

40-7344

Regulatory

File y.

# GENERAL ELECTRIC

GENERAL ELECTRIC COMPANY . . . . . 3198 CHESTNUT STREET  
PHILADELPHIA, PENNSYLVANIA 19101, Phone (215) 823-1000

RE-ENTRY AND  
ENVIRONMENTAL  
SYSTEMS DIVISION

April 3, 1974

United States Atomic Energy Commission  
Source & Special Nuclear Materials Branch  
Division of Material Licensing  
Washington, D.C. 20545

Attention: F. Davis

Dear Mr. Davis:

I am requesting our License SUB-831 to be amended to allow possession of natural Thorium in quantities over the generally licensed amounts. The Thorium will be received as Thoriated Tungsten containing  $\text{ThO}_2$  (2% by weight). Our intention is to machine and braze this material and our radiation safety procedures to be followed are outlined in this application.

Also, J. R. McFadden is now the Secretary of the Ionizing Radiation Advisory Group and is also the Radiation Protection Officer replacing J. S. Davis.

If there are any questions, please contact me on 215-823-3745/6.

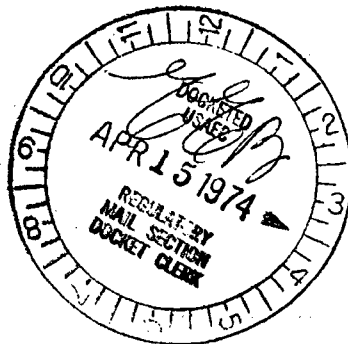
Yours truly,

*J. R. McFadden*

J. R. McFadden, Health Physicist  
Industrial Safety Engineering

/ktd

Enclosures



Information in this record was deleted  
in accordance with the Freedom of Information  
Act, 5 U.S.C. 552  
FOIA-2007-304

F-53

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UNITED STATES ATOMIC ENERGY COMMISSION

APPLICATION FOR SOURCE MATERIAL LICENSE

Pursuant to the regulations in Title 10, Code of Federal Regulations, Chapter 1, Part 40, application is hereby made for a license to receive, possess, use, transfer, deliver or import into the United States, source material for the activity or activities described.

<b>1. (Check one)</b> <input type="checkbox"/> (a) New license <input checked="" type="checkbox"/> (b) Amendment to License No. <u>SUB-831</u> <input type="checkbox"/> (c) Renewal of License No. _____ <input type="checkbox"/> (d) Previous License No. _____		<b>2. NAME OF APPLICANT</b> General Electric Company, Re-entry and Environmental Systems Division	
		<b>3. PRINCIPAL BUSINESS ADDRESS</b> 3198 Chestnut Street Philadelphia, Pa. 19101	
<b>4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED</b>  See Attachment 1			
<b>5. BUSINESS OR OCCUPATION</b> Manufacturing & Missile Research		<b>6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP</b> n/a	<b>(b) AGE</b> n/a
<b>7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED</b>  Research, development, and manufacturing programs related to the missile and space programs.			
<b>8. STATE THE TYPE OR TYPES, CHEMICAL FORM OR FORMS, AND QUANTITIES OF SOURCE MATERIAL YOU PROPOSE TO RECEIVE, POSSESS, USE, OR TRANSFER UNDER THE LICENSE</b>			
<b>(a) TYPE</b>	<b>(b) CHEMICAL FORM</b>	<b>(c) PHYSICAL FORM (Including % U or Th.)</b>	<b>(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)</b>
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE			
THORIUM (ISOTOPE)	Thoriated Tungsten (NatTh)	Solid (1.8% Th)	2000
<b>(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)</b>  36			
<b>9. DESCRIBE THE CHEMICAL, PHYSICAL, METALLURGICAL, OR NUCLEAR PROCESS OR PROCESSES IN WHICH THE SOURCE MATERIAL WILL BE USED, INDICATING THE MAXIMUM AMOUNT OF SOURCE MATERIAL INVOLVED IN EACH PROCESS AT ANY ONE TIME, AND PROVIDING A THOROUGH EVALUATION OF THE POTENTIAL RADIATION HAZARDS ASSOCIATED WITH EACH STEP OF THOSE PROCESSES.</b>  See Attachment 2			
<b>10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS INCLUDING TRAINING AND EXPERIENCE THAT WILL BE REQUIRED OF AP- PLICANT'S SUPERVISORY PERSONNEL INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM (OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL).</b>  See Attachment 3			
<b>11. DESCRIBE THE EQUIPMENT AND FACILITIES WHICH WILL BE USED TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE OR PROPERTY AND RELATE THE USE OF THE EQUIPMENT AND FACILITIES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) RADIATION DETECTION AND RELATED INSTRUMENTS (including film badges, dosimeters, counters, air sampling, and other survey equipment as appropriate. The description of radiation detection instruments should include the instrument characteristics such as type of radiation detected, window thickness, and the range(s) of each in- strument).</b>  See Attachment 4			
<b>(b) METHOD, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE, INCLUDING AIR SAMPLING EQUIPMENT (for film badges, specify method of calibrating and processing, or name supplier).</b>  See Attachment 5			

11(c). VENTILATION EQUIPMENT WHICH WILL BE USED IN OPERATIONS WHICH PRODUCE DUST, FUMES, MISTS, OR GASES, INCLUDING PLAN VIEW SHOWING TYPE AND LOCATION OF HOOD AND FILTERS, MINIMUM VELOCITIES MAINTAINED AT HOOD OPENINGS AND PROCEDURES FOR TESTING SUCH EQUIPMENT.

See Attachment 2

12. DESCRIBE PROPOSED PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THESE PROCEDURES TO THE OPERATIONS LISTED IN ITEM 9; INCLUDE: (a) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS, SUCH AS FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

See Attachment 2

(b) EMERGENCY PROCEDURES IN THE EVENT OF ACCIDENTS WHICH MIGHT INVOLVE SOURCE MATERIAL.

See Attachment 2

(c) DETAILED DESCRIPTION OF RADIATION SURVEY PROGRAM AND PROCEDURES.

See Attachment 2

13. WASTE PRODUCTS: If none will be generated, state "None" opposite (a), below. If waste products will be generated, check here ☒ and explain on a supplemental sheet:

(a) Quantity and type of radioactive waste that will be generated.

(b) Detailed procedures for waste disposal. See Attachment 3

14. IF PRODUCTS FOR DISTRIBUTION TO THE GENERAL PUBLIC UNDER AN EXEMPTION CONTAINED IN 10 CFR 40 ARE TO BE MANUFACTURED, USE A SUPPLEMENTAL SHEET TO FURNISH A DETAILED DESCRIPTION OF THE PRODUCT, INCLUDING:

(a) PERCENT SOURCE MATERIAL IN THE PRODUCT AND ITS LOCATION IN THE PRODUCT.

(b) PHYSICAL DESCRIPTION OF THE PRODUCT INCLUDING CHARACTERISTICS, IF ANY, THAT WILL PREVENT INHALATION OR INGESTION OF SOURCE MATERIAL THAT MIGHT BE SEPARATED FROM THE PRODUCT.

(c) BETA AND BETA PLUS GAMMA RADIATION LEVELS (Specify instrument used, date of calibration and calibration technique used) AT THE SURFACE OF THE PRODUCT AND AT 12 INCHES.

(d) METHOD OF ASSURING THAT SOURCE MATERIAL CANNOT BE DISASSOCIATED FROM THE MANUFACTURED PRODUCT.

### CERTIFICATE

(This item must be completed by applicant)

15. 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 40, and that all information contained herein, including any supplements attached hereto, is true and correct to the best of our knowledge and belief.

General Electric Company, RESD

(Applicant named in Item 2)

Dated

H-4-74

BY:

J. R. McFadden

(Print or type name under signature)

J. R. McFadden

Health Physicist

(Title of certifying official authorized to act on behalf of the applicant)

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.

ATTACHMENT 1

4. Authorized Places of Use: The licensee's facilities at:
- a. 3198 Chestnut Street, Philadelphia, Pa.
  - b. D and Luzerne Streets, Philadelphia, Pa.
  - c. Morgantown Test Facility, Elverson, Pa.
  - d. STC Building 100, Goddard Boulevard, King of Prussia, Pa.
  - e. CC&F Building 9, Fifth Avenue, King of Prussia, Pa.
  - f. Vandenberg Air Force Base, California

## ATTACHMENT 2

9. Radiological Procedures when working with Thoriated Tungsten or materials containing Thoriated Tungsten:
- a. All programs must be reviewed and approved by the Ionizing Radiation Advisory Group prior to the start of any work with radioactive materials.
  - b. Receiving - All radioactive materials, including Thorium, should be marked with an appropriate shipping tag. Receiving segregates all radioactive materials upon arrival and notifies the Safety Office. Safety takes a radiation and contamination survey before delivery to the user.
  - c. Storage - Radioactive materials must be stored in a locked, properly posted room or locker which has been approved by the Health Physicist. Periodic contamination surveys are taken of the storage areas.
  - d. Machining and Brazing - Manufacturing work with Thorium must be performed in a properly posted area. Personnel contamination is to be controlled by use of gloves and lab coats. A local air exhaust system is recommended but not required unless airborne contamination surveys indicate the necessity of such a requirement. All waste materials are disposed as radioactive waste and periodic contamination surveys of work apparel and area are taken. TLD badges will be worn by all personnel involved in this procedure if results of a radiation survey indicate the possibility of an exposure rate of 0.6 mr/hr or greater to the whole body.
  - e. Inspection - All inspectors should wear gloves when handling Thorium.
  - f. Shipping - All radioactive materials, including Thoriated Tungsten, should be marked with an appropriate shipping tag before shipment. Safety must take a radiation and contamination survey to assure all radiological shipping regulations are met.

### I Miscellaneous Suggestions:

- A. The maximum amount of Thoriated Tungsten to be handled at any one time should not exceed 100 lbs.
- B. The material should not be transported, carried or shipped to any location except by using proper shipping procedures.

ATTACHMENT 2 (continued)

- C. Operations causing contamination levels high enough to require a respirator should not be allowed. All high level contamination must be controlled by hoods with positive air flows.
- D. All personnel actively engaged in Thorium work should be trained in the problems involved when working with radioactive materials.

II Emergency Procedure:

- A. An emergency is defined as a fire involving the spread of Thorium.
- B. The immediate response of all personnel in the area is to hold their breath and leave the room.
- C. The Health Physicist or Safety Office should be called for assistance.
- D. While waiting for assistance all involved personnel should:
  - 1. Limit the spread of Thorium to the room (i.e. close all doors, etc.)
  - 2. Remain in one area to limit spread of contamination.
- E. The Health Physicist or his designee will direct all subsequent operations. He will:
  - 1. Survey the area and evaluate the extent of the emergency.
  - 2. Survey all persons involved.
  - 3. Supervise decontamination of all personnel, if necessary.
  - 4. Supervise decontamination of the room.

ATTACHMENT 3

1. The manager of the component using radioactive materials must be approved by the Ionizing Radiation Advisory Group (IRAG). Members of the IRAG include:

Chairman: C. B. Chilton, Manager - Industrial Safety Engineering

Secretary: J. R. McFadden, Health Physicist

Member: J. R. Ficke, M.D., Medical Director

Supervisory personnel and radiation workers receive a basic course in radiological health to inform them of the biological hazards associated with ionizing radiation and the protective measures to be taken to reduce their exposure.

The person responsible for the Radiation Safety Program is the Health Physicist, J. R. McFadden. His resume is enclosed.

2. Personnel monitoring devices are supplied by Teledyne - Isotopes Co., 50 Van Buren Avenue, Westwood, New Jersey. This is a TLD type service.
3. Waste disposal services are supplied by Radiological Service Co., 50 Van Buren Avenue, Westwood, New Jersey. (A division of Teledyne-Isotopes).

RESUME

JOHN R. McFADDEN

A. EDUCATION:

PH.D Purdue University, W. Laf., Ind., 1967 - 1971;  
Major in Bionucleonics

MS Temple University, Phila., Pa., 1966 - 1967;  
Major in Radiological Health

BA St. Joseph's College, Phila., Pa., (b)(6) *et al*  
Major in Biology

B. WORK EXPERIENCE

7/72 to 10/72: Public Health trainee in radiological health unit of Philadelphia Health Department. Primary responsibilities included conducting inspection of diagnostic x-ray machines and representing city of Philadelphia during AEC License inspections:

11/72 to 12/73: Medical Physicist for Nuclear Radiation Consultants, New Haven, Conn. Consultation in medical physics provided to hospitals in Conn. and Mass.

1/74 to Present: Health Physicist for General Electric Company, RESD. Primary responsibilities are to insure compliance with all applicable radiation control regulations and to provide technical assistance in the handling of various sources.



RESUME

JOHN R. McFADDEN

C. EXPERIENCE WITH RADIATION

ISOTOPE	MAXIMUM AMOUNT	EMPLOYER	DURATION	TYPE OF USE
Co-60	5000 Ci	N.R. Consultants	1 year	Radiation Therapy
P-32	0.02 Ci	"	"	"
Ra-226	0.1 Ci	"	"	"
Au-109	0.002 Ci	"	"	Nuclear Medicine (diagnosis)
Se-75	0.002 Ci	"	"	"
Hg-197	0.002 Ci	"	"	"
I-131	0.001 Ci	"	"	"
Mo-99	0.05 Ci	"	"	"
I-125	0.02 Ci	"	"	In Vitro Research
U-238	50 lbs.	"	"	Shielding
Any Byproduct Material	3 Ci	GE/RESO	1 mo.	Measurements

ATTACHMENT 4

TYPE OF INSTRUMENT	NUMBER AVAILABLE	RADIATION DETECTED	SENSITIVITY	WINDOW THICKNESS	USE
1. Victoreen Model 440	1	Beta-Gamma	0-300 mr/hr	1 mg/cm <sup>2</sup>	Surveying & measuring
2. Eberline Model E-120	1	Beta-Gamma	0-50 mr/hr	30 mg/cm <sup>2</sup>	Measuring
3. Wm. B. Johnson & Ass. Model ASP-2A Alpha scintillation probe on Model GSM-5 survey meter	1	Alpha	0 to 50,000 cpm		Surveying & measuring smears and air samples
4. Gast Air Pump (Whatman #41 filter)	2				Air sample counted on alpha Scin- tillation probe

ATTACHMENT 5

1. The Victoreen model 440, Eberline Model E-120 are calibrated using a technical operations, 15 mc Co<sup>60</sup> calibration kit. The instruments are calibrated yearly and spot checked as needed.
2. The Johnson's Assc. model ASP-2A Alpha scintillation probe on the model GSM-5 survey meter is calibrated using a depleted uranium standard and/or a thorium <sup>232</sup> standard, whenever the probe is used.
3. Thermoluminescent dosimeters are supplied by Teledyne-Isotopes on a quarterly basis.