L+L= 20840
030-21251

NRC Form 313 I (12-81) 10 CFR 30

U.S. NUCLEAR REGULATORY COMMISSION

APPLICATION FOR BYPRODUCT MATERIAL LICENSE
INDUSTRIAL

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

03123

X	a. NEW LICENSE
	b. AMENDMENT TO: LICENSE NUMBER
	c. RENEWAL OF: LICENSE NUMBER

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.

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

Thermedics, Inc.

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(617) 938-3786

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

Ulku Goff, Lab Mgr.

TELEPHONE NUMBER: AREA CODE – NUMBER EXTENSION
(617) 938-3786

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

Thermedics, Inc.
470 Wildwood Street
Woburn, MA 01888-1799

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

Thermedics, Inc.
470 Wildwood Street
Woburn, MA 01888-1799

(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.	Esen Ulku Goff	Mgr., Analytical Service Lab
b.		
c.		

7. RADIATION PROTECTION OFFICER

Fred Norman Huffman, Ph.D

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)	Nickel-63	Plated source	Hewlett-Packard Model 18713A EC Detect cell	15millicuries/source (one source)
(2)				
(3)				
(4)				

	E DESCRIBE USE OF LICENSED MATERIAL
(1)	For use in Hewlett-Packard gas chromatograph (model 5710A)
(2)	
(3)	
(4)	

"OFFICIAL RECORD COPY"

ML10 03753

NRC FORM 313 I (12-81)

MAY 02 1985

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)	Hewlett-Packard Model 5710 gas chromatograph	See item 8	See item 8
(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)	N.A.					
(2)						
(3)						
(4)						

11. CALIBRATION OF INSTRUMENTS LISTED IN ITEM 10

☐ a. CALIBRATED BY SERVICE COMPANY

NAME, ADDRESS, AND FREQUENCY

N.A.

☐ b. CALIBRATED BY APPLICANT

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

N.A.

12. PERSONNEL MONITORING DEVICES

TYPE (Check and/or complete as appropriate.) A	SUPPLIER (Service Company) B	EXCHANGE FREQUENCY C
☐ (1) FILM BADGE	N.A.	☐ MONTHLY
☐ (2) THERMOLUMINESCENCE DOSIMETER (TLD)		☐ QUARTERLY
☐ (3) OTHER (Specify): N.A.		☐ OTHER (Specify): N.A.

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. Locked metal cabinet in Analytical Services Laboratory at Wildwood St Woburn, Mass.

☐ c. REMOTE HANDLING TOOLS OR EQUIPMENT, ETC.

☐ d. RESPIRATORY PROTECTIVE EQUIPMENT, ETC.

14. WASTE DISPOSAL

a. NAME OF COMMERCIAL WASTE DISPOSAL SERVICE EMPLOYED

N.A.

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.

. Return to Supplier

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.

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.

    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.

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)* Fred Norman Huffman
$230.00	c. NAME *(Type or print)* Fred Norman Huffman, Ph.D.
(1) LICENSE FEE CATEGORY: New License	d. TITLE RPO and Mgr. DEC Dept.
(2) LICENSE FEE ENCLOSED: $ 230.00	e. DATE 4/17/85

Item 15

Radiation Protection Program

The routine use of radiation survey instruments and personnel monitoring devices are not deemed necessary for this source. Leak testing will be performed in conjunction with MIT.

Duties and Responsibilities of the
Radiation Protection Officer (Fred N. Huffman, Ph.D)

1. Ensuring that the use and possession of the radiation source is limited to authorized individuals.

3. Serving as a point of contact and assistance in case of emergency (device damage, fire, theft, etc.) and ensuring that proper authorities (e.g., NRC, police, State personnel) are notified promptly in case of accident or damage.

4. Ensuring that the terms and conditions of the license (e.g., periodic leak tests) are met and that the required documentation records, leak test records, are reviewed for compliance with Nuclear Regulatory Commission regulations, requirements and license conditions as well as the regulations of the State of Massachusetts.

Note that the source will not be incorporated into any product and is not expected to be used in the field.

Leak Testing

The Ni-63 source is leak tested every six months using filter paper to wipe the inlet, outlet and housing of the device. The wipes are counted at MIT under the supervision of the radiochemist, Murry Bolton, Jr. (NRC License No. 20-13302-01).

Esen Ulku Goff

Manager, Analytical Services Laboratory

Thermedics, Inc.

Education

1970 B.S. Chemistry, Middle East Technical University

1972 M.S. Chemistry, Middle East Technical University

Radioisotope Experience

1980-1985 Gas chromatography at Thermo Electron Analytical Services Laboratory using Ni-63 (15 millicurie electron capture detector).

Radioisotope Training

1970 Nuclear chemistry course work at Middle East Technical University

Items 16 & 17

Radiation Protection Officer

RADIOISOTOPE TRAINING AND EXPERIENCE

FRED NORMAN HUFFMAN, Ph. D.
Manager, Direct Energy Conversion Dept.
Thermo Electron Research and Development Center

EDUCATION

1964	Ph. D., Physics, Johns Hopkins University
1957	Graduate, Oak Ridge School of Reactor Technology
1956	M. S., Physics, Vanderbilt University
1954	B. S., Chemistry, Lenoir Rhyne College

RADIOISOTOPE TRAINING

1954-56	USAEC Radiological Physics Fellow Lectures and laboratory, Vanderbilt University Summer on-the-job training, Oak Ridge National Laboratory Thesis research, Health Physics Division, Oak Ridge National Laboratory
1956-57	Oak Ridge School of Reactor Technology Lectures and laboratory

RADIOISOTOPE EXPERIENCE

SNAP-III Radioisotope Thermoelectric Space Power Supply - Directed handling and fueling of the generator using a heat source of 1500 curies of Po-210 in sealed sources.

Radioisotope Phosphor Photovoltaic Generator - Fabrication required wet chemistry of 100 curies Pm-147.

Intracorporeal Blood Irradiator - Designed, fabricated and tested units involving beta emitters of over 150 millicuries of Sr-90 in sealed sources.

Myocardial Failure Model Study Using a Sr-90 Tipped Catheter - (Children's Hospital Medical Center, License No. 20-09568-06)- 300 millicuries Sr-90 in sealed sources.

Endogenous Heat and Radiation Studies - (Boston City Hospital, License No. SNM-1012) - Supervised design and application of
(1) 560 curie 16-watt Pu-238 sealed source
(1) 845 curie 24-watt Pu-238 sealed source
(4) 50 millicurie Am-241/Be sealed sources
(4) 30 millicurie Sr-90 bremsstrahlung sealed sources

Nuclear Artificial Heart Program (Thermo Electron Corp., License No. SNM-797) Supervised tests utilizing 1600 curie Pu-238 sealed source

FRED NORMAN HUFFMAN, Ph. D.

SELECTED PUBLICATIONS

Huffman, F. N. et al: Spatial Distribution of Energy Absorbed from an Electron Beam Penetrating Aluminum. Phys. Rev. 106: 435, 1957

Huffman, F. N. and Gross, E.: Performance Data and Environmental Test Results of SNAP-3. Ballistics Missiles and Space Technology, Vol. II, Pergamon Press, 1961.

Bearden, J. A., Huffman, F. N. and Spijkerman, J. J.: Design of a Mercury Mercury Vapor Target X-ray Tube. Rev. Sci. Instru., December 1964.

Huffman, F. N. and Hellerstein, L. J.: An Intracorporeal Vascular Prosthesis Blood Irradiator. Proceedings of the Annual Conference On Engineering in Medicine and Biology, 10: 52A4, 1968.

Huffman, F. N., Spira, J., Pegg, C., Sandberg, G., Lee, R. and Norman, J. C.: In Vivo Studies of 16 and 24 Watt Pu-238 Capsules. Trans. of American Nuclear Society Fifteenth Annual Meeting, June 1969, p. 48.

Sandberg, G. W., Huffman, F. N. and Norman, J. C.: Experimental Observations of Intracorporeal Strontium 90-Americium 241/Beryllium Sources Simulating Radiation Fields from Nuclear-Powered Artificial Hearts. Ann. Thor. Surgery 9 (5): 401, 1970.

Norman, J. C., Sandberg, G. W. and Huffman, F. N.: Implantable Nuclear-Powered Cardiac Pacemakers. New England J. Med. 283: 1203, 1970.

Huffman, F. N., Bornhorst, W. J. and Harmison, L. T.: A Radioisotope-Fueled Vapor Cycle Power Supply for an Artificial Heart. Trans. Am. Nuclear Soc. 13 (2): 504, 1970.

Huffman, F. N. and Norman, J. C. Nuclear-Fueled Circulatory Support Systems IV: Radiologic Perspectives. Transplantation Proc. 6 (3): 61, 1974.

BETWEEN: William O. Miller, Chief
License Fee Management Branch
Office of Administration

John E. Glenn, Chief
Nuclear Materials Section B
Division of Engineering and
Technical Programs

LICENSE FEE TRANSMITTAL

A. REGION 1

1. APPLICATION ATTACHED

Applicant/Licensee: Thermedics, Incorporated

Application Dated: 4/17/85

Control No.: 03753

License No.: New

2. FEE ATTACHED

Amount: $230.00

Check No.: 1677

3. COMMENTS

Signed Brenda Platchek

Date 5/3/85

B. LICENSE FEE MANAGEMENT BRANCH

1. Fee Category and Amount: 3P $230

2. Correct Fee Paid. Application may be processed for:

Amendment _____

Renewal _____

License ✓

Signed Francee Brown

Date 5/15/85

10 8/17/85

REGION I FORM 213
(MARCH 1983)