Form AEC-313
(8-64)
10 CFR 30

UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved.
Budget Bureau No. 38-R0027

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 pe etc. Include ZIP Code.)*

HOWARD HOSPITAL SUPPLY CORPORATION
2212 Georgia Avenue, N.W.
Washington, D.C. 20001

(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

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.)*

David G. Mahan, B.S.,Ph.D.

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.)*

Ulrich K. Henschke, MD, Ph.D, FACR

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

Iridium 192

(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.)*

30% Iridium-70% Platinum alloy enclosed in stainless steel.

Possession limit: 15 curies

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.)*

For preparation of sources to be used in interstitial, intracavitary and surface radiationtherapy.

Applicant Howard Hosp. Supply Corp.
Check No. 71002
Amount $500.00
Date of Check 5-15-71
Date Check Rec'd 5-19-71/asc

(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 attached 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
^{226}Ra	5 Grams	Ohio State University	18 mos.	Interstitial, Intracavitary and surface radiationtherapy
^{60}Co	5 curies	Memorial Center for Cancer	15 yrs.	
^{192}Ir	5 curies	" " "	"	
^{192}Ir	15 curies	Howard University	8 mos.	

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)
Capintec Calibr.CRC-2	1	Beta,Gamma			measuring
Baird 503 Spectrometer	1	"			"
Victoreen mod. 440	1	"	0.1 - 300		Survey
Eberline RM-14	1	"			Monitoring
Radiacmeter EP-271	1	"	0.1 - 500		Survey
Eberline E-120 G.Conter	1	"	0.1 - 50		"
Nuclear-Chicago Counter	1	"	0.1-100		Survey

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

CAlibration with cesium-137 standard monthly

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

Direct reading dosimeters assigned all persons in laboratory.Readings recorded daily.
Film badges by Eberline for all personnel.

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

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.

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. Union Carbide Reactor Tuxedo,N.Y.

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.

Howard Hospital Supply Corporation

Applicant named in Item 1

Date May 2, 1971

By: David G. Mahan

David G. Mahan
President

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 any 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 : 1966 O—324-243

Attachment to Item 8

Dr. Mahan with Dr. Ulrich Henschke has pioneered the development and use of artificial radioisotopes in surface, intracavitary and interstitial radiation-therapy and has co-authored 6 papers in radiological and scientific journals and monographs on the development of reactor produced radioisotopes for interstitial and intracavitary application. He has also co-authored chapters in standard textbooks by Watson and by Ariel. He has worked with Iridium 192 continuously since 1954. Formal training ta Bluefield State College, Tuskegee Institute, Ohio State University, City College of New York, Sloan-Kettering Institute and Rochdale College.

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	Dr. Henschke has pioneered the application of artificial radioisotopes in surface, intracavitary and interstitial radiotherapy and has published numerous papers. He has worked with ^{192}Ir and ^{60}Co continuously since 1952.	18 years	(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
226 Ra	5 grams	Univ of Berlin and Munich	10 years	Interstitital, intracavitary and surface radiationtherapy.
^{60}Co	5 Curies	Ohio State University	3 years	
^{192}Ir	15 Curies	Memorial Center for Cancer NY C	15 years	

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

SUPPLEMENTARY INFORMATION TO ITEM 13 AND 14 OF AEC APPLICATION

A. Facilities and Equipment (Item 13)

All Iridium 192 Sources are received in the Isotope Section which is located on the first floor in the rear of the building, located at 2212 Georgia Avenue, N.W. The entire building is rented and controlled by the Howard Hospital Supply Corporation. The other rooms on the first floor are used for laboratory, showroom, and workshop.

The second floor is used for office space. There is no second floor over the Isotope Section. The back of the Isotope Section is surrounded by a fenced in yard. All windows and doors are secured with iron bars. The building is flood lighted at night.

The Isotope Section is equipped with lead storage containers, portable lead bricks, stationary lead sheilds, high density concrete sheilds, remote handling equipment, work benches, waste containers, and similar equipment.

B. Radiaion Pratection Program (Item 14)

Isotopes will be stored in a safe in the Isotope Section. Only persons authorized by the Corporation will have access to the Isotope Section.

Weekly surveys will be made by the GM Survey Meter in all areas where Isotopes are handled, stored and dispensed.

All testing, preparation and shipping of Radiative Sources will be under the supervision of the Radiation Safety Officer, (DR. U.K. Henschke).

All sources will be stored in containers which limit the Radiation level at the surface of the container to 200/m r/hr. All work with sources will be done behind lead sheilding using remote handling equipment.

Radiation exposure records will be kept for all personnel.

Radiation Safety Officer, U.K. Henschke, M.D.,PhD., FACR, has over 29 years experience in the use of Radioactive sources for Interstitial, Intracavitary and Surface Radiation Therapy. He has pioneered the use of Iridium 192 in these applications. His work is published in many publications including several textbooks. He is currentlyauthorized to handle the same Iridium 192 Sources and amounts under the U.S. ATOMIC ENERGY COMMISSION BYPRODUCT MATERIAL LICENSE Number 08-03075-07.

2203

A. Identification: HU - A

B. Proposed Use: For afterloading of interstitial implants and of intracavitary and surface applicators.

C. Radioisotope: Iridium 192 in form of metal or 30% iridium - 70% platinum alloy up to 5 millicuries per centimeter of active length. Up to 750 mc total.

D. Construction: Active material in form of a wire of 0.075 mm (0.003 inches in diameter. Inner stainless steel capsule has an inside diameter of 0.100 mm (0.004 inches) and an outside diameter of (0.009 inches). Outer stainless steel capsule has an inner diameter of 0.25 mm (0.010 inches) and an outside diameter of 0.50 mm (0.020 inches). Both capsules heli-arcwelded on both ends.

E. Prototype tests: No contamination or other problems experienced in actual use of such sources in several years of clinical practice.

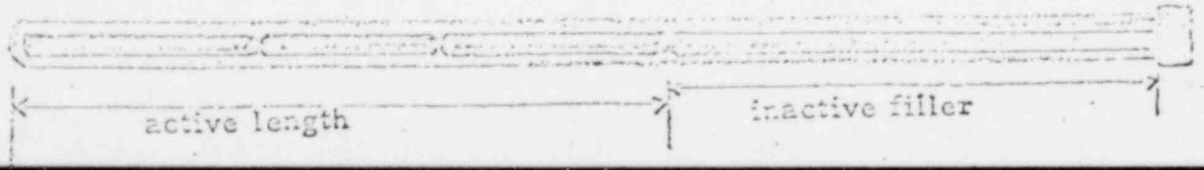
Smear tests: All source surface is rubbed with wet litmus paper. The activity of the paper when dry is measured by scintillator or Geiger Counter; it must be less than .005 microcuries, procedure is repeated 4 weeks later.

Immersion tests: The source is immersed in water for 24 hrs. The water activity must be less than .005 microcuries. The source is also immersed in cold sterilization solution (zepherin) for 24 hrs. Solution is then measured and must be less than .005 microcuries, procedure is repeated one week later.

Mechanical test: Dummy sources are coiled and bent and examined by microscope to determine that wire is not exposed.

F. Quality Control: The type 304 stainless steel hyperdermic needle tubing and metal or alloy wire is certified by manufacturer. Each inner capsule is smear and immersion tested before loading into the outer stainless steel capsule. The completed source is then smear tested by the above stated method at intervals of less than six months. Representative dummy sources are microspically tested to determine quality of the seals.

G. Labelling: Yellow Radiation label will be attached to all container. It will contain the following description: Radioisotope, Howard University Source Type A, mg. radium equivalent, Caution-Radioactive Material, and the Radiation symbol.



HOWARD UNIVERSITY RADIOISOTOPE SOURCE TYPE 1

A. Identification: HU - I

B. Proposed Use: For removable and permanent interstitial implants.

C. Radioisotope: Iridium 192 in form of a 30% iridium - 70% platinum alloy wire of 0.075 mm (0.003 inches) in diameter up to 1.0 mc per wire, up to 4 curies total.

D. Construction: Active material in two stainless steel capsules. The inner stainless steel capsules has an inside diamter of 1.1 mm (0.004 inches) and an outside diameter of 0.225 mm (0.0009 inches). Outer capsule has an inside diameter of 0.25 mm (0.010 inches) and an outside diameter of 0.50mm (0.020 inches), capsules are cold welded by shearing forces.

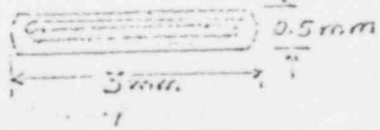
E. Prototype tests: These sources have been in use for 17 years and no problems have been encountered in clinical practice.

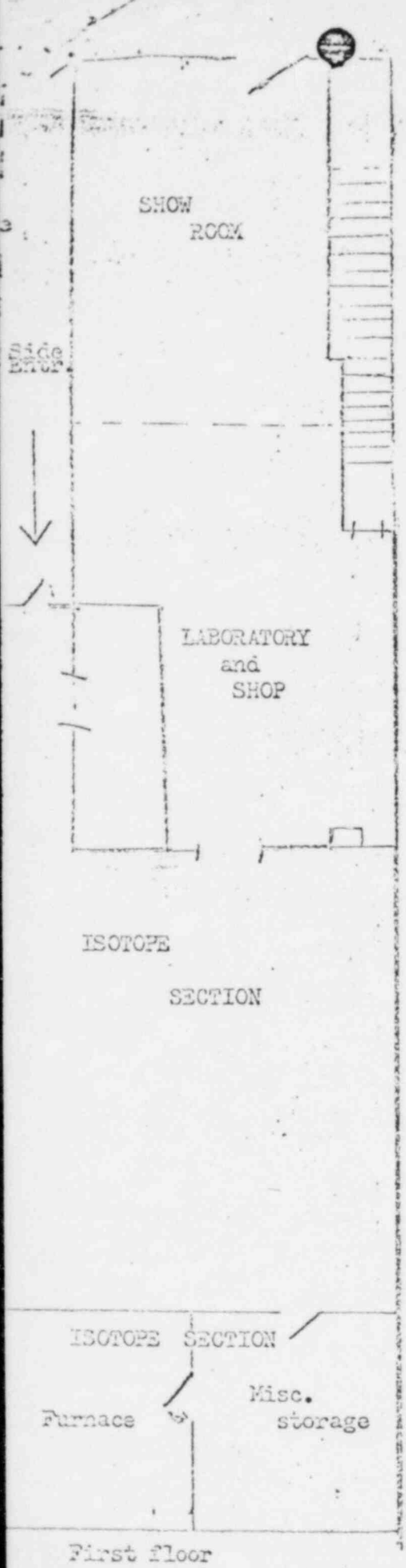
Corrosion: Sources have been exposed to water and to cold and warm isotonic saline solutions (0.025% sodium Chloride by weight) for peroids up to six months without any sign of corrosion or deterioration.
Prolonged exposure to concentrated "zepherin" (antiseptic solution) up to six months showed no signs of corrosion or deterioration.

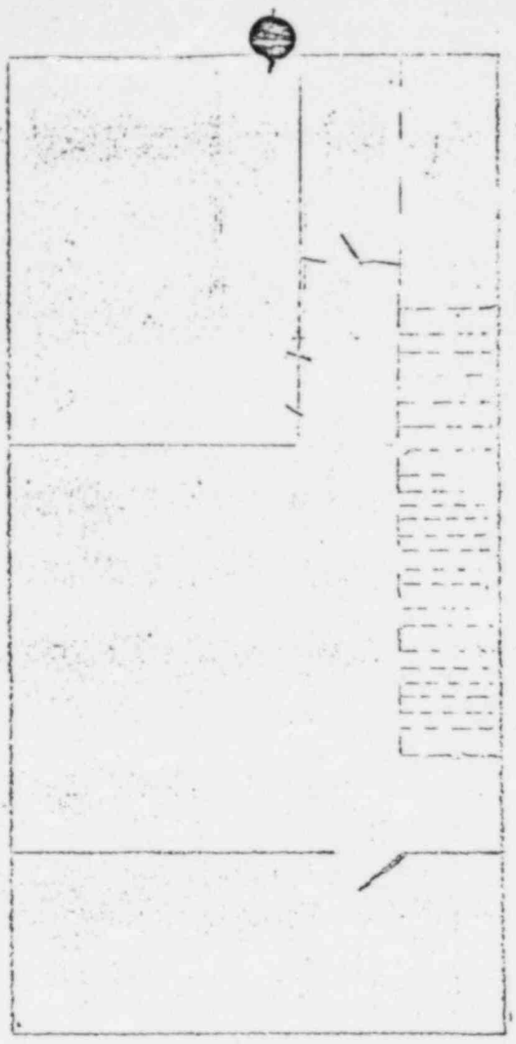
Sources are autoclaved at pressure up to 350 psi and temperatures up to 250 F for 30 minute peroids without any adverse affects noticed.

E. Quality Controls: Are provided routinely throughout the manufacturer and use of the sources. The stainless steel tubing from which the capsules are made are certified by the manufacturer (Superior Tube Company) to be type 304 stainless steel hyperdermic needle tubing with chemical composition and mechanical properties tested and notorized. The manufacturer (Engelhard Industries) of the wire used certify it to be an alloy of 30% iridium and 70% platinum. During seed fabrication representative numbers are individually inspected with a microscope to ensure the cold weld when fabrication is complete, all seeds are individually inspected for uniformity bent or damaged seeds are discarded. After seeds are irridiated they are comparitively measured with a standard of known activity. Representative are then smear tested for possible contamination.

G. Labelling: Yellow radiation label will be attached to all containers with iridium 192 seeds. It will contain the following description: Howard University Iridium 192 seeds type 1, activity....mg Radium equivalent on...., Caution- Radioactive Material, and the radiation symbol.







HOWARD HOSPITAL SUPPLY CORPORATION facility
Two story building at 2212 Georgia Ave.N.W.,
Washington,D.C.