

UNITED STATES ATOMIC ENERGY COMMISSION  
APPLICATION FOR BYPRODUCT MATERIAL LICENSE

Form approved  
Budget Bureau No. 38-20027

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: Materials Branch, Directorate of 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, and the license fee provisions of Title 10, Code of Federal Regulations, Part 170. The license fee category should be stated in Item 16 and the appropriate fee enclosed. (See Note in Instruction Sheet).

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

Sargent-Welch Scientific Co.

7300 North Linder Avenue

Skokie, Illinois 60076

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

Sargent-Welch Scientific Co.

7300 North Linder Avenue

Skokie, Illinois 60076

2. DEPARTMENT TO USE BYPRODUCT MATERIAL

Warehouse and Transitory inventory

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

Renewal of AEC License  
No. 12-06661-02E

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.)

Jerry Deemer, Marketing Manager  
Edward Javor, Jr. Director of Warehousing  
and Buildings

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.)

Jerry Deemer, Marketing Manager

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

Polonium 210

Thallium 204

Cobalt 60

Strontium 90

Tin 113

Cesium 137

(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.)

Electroplated on disk 50 microcuries

Encapsulated in disk 77200 microcuries

Encapsulated in disk 2000 microcuries

Contained in "Minigenerator"  
eluting system 5 microcuries

Contained in "Minigenerator"  
eluting system 1350 microcuries

Contained in "Minigenerator"  
eluting system 1350 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.)

For resale and distribution to persons exempt from licensing pursuant to Section 30.18, 10 CFR Part 30.

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PDR FOIA  
TRAWICK84-414 PDR

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

8. TYPE OF TRAINING	Jerry Deemer WHERE TRAINED	DURATION OF TRAINING	ON THE JOB (Circle answer)	FORMAL COURSE (Circle answer)
a. Principles and practices of radiation protection	OCDM, Battle Creek, Michigan		Yes <input type="radio"/> No <input checked="" type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>
b. Radioactivity measurement standardization and monitoring techniques and instruments	OCDM, Battle Creek, Michigan		Yes <input type="radio"/> No <input checked="" type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>
c. Mathematics and calculations basic to the use and measurement of radioactivity	OCDM, Battle Creek, Michigan		Yes <input type="radio"/> No <input checked="" type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>
d. Biological effects of radiation	OCDM, Battle Creek, Michigan		Yes <input type="radio"/> No <input checked="" type="radio"/>	Yes <input checked="" type="radio"/> No <input type="radio"/>

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

ISOTOPE	MAXIMUM AMOUNT	WHERE EXPERIENCE WAS GAINED	DURATION OF EXPERIENCE	TYPE OF USE
Co 60	1 Ci	OCDM	2 weeks	OCDM Training

## 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)
EON Nuclear & Medical Insts., Inc. # PSM 700	2	Beta Gamma	0-50	30	monitoring and surveying

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

see attachment

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

No personnel monitoring is required. See attachment.

## 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 attachment

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 attachment

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. Atomic Disposal Company, Inc.  
7221 Duran Drive, Tinley Park, Illinois

## 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.

License Fee Category \$

Fee Enclosed \$ No fee due

Sargent-Welch Scientific Company  
Applicant named in item 1

By:

Assistant Secretary

Title of certifying official

Date September 16, 1977

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.

Item 8

Re; Edward Javor, Jr.

Experience in warehouse management - supervision of plant security and warehouse control.

Experience from having been exposed to the standard requirements of the State of Illinois as to what it considers a non-hazardous approach to radiation. We are currently following warehousing and personnel safety procedures recommended by the Illinois Department of Public Health.

Item 11.

Two survey meters are available for use. Normally one meter is held in reserve as a back up unit, but both meters are in use during the late summer months when the bulk of the business for radioactive material is conducted.

Both survey meters have been calibrated initially either by the manufacturer, EON Corporation, or by the Health Physics Associates, of Highland Park, Illinois. Calibration is maintained inhouse by weekly checking calibration, with a more comprehensive check made every 6 months consisting of a two-point calibration of each range of both meters.

Calibration Sources:

A gamma and beta source are used, both of which are manufactured by Isotope Products Laboratories, Burbank, California.

Co	60	10 $\mu$ Ci	Model 236
Tl	204	10 $\mu$ Ci	Model 227

Accuracy of the sources is within 5 - 7% of the stated value at the 99% confidence level.

#### Calibration Procedures:

1. Meters are initially calibrated by either of the outside firms mentioned above.
2. Once received back in our facilities, each meter is compared with both calibrated sources placed at six different positions from the G.M. tube so as to give two readings for each of the three ranges of each instrument.
3. These six positions and their corresponding meter readings are the basis for future calibration of the instruments. Graphs are provided to indicate meter readings calculated to take into account the decay of the calibrated sources. A jig is provided to measure G.M. to source distances and to maintain the same geometric configuration for all tests.
4. A calibration check is made on the first day of every work week of the two points on the 0-0.5 mR/hr range. This range is checked because it is the only range used when monitoring outer carton and center aisle activity. If the meter reads to within 10% of the value indicated on the graph, the meter is considered to be in calibration.
5. Every six months, two points on each of the three ranges are checked for calibration. If the meter reads to within 10% of the value indicated on the graph, the meter is considered to be in calibration.
6. If the meter is found to be out of calibration, then the batteries are replaced, the jig and G.M. to source distances rechecked and either steps (4) or (5) repeated. If the meter is still out of calibration, adjustments to variable potentiometers in the circuitry will be made according to the manufacturer's instructions until the meter is back into calibration.
7. If the meter is in need of repair, it will be recalibrated after repair by an outside firm and steps (2) and (3) will be repeated for that meter.

#### Personnel to Perform Calibration

1. Jerry Deemer. Qualifications stated in items (8) and (9) of the attached NRC Form 313.

2. Gerald T. Cuzelis. Qualifications include Masters of Science Degree in Physics with 3-1/2 years experience in radiation safety program at Sargent-Welch.

Item 12.

Warehouse personnel have unrestricted access to and through storage locations. No high radiation areas are present. All stock is overpacked in individual shipping cartons and decentralized throughout the warehouse facilities to minimize the overall dose rate. From quarterly surveys of all such locations, it has been found that on average the maximum center aisle activity at any one location would result in no more than 123 mrem per quarter to the body. However, in the normal course of an 8-hour business day, no one has the occasion to spend more than a few minutes at any one location and therefore probable dosage rates are considerably less.

(Data based upon 12 quarterly surveys of warehouse and piece parts storage areas. Highest reading would result in 260 mrem per quarter; lowest, 10 mrem per quarter. Average, 123 mrem per quarter; standard deviation, 86 mrem per quarter).

Item 13.

Sargent-Welch Scientific Company does not have or operate a radioactivity laboratory. Radioactive sources are purchased from vendors, repackaged, and warehoused for resale.

Item 14.

a. Survey Program

A quarterly survey using the calibrated survey meter is made of all warehouse locations where radioactive materials are stored. The survey consists of a list of radioactive materials in stock at the time of the survey, the number of sources, isotope, total activity and measured center aisle dosage rate for each location. A report of a typical survey made December 6, 1976 is attached.

b. Records Management Program

The Radiation Safety Officer maintains a file of past survey reports. He reviews



each survey and issues changes in procedures, if necessary, based upon these surveys.

A computer printout updated provides inventory and storage locations for each item. A physical inventory of stock is conducted the last Friday of November each year.

c. Emergency Procedures

Because of the physical form (encapsulated), low activity of individual sources, and decentralization of stock, no specific emergency procedures are set forth for these materials. Information concerning procedures to take in case of fire, and company safety officers to notify, are posted throughout the warehouse.

d. Inventory Security

The transfer of stock in and out of the warehouse is maintained via computer. Unauthorized access to warehouse facilities is prevented by plant security which requires employees to have photo identification badges which must be presented upon entrance to the building. Any packages taken out of the building must be accompanied by a Package Pass which requires a description of the package contents and an authorized signature by designated supervisory personnel.

Compliance with Sections 32.18 and 32.19 of 10 CFR Part 32

32.18(a). Description of facilities and procedures for handling radioactive materials are detailed in Items 10 through 15 of the attached NRC Form 313.

32.18(b). None of the radioactive sources Sargent-Welch distributes are intended for human use in any way.

32.18(c). This material is not incorporated into equipment; that is, it is not attached, affixed, or installed into equipment. In certain products (Minigenerator labs) byproduct material is overpacked with other accessories, but is not incorporated into accessory equipment.

32.18(d). Attached are drawings of the general form of the labels used by each of our suppliers. The specific isotope and activity for each of the sources we distribute is stamped or printed on the label according to the information contained on the following list. These items comprise all of the byproduct material distributed by Sargent-Welch.

Cat. No.	Description	Isotope	Activity	*Supplier Order
(list on following page)				

Cat. No.	Description	Isotope	Activity (uCi)	*Supplier	Order Point	Order Quantity	On Hand
S-72110-20	Minigenerator Lab	Sn 113 Cs 137	9.0 9.0	a	8	5	7
(Also used as part of S-72110-05 Minigenerator Lab)							
S-72110-25	Minigenerator Lab	Sn 113 Sr 90	9.0 0.9	a	0	2	1
( Also used as part of S-72110-10 Minigenerator Lab)							
S-72110-45	Minigenerator	Cs 137	9.0	a	24	40	0
S-72110-80	Minigenerator	Sr 90	0.9	a	0	5	0
S-72110-85	Minigenerator	Sn 113	9.0	a	17	15	18
S-72112-20	Radioactive Source Set	Tl 204 1 204 Co 60	10.0 10.0	b	45	90	141
(Also used as part of S-72112 Radioactivity Demonstrator)							
S-72117-10	Beta Ray Source	Tl 204	10.0	b	8	10	0
S-72117-25-A	Calibrated Source	Po 210	0.003	c	0	5	0
S-72117-25-B	Calibrated Source	Sr 90	0.01	c	0	5	0
S-72117-25-C	Calibrated Source	Co 60	0.01	c	0	5	0
S-72117-50	Gamma Ray Source	Co 60	1.0	b	21	80	10
(Also used as part of S-72095-95 Radiosotope Training Lab)							
S-72118-40	Radiosotope Source Set	Tl 204 Co 60 Po 210	1.0 1.0 0.1	b	29	100	63
(Also used as part of S-72095-90 Radioactivity Laboratory)							
2190G	Decade Scaler Accessory Set	Co 60	1.0	b	-1	1	41
(Item to be discontinued)							

## \*Suppliers

- (a) Redco Nucleonics, Inc.  
Simpson Road  
Carmel, NY 10512

NRC License No. - Application Pending  
Minigenerators fabricated by The Nucleus (Formerly fabricated and distributed by  
Union Carbide Corp.)

- (b) The Nucleus  
P.O. Box R  
Oak Ridge, TN 37830

NRC License No. 41-14168-01E Amendment No.1 - Expires March 31, 1982  
Tennessee License No. R-0112-L3



Suppliers (cont'd)

(c) Isotope Products Laboratory  
1800 N. Keystone Street  
Burbank, California 91504

California License No. 1509-59 - Expires Feb. 24, 1984

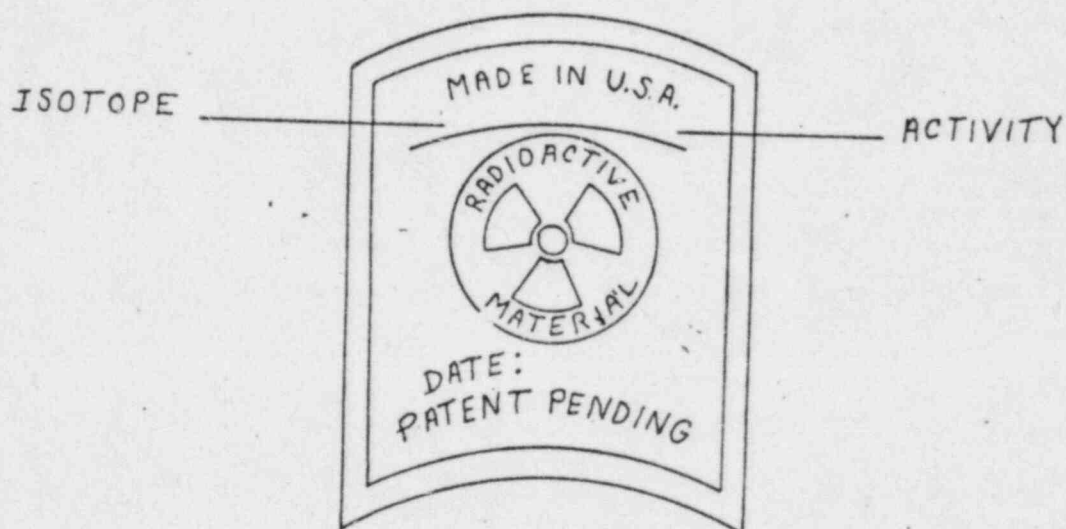
The following products consist of Certificates of Purchase for radioisotopes in solution. When the customer orders any one of these catalog numbers, he receives the Certificate of Purchase and mails it to The Nucleus in Oak Ridge, TN. The Nucleus will ship the isotope directly to the customer. The isotopes themselves are not handled, stored or shipped from the Sargent-Welch Skokie, Illinois, Warehouse or from any of its Branch Offices.

S-72118-10 Radioisotope Set consists of six Certificates of Purchase for the radioisotopes: C 14, Ca 45, Ce 144, Co 60, Pb 210 and Zn 65. S-72118-10 is also part of the S-72095-95 Radioisotope Training Laboratory.

Cat. No.	Description	Isotope	Activity (uCi)	Order Point	Order Quantity	On Hand
S-72118-20-H	Radioisotope Mailer	Ca 45	10.0	-1	1	5
S-72118-20-H	Radioisotope Mailer	C 14	50.0	-1	1	1
S-72118-20-K	Radioisotope Mailer	Ce 144	1.0	-1	1	0
S-72118-20-M	Radioisotope Mailer	Co 60	1.0	-1	1	1
S-72118-20-R	Radioisotope Mailer	I 131	1.0	-1	1	3
S-72118-20-T	Radioisotope Mailer	Pb 210	0.1	-1	1	0
S-72118-20-W (Also used as part of S-72095-10 Autoradiography Kit)	Radioisotope Mailer	P 32	10.0	-1	1	8
S-72118-20-Z	Radioisotope Mailer	Zn 65	10.0	-1	1	0

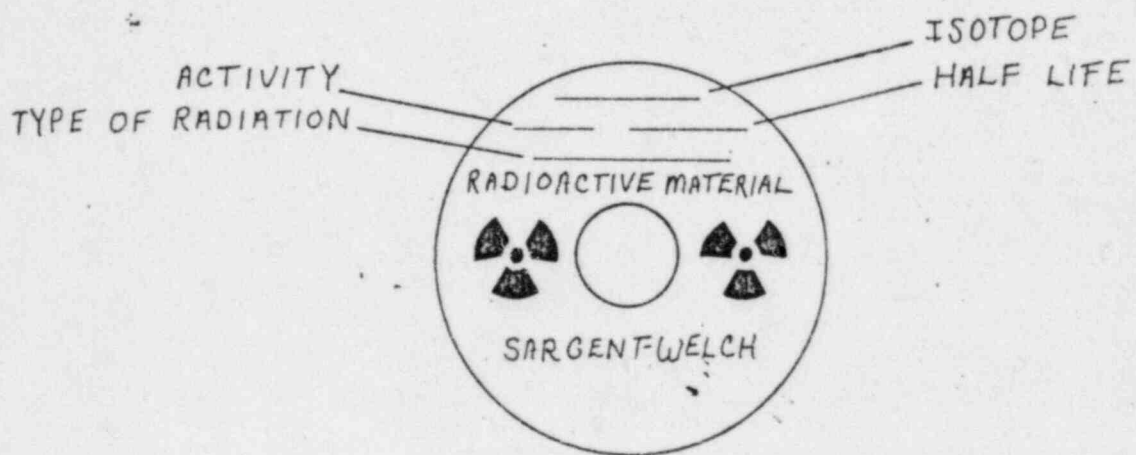
Section 32.18(d) Attachment

a) Label used by  
Radio Nucleonics



Section 32.18 (d) Attachment

b) Label used by  
The Nucleus



Section 32.18 (d) Attachment

c) Label used by  
Isotope Products Laboratory



32.19(a). All bin locations where radioactive material is stored have large, prominent labels displayed instructing order-pickers to limit to 10 per order the number of items containing radioactive material.

32.19(b). Packers will not receive more than 10 exempt quantities of by-product materials per order from order-pickers. Sources are individually packaged so that the surface dose rate does not exceed 0.5 mrem/hr. Packers trained in the use of the survey meter check this dose rate before shipping, and repackage the source if it is found that the outer carton exceeds 0.5 mrem/hr. If more than one source is shipped per order, the overpack shipping carton is checked to make certain that the surface dose rate does not exceed 0.5 mrem/hr.

32.19(c). The attached labels are a representative sample of those attached to the shipping carton containing byproduct material.

32.19(d). The attached brochure is included with all of the byproduct material distributed by Sargent-Welch.



### IMPORTANT - KEEP THESE INSTRUCTIONS

This package contains an exempt quantity of radioactive material. It is exempt from A.E.C. or Agreement State Licensing Requirements.

### RADIOACTIVE MATERIAL

Not for human use—introduction into foods, beverages, cosmetics, drugs, or medicinals, or into products manufactured for commercial distribution is prohibited—exempt quantities should not be combined.

### RADIATION SAFETY PRECAUTIONS

1. Students working with radioactive materials should know how to use an available radiation survey instrument.
2. Students should work with radioactive materials in a laboratory supervised by an instructor.
3. Eating, drinking or using cosmetics should be avoided when working with radioactive materials.
4. Special care should be taken to avoid contamination from unsealed sources.
  - (a) Mouth pipetting of radioactive solutions is prohibited.
  - (b) Protective gloves should be worn.
  - (c) Hands should be washed and the person surveyed before leaving the laboratory.
  - (d) Work area should be monitored and flushed at the conclusion of experiments.
5. When not in use, radioactive materials should be stored in an area under the control of an instructor.
6. Disposal may be accomplished by means of natural radioactive decay or by release into sanitary sewerage systems.