FORM NRC-313 I (3-80) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

See attached instructions for details.

Completed applications are filed in duplicate with the Division of Fuel Cycle and Material Safety, Office of Nuclear Material Safety, and Safeguards, U.S. Nuclear Regulatory Commission, Washington, DC 20555 or applications may be filed in person at the Commission's office at 1717 H Street, NW, Washington, D. C. or 7915 Eastern Avenue, Silver Spring, Maryland.

1. APPLICATION FOR: *(Check and/or complete as appropriate)*

- [ ] a. NEW LICENSE
- [ ] b. AMENDMENT TO: LICENSE NUMBER
- [ ] c. RENEWAL OF: LICENSE NUMBER 20-03310-03

2. APPLICANT'S NAME *(Institution, firm, person, etc.)*

General Electric Company

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION

494-3949 413

3. NAME AND TITLE OF PERSON TO BE CONTACTED REGARDING THIS APPLICATION

Edward R. Verminski Mgr.,Industrial Hygiene and Safety

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION

494-3949 413

4. APPLICANT'S MAILING ADDRESS *(Include Zip Code)*
(Address to which NRC correspondence, notices, bulletins, etc., should be sent.)

100 Woodlawn Avenue
Pittsfield, MA 01201

5. STREET ADDRESS WHERE LICENSED MATERIAL WILL BE USED *(Include Zip Code)*

100 Woodlawn Avenue
Pittsfield, MA 01201

(IF MORE SPACE IS NEEDED FOR ANY ITEM, USE ADDITIONAL PROPERLY KEYED PAGES.)

6. INDIVIDUAL(S) WHO WILL USE OR DIRECTLY SUPERVISE THE USE OF LICENSED MATERIAL
(See Items 16 and 17 for required training and experience of each individual named below)

	FULL NAME	TITLE
a.	Edward R. Verminski	Mgr.,Industrial Hygiene and Safety
b.	David J. Fisher	Development Chemist
c.	James S. Kresge	Sr. Development Engineer

7. RADIATION PROTECTION OFFICER

Edward R. Verminski

Attach a resume of person's training and experience as outlined in Items 16 and 17 and describe his responsibilities under Item 15.

8. LICENSED MATERIAL

LINE NO.	A ELEMENT AND MASS NUMBER	B CHEMICAL AND/OR PHYSICAL FORM	C NAME OF MANUFACTURER AND MODEL NUMBER *(If Sealed Source)*	D MAXIMUM NUMBER OF MILLICURIES AND/OR SEALED SOURCES AND MAXIMUM ACTIVITY PER SOURCE WHICH WILL BE POSSESSED AT ANY ONE TIME
(1)		SEE APPENDIX #1		
(2)				
(3)				
(4)				

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	SEE APPENDIX #1
(2)	
(3)	
(4)	

9. STORAGE OF SEALED SOURCES

LINE NO.	CONTAINER AND/OR DEVICE IN WHICH EACH SEALED SOURCE WILL BE STORED OR USED. A.	NAME OF MANUFACTURER B.	MODEL NUMBER C.
(1)	SEE APPENDIX #2		
(2)			
(3)			
(4)			

10. RADIATION DETECTION INSTRUMENTS

LINE NO.	TYPE OF INSTRUMENT A	MANUFACTURER'S NAME B	MODEL NUMBER C	NUMBER AVAILABLE D	RADIATION DETECTED (alpha, beta, gamma, neutron) E	SENSITIVITY RANGE (milliroentgens/hour or counts/minute) F
(1)	Surveying, Monitoring	Victoreen	444	1	ABG	3/10/30/100/300
(2)	Surveying	Technical Associates	SRJ-6	1	ABG	50/500/5000
(3)	Surveying	TracerLab Geiger Counter	SU5A	1	ABG	.02/.2/2/20
(4)	Leak Test	Scintillation Det.	P20A	1	ABG	----

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

☐ b. CALIBRATED BY APPLICANT

Attach a separate sheet describing method, frequency and standards used for calibrating instruments.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☒ (1) FILM BADGE	ICM Pharmaceuticals, Cleveland, Ohio	☒ MONTHLY
☒ (2) THERMOLUMINESCENCE DOSIMETER (TLD)	Cambridge 200 mr dosimeters used as needed .	☐ QUARTERLY
☒ (3) OTHER (Specify): Pocket chambers	Victoreen (available)	☐ OTHER (Specify):

13. FACILITIES AND EQUIPMENT (Check were appropriate and attach annotated sketch(es) and description(s).

☐ a. LABORATORY FACILITIES, PLANT FACILITIES, FUME HOODS (*Include filtration, if any*), ETC.

☐ b. STORAGE FACILITIES, CONTAINERS, SPECIAL SHIELDING (*fixed and/or temporary*), ETC.

☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

No radioactive wastes involved.

b. IF COMMERCIAL WASTE DISPOSAL SERVICE IS NOT EMPLOYED, SUBMIT A DETAILED DESCRIPTION OF METHODS WHICH WILL BE USED FOR DISPOSING OF RADIOACTIVE WASTES AND ESTIMATES OF THE TYPE AND AMOUNT OF ACTIVITY INVOLVED. IF THE APPLICATION IS FOR SEALED SOURCES AND DEVICES AND THEY WILL BE RETURNED TO THE MANUFACTURER, SO STATE.

INFORMATION REQUIRED FOR ITEMS 15, 16 AND 17

Describe in detail the information required for Items 15, 16 and 17. Begin each item on a separate page and key to the application as follows:

15. RADIATION PROTECTION PROGRAM. Describe the radiation protection program as appropriate for the material to be used including the duties and responsibilities of the Radiation Protection Officer, control measures, bioassay procedures *(if needed)*, day-to-day general safety instruction to be followed, etc. If the application is for sealed source's also submit leak testing procedures, or if leak testing will be performed using a leak test kit, specify manufacturer and model number of the leak test kit.

SEE APPENDIX #3

16. FORMAL TRAINING IN RADIATION SAFETY. Attach a resume for each individual named in Items 6 and 7. Describe individual's formal training in the following areas where applicable. Include the name of person or institution providing the training, duration of training, when training was received, etc.

SEE APPENDIX #4

a. Principles and practices of radiation protection.

b. Radioactivity measurement standardization and monitoring techniques and instruments.

c. Mathematics and calculations basic to the use and measurement of radioactivity.

d. Biological effects of radiation.

17. EXPERIENCE. Attach a resume for each individual named in Items 6 and 7. Describe individual's work experience with radiation, including where experience was obtained. Work experience or on-the-job training should be commensurate with the proposed use. Include list of radioisotopes and maximum activity of each used.

SEE APPENDIX #5

18. CERTIFICATE

(This item must be completed by applicant)

The applicant and any official executing this certificate on behalf of the applicant named in Item 2, 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.

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.

a. LICENSE FEE REQUIRED *(See Section 170.31, 10 CFR 170)*	b. CERTIFYING OFFICIAL *(Signature)* Edward R. Vermiński
	c. NAME *(Type or print)* Edward R. Vermiński
(1) LICENSE FEE CATEGORY:	d. TITLE Mgr., Industrial Hygiene and Safety
(2) LICENSE FEE ENCLOSED: $ Not Required	e. DATE August 19, 1982

FORM NRC-313 I (3-80)

SECTION 5
RADIATION SAFETY

5.1 GENERAL

This section describes the procedures governing the handling, contamination testing, maintenance of records, repair, storage and shipping of the ^{63}Ni Pulsed Electron Capture Detector as a radioactive source. Users of this detector are required by the Nuclear Regulatory Commission (NRC) regulations to be familiar with these procedures.

5.2 USAGE, HANDLING AND REPAIR

This detector contains a beta-emitting radioactive iostope (^{63}Ni) plated onto a 1/2 x 3/4-inch platinum foil for ionization of the carrier gas. Some of the characteristics of ^{63}Ni are listed in Table 5-1. The total amount of activity in this detector is 8 millicuries maximum.

TABLE 5-1
^{63}Ni CHARACTERISTICS

Half Life	92 Years
Type of Decay	β^-
Particle Energy	67 KeV
Specific Activity	5 Ci/g
Physical State	Solid

This detector does not emanate radioactive gas when heated to the maximum limit of its working temperature; however, to prevent exposure of the user to the radioactive source in the detector cell, removal and/or dismantling of the detector *cell* is prohibited (see IMPORTANT note in paragraph 2.4).

Unless the user is specifically licensed to do so, all repair, radioactive decontamination, and foil replacement must be done by Varian Instrument Division, Aerograph Operations.

Any user who feels he is qualified and wishes to do his own foil replacement or chemical foil cleaning (5% KOH/95% methanol) may request a Specific License from the appropriate radiation authority allowing him to possess the following:

- ECD Kit with removable detector cell, P/N 02-001972-01;
- Detector Cell Assembly with foil, P/N 01-001028-01; and/or
- ^{63}Ni ECD Foil Replacement Kit, P/N 03-949031-00.

The form for requesting permission to possess the above items is included in the ^{63}Ni ECD Foil Replacement Kit Instructions (P/N 03-949030-00).

Upon receipt of the Specific License, the user may return the P/N 02-001972-00 ECD to Varian Instrument Division for modification to the -01 version.

Refer to paragraph 2.5.2 for the tower removal procedure and to paragraph 5.7 for shipping instructions.

WARNING

Always wash your hands thoroughly after handling the ECD. Although beta particles emitted by ^{63}Ni have a relatively low energy level and cannot readily penetrate the skin, even a minute amount of radioactive material ingested into the body may cause damage.

5.3 RADIOACTIVE-CONTAMINATION LEAK TEST

Prior to shipment to the user, the ^{63}Ni ECD is tested for radioactive leakage. A certificate indicating the results of that test is included with the detector. This initial leak-test record must be retained, along with records of all subsequent tests (see paragraph 5.8 for required records).

State radiation authorities require that the ECD be tested for removable radioactive contamination ***every six months*** and that records be kept for display upon request. The General Licensed owner or user is ***not*** allowed to take the leak-test wipes. The regulations require that the General Licensee have the wipes taken by a holder of an appropriate Specific License. Varian Instrument Division Service personnel are authorized to take the leak-test wipes for the user, or the ECD may be returned to Varian Instrument Division for leak testing.

NOTE

The [illegible] Licensee/User of VIP Elec- [illegible]

NOTE

If the leak test reveals the presence of 0.005 microcuries or more of removable radioactive contamination, the owner must file a report in duplicate with the state radiation authority (e.g., State of California Department of Health) within 5 days of the test, describing the source involved, the test results, and the corrective action taken. In addition, the user must remove the detector from service and return it to Varian Instrument Division for radioactive decontamination (see paragraph 2.5.2 for removal procedure and paragraph 5.7 for shipping instructions). Varian will decontaminate the detector whenever required, without charge (02-001972-00 kit only), for as long as the customer owns the ECD.

If the user prefers to avoid the expense of service calls or the inconvenience of removing and shipping the detector for leak testing, he may request a Specific License from the appropriate radiation authority allowing him to use the Varian Wipe Kit (P/N 03-949041-00) as described in paragraph 5.3.2 of this manual or Publication No. 02-949042-00. The California Department of Health charges the minimum amount of $20.00 for such a license (1976).

To obtain authorization to take the leak-test wipes, an explicit request must be made, indicating the following:

- Name of person (or persons) requesting authorization;
- Position or title of each applicant;
- Type of device to be surveyed;
- Isotope and amount;
- Manufacturer of device;
- Manufacturer of leak-test wipe kit;
- Time between leak tests;
- Procedure to be followed in taking wipes.

In states that do not grant a Specific License for taking leak-test wipes, and in states that make no charge for Specific Licenses, the user may desire to obtain a Specific License for possession of a radioactive device which includes permission to take the wipes.

If the users already possesses a Specific License covering certain radioactive devices, the ECD may be added to the license. The NRC and most agreement states (see paragraph 5.8) do not charge for this type of change in the Specific License.

5.3.1 Varian Leak Test Program (United States only)

Varian Instrument Division has a program for reminding its customers every six months of the need to perform the radioactive-contamination leak test. At the appropriate time, a wipe kit will be sent to the user. For a small charge, the returned swabs will be measured for radioactive contamination. A completed leak-test form will then be returned to the user with the information needed for his records. Varian will also maintain a file of the leak-test results.

The Varian Wipe Kit (P/N 03-949041-00) contains two cotton swabs and a vial of methanol which is to be used to wet the swabs prior to taking the wipes. The used swabs are to be placed in their numbered vials and returned to Varian in the original container. As long as the customer continues to return the wipe swabs to Varian, he will stay on the program mailing list and will continue to receive a wipe kit every six months.

If some activity is evident in the results of the leak test, Varian will request return of the detector long before the activity reaches the level that will require the customer to file a report with state radiation authorities (see paragraph 5.3). Varian will clean the detector (P/N 02-001972-00 ECD only) without charge and return it to the user. The activity level at which Varian will request return of the ECD is approximately .002 microcuries on the first wipe.

5.3.2 Leak Test Procedure

NOTE

This section applies only to the user who holds a Specific License which allows him to take leak-test wipes.

The radioactive source is contained in the detector cell. The carrier gas enters the bottom of the cell, passes through the radioactive foil holder, and exhausts at the top. Because of the extremely low vapor pressure of nickel at the temperatures to which the detector is exposed, any contamination that may escape must be assumed to be in solid form. Any ^{63}Ni particles swept out by the carrier gas will most likely be deposited on the top of the detector tower cap, on the cell exit tube, and on the top of the foil cylinder (see Figure 2-4).

Leak-test wipes are to be taken from the areas most likely to show radioactive material. Each wipe is to be taken by rotating the swab while forcefully holding it in

contact with the area. The direction of the wipe should be *from* the area *least* likely to be contaminated *toward* the area *most* likely to be contaminated.

Test for radioactive contamination as follows:

(1) Allow the ECD to cool to room temperature.

WARNING

To avoid spreading any possible contamination, do not handle the *top* of he tower cap or the detector cell exit tube.

(2) Remove swab #1 from its vial.

(a) Wet the swab with methanol.

(b) Wipe the top of the detector tower cap first, using a circular motion, starting at the outside edge and progressing toward the center.

(c) Remove the detector tower cap by holding it by its sides.

(d) Wipe the detector cell exit tube with the swab, then wipe the top of the foil cylinder.

(e) Replace the detector tower cap.

(3) Place swab #1 in vial #1.

(4) Repeat steps 2 and 3 with swab #2 (in vial #2).

(5) Wash your hands thoroughly after completing the leak-test procedure (see WARNING in paragraph 5.2).

(6) Package the swab vials in their original container and return to Varian for measurement of the amount of ^{63}Ni removed.

5.4 RADIOACTIVE SOURCE REPLACEMENT

When the ionization efficiency of the foil has been significantly reduced, as measured by an increase in f_0 (see paragraph 3.9), the foil can often be regenerated by one of the cleaning procedures given in paragraph 4.2 of this manual. If these proceures do not produce the desired result, the foil may have to be cleaned chemically or replaced. Since the detector cell may not be removed or dismantled by unauthorized personnel (see IMPORTANT note in paragraph 2.4) it is required that the whole detector be returned to Varian. See paragraph 2.5.2 for tower removal procedure and paragraph 5.7 for shipping instructions.

5.5 DAMAGE

In case of any damage which makes one suspect that radioactive material might be released, the user must immediately discontinue use of the device and consult the Radiation Safety Officer of Varian Instrument Division, Aerograph Operations, by phone: (415) 939-2400.

A leak test must be scheduled as soon as possible (device must be cool) and action must be taken to prevent the spread of possible contamination.

5.6 STORAGE

Because of its potential personnel hazard, the detector must be stored under lock and key in an area posted with a "CAUTION - RADIOACTIVE MATERIAL" warning sign when not installed in an instrument. The ECD should be stored in its original inner shipping container (ECD case) which is marked with appropriate radioactivity labeling. If the ECD case is not available, the storage container must be marked with a "CAUTION—RADIOACTIVE MATERIAL" label which includes the isotope, quantity, and date given on the ECD label, or the label on the front panel of the GC may be removed and used to mark the new container. The installation tool received with the ECD should also be kept in the ECD case. This tool should not be used for any purpose other than installation and removal of the ECD.

5.7 SHIPPING

Regulations of the Department of Transportation and International Air Transport Association specify the packaging standards and labeling requirements for shipment of radioactive materials. Paragraph 173.391 of Title 49 of the Code of Federal Regulations, and Part 2, Section 4.2 of the International Transport Association Regulations, exempt the ^{63}Ni ECD's made by Varian Instrument Division from specific packaging, marking, and labeling requirements if certain conditions are met. These conditions are as follows:

(1) The material must be packaged in a strong, tight package such that there will be no leakage of radioactive material under conditions normally incident to transportation.

(2) The package must consist of two or more layers of packaging material, including rigid inner and outer containers.

(3) The outside of the inner container must be labeled "CAUTION — RADIOACTIVE MATERIAL".

(4) The gamma radiation dose rate at any point on the external surface of the outer container must not exceed 0.5 millirem per hour.

(5) There must be no significant removable radioactive contamination on the exterior surface of the package (no more than 10^{-11} Ci/cm² or 2,200 disintegrations/min per 100 cm²).

To comply with all of the above conditions, it is recommended that the detector and installation tool be returned in the same inner container (ECD case) in which they were received, with an outer container made of new rigid packaging material (e.g., corrugated cardboard).

Minimum outside dimension of the outer container must not be less than 4 inches (10 cm). The ECD case, which is labeled as specified in condition 2 above, should be placed in a clean, clear plastic bag and securely and tightly packaged in the outer container. Shock absorbing material should also be used between the ECD case and the outer container. If the original ECD case is not available, be sure to label the new inner container according to condition 3 above.

If the outer container in which the ECD was received is to be used for shipment, removable contamination on the exterior surface must comply with condition 5 above. This may be checked by a radioactive-contamination leak test.

If all of the above conditions are met, a "RADIOACTIVE" label is not required on the outer container.

All return shipments of radioactive materials or devices to Varian must be accompanied by a completed shipper's certificate (as per sample on Page 5-6).

5.8 CALIFORNIA RADIATION-CONTROL REGULATIONS

The following excerpts relating to licensing of radioactive materials and standards for protection against radiation are taken from California Radiation Control Regulations, Title 17, California Administrative Code, Chapter 5, Subchapter 4. The regulations in all other areas under the jurisdiction of the NRC and other agreement states are substantially the same as these; however, the owner/user should consult with local authorities for the relevant regulations.

Group 2. Licensing of Radioactive Material

Article 4. Licenses

30192. General Licenses—Other Radioactive Material.

(e) (1) **A general license is hereby issued to acquire and use radioactive material when contained in devices designed and manufactured for the purpose of detecting, measuring, gauging or controlling thickness, density, level, interface location, radiation, leakage, or qualitative or quantitative chemical composition, or for producing light or an ionized atmosphere, when such devices are manufactured pursuant to a specific** license authorizing distribution to general licensees; provided that each such device:

(A) is labeled in accordance with the provisions of the specific license which authorizes distribution of the devices;

(B) bears a label containing the following or a substantially similar statement:

"The receipt, possession, use and transfer of this device, Model ....., Serial No. ....., are subject to a general license or equivalent and the regulations of the US NRC or of a State with which the NRC has entered into an agreement for the exercise of regulatory authority. Removal of this label is prohibited.

CAUTION—RADIOACTIVE MATERIAL

.....

(Name of Supplier)

The model, serial number and name of supplier may be omitted from this label provided they are elsewhere specified in labeling affixed to the device; and

(C) when specified by the label on the device, is installed in the premises of the general licensee by a person having a specific license which authorizes installation of such devices.

(2) Persons who possess a device pursuant to the general license contained in Section 30192(e)(1) shall, with respect thereto, be exempt from the requirements of Group 3 of this subchapter except for Sections 30253, 30254, 30293(a)(2), 30294, and 30295, but shall comply with all of the following:

(A) Within 30 days of the receipt of any such device register with the department and within 30 days of transfer of any such device notify the department, in accordance with the provisions of Group 1 of this subchapter (Registration of Radiation Sources).

(B) Shall not transfer, abandon or dispose of the device, except by transfer to a person holding a specific license to receive such device.

(C) Assure that all labels affixed to the devices at the time of receipt and bearing the statement, "Removal of this label is prohibited" are maintained thereon, and comply with all instructions contained in such labels.

(D) Have the device tested for leakage of radioactive material and proper operation of the on-off mechanism and indicator, if any, at the time of installation of the device or of replacement of the radioactive material on the premises of the general licensee and thereafter at no longer than six-month intervals or at such longer intervals as may be specified in the specific license which authorizes distribution of the device to general licensees, except that any such intervals shall not exceed three years unless specifically approved by the department. Devices containing only krypton in gaseous form need not be tested for leakage and devices containing only tritium need not be tested for any purpose.

(E) Have the tests required by Section 30192 (e)(2)(D) and all other services involving the radioactive material, its shielding and containment, performed by a person holding an appropriate specific license therefor.

(F) Maintain records of all tests performed on the devices as required under this section, including the dates and results of the tests and the names and addresses of the persons conducting the tests.

(G) Upon the occurrence of a failure of or damage to, or any indication of a possible failure of or damage to, the shielding or containment of the radioactive material or the on-off mechanism or indicator, immediately suspend operation of the device until it has been repaired by or disposed of to a person holding an appropriate specific license therefor.