,500	1	Measuring
Nuclear Corp. of America Model CS-40A Ionization Chamber Survey Meter	1	Beta, Gamma	0-50,000	75	Surveying
Nuclear Chicago Model 2112 Survey Meter with DN-3 Neutron Probe	2	Neutrons	---	---	Monitoring
Eberline Type N57SB Slow Neutron Monitor	1	Slow Neutrons	---	---	Monitoring

SUPPLEMENTAL SHEET 6

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

The instruments will be calibrated by placing them at known distance from a standard source and comparing the calculated standard source exposure with the observed instrument reading. Instruments will be calibrated at intervals of three months, and will probably be calibrated monthly, which is the schedule followed by WRAMC Health Physics Office.

The following standard sources are available at HDL or at WRAMC Health Physics Office for calibration:

At HDL

Cobalt-60 - N.B.S. - 12.3 mr/hr at one meter on 26 January 1961.

U_3O_8 - N.B.S. - 3,115 α/min on 23 March 1962.

Radium (D+E) - N.B.S. - 28,000 c/min alpha plus beta on 23 March 1962.

Plutonium-Beryllium Neutron Source - 15.95 grams Plutonium - Mound Laboratories Standard Source No. M-720.

At WRAMC

Cobalt-60 - Model M-1 - Tracerlab Inc. - 87.3 millicuries on 24 May 1956.

Plutonium Alpha Standard Set - Eberline Instrument Co.
a. 1,000 c/m
b. 14,000 c/m
c. 126,000 c/m
d. 1,430,000 c/m

Thallium-204 - New England Nuclear Corp. - .0236 microcuries on 1 Nov 1960.

Plutonium-Beryllium Neutron Source - Nuclear Materials and Equipment Corporation - 160 grams, [illegible]0 neutrons per second on 7 August 1961.

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Item 13. Facilities and Equipment

Americium-241

General

a. The neutron source will be used in the Triga Mark F reactor at the Diamond Ordnance Radiation Facility (DORF), which is located on the Walter Reed Army Medical Center Forest Glen Annex, Forest Glen, Maryland. The reactor and attendant facilities are housed in a reinforced concrete and brick building.

b. Handling

Personnel handling the source will be equipped with beta-gamma and neutron film badges and will be required to use tongs when handling the source.

c. Shielding

During reactor operation the source will be shielded by 17 feet of water. No other use of this source is anticipated.

Normal storage will be in the reactor pool. In case of unforeseen events requiring removal of the source from the reactor pool, it will be stored in an appropriate paraffin shielded storage container and placed in the warm storage room.

Strontium 90

a. General

Equipment containing the Strontium-90 check sources will be used for monitoring purposes in conjunction with the Triga Mark F reactor at DORF.

The "Radector," "Radgun" and EKCO Slow Neutron Monitor containing 15 microcuries, 5 microcuries, and 300 microcuries respectively of Strontium 90 are standard hand-held survey instruments. The "Remote Area Monitor" system consists of a central recording station and eight "sensing elements" (seven containing a 0.3 microcurie source and one modified element containing a 10 microcurie source). The sensing elements are immersion proof, vapor tight, sealed cylindrical containers, each housing a sealed ionization chamber and a calibration source, all calibration provisions are wholly self-contained and push-button operated; no manual access to the detector is required. Six of the sensing elements are located in selected spots in the reactor building. Two "spare" sensing elements containing an 0.3 microcurie check source are located in a cabinet in a limited access area.

b. Shielding

No special provisions for shielding are required.

c. Handling

The hand-held survey instruments will be used by the DORF staff. The Remova Area Monitoring System sensing elements will not be handled except for repair and leak testing.

d. Storage

The sources are stored in the instruments.

Gold 198

a. General

Gold reference sources will be used as counting standards in conjunction with dosimetry studies at DORF.

b. Shielding

The reference sources will be kept in the original shipping container.

c. Handling

Sources will be handled by Mr. Emmert D. McGarry and/or Robert B. Oswald, Jr.

d. Storage

When not in use, the sources shall be stored in the original shipping container.

SUPPLEMENTAL SHEET 8

Item 14. Radiation Protection Program

General

Per agreement between the Chief of Ordnance and the Surgeon General, on site Health Physics service at the Facility is provided by personnel from the Walter Reed Army Medical Center under the direction of the WRAMC Health Physics Officer. The WRAMC Health Physicist on duty at the DORF reactor is known as the DORF Health Physicist. At least one Health Physicist will be on duty at DORF during all operating hours.

A complete Health Physics Office is maintained at the DORF Reactor. Various Beta-Gamma, Neutron, and Alpha radiation detection instruments are available. Specific instruments which are of particular value for monitoring in conjunction with the requested material have been listed in item 10.

Leak testing will be done by either the HDL Radiation Protection Officer or by the DORF Health Physicist. Because the DORF Health Physicist is a member of the Armed Forces of the United States and is subject to transfer on short notice, it is not feasible to include any one individual's name, experience and training in this application. However, the position of DORF Health Physicist will be kept filled per the referenced agreement between the Chief of Ordnance and the Surgeon General. The actual assignment of personnel will be made by the WRAMC Health Physics Officer.

In case a source is found leaking it will be returned to the supplier for repair or disposal or transferred to another licensee whose license authorizes him to receive such material.

Sources will be leak tested at intervals not to exceed 6 months.

Leak testing will be done in the following ways:

a. The source will be wiped with a filter paper and the filter paper will be counted in an internal gas-flow proportional counter.

b. The source will be swabbed with a piece of cotton, with a suitable solvent, and the swab will be counted in an internal gas-flow proportional counter.

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.

DEPARTMENT OF THE ARMY
HARRY DIAMOND LABORATORIES
WASHINGTON, D.C. 20438

IN REPLY REFER TO:
AMXDO-ASD

34-3934 : 2 [illegible]

SUBJECT: Request for Renewal of License No. 8-2534-9

TO: Commanding General
U.S. Army Materiel Command
ATTN: AMCAD-SA-E
Washington, D. C. 20315

1. Transmitted herewith are seven copies of application for renewal of License No. 8-2534-9.

2. Request removal of Philip G. Berman from list of users and incorporation of the name of Emmert D. McGarry.

V. H. ELLIS
COL, OrdC
Commanding

1 Incl
Form AEC 313 for 8-2534-9
w/Suppl (7 cys)

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