FORM AEC-2
(5-64)
Previous editions are obsolete.

FORM APPROVED
BUREAU OF BUDGET NO. 38-R02

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.

1. (Check one)
- [x] (a) New license
- [ ] (b) Amendment to License No. _____
- [ ] (c) Renewal of License No. _____
- [ ] (d) Previous License No. _____

2. NAME OF APPLICANT
General Electric Co. - Space stems

3. PRINCIPAL BUSINESS ADDRESS
Valley Forge Space Technology Center
P. O. Box 8555, Philadelphia, Pa. 19101

4. STATE THE ADDRESS(ES) AT WHICH SOURCE MATERIAL WILL BE POSSESSED OR USED
Item #2) Morgantown Test Facility, Elverson, Pa.
Cabot, Cabot & Forbes Buildings, Allendale Rd., King of Prussia, Pa.

5. BUSINESS OR OCCUPATION
Manufacturing & Missile Research

6. (a) IF APPLICANT IS AN INDIVIDUAL, STATE CITIZENSHIP
N/A

(b) AGE
N/A

7. DESCRIBE PURPOSE FOR WHICH SOURCE MATERIAL WILL BE USED
Research development and manufacturing programs related to the Missile and Space programs.

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

(a) TYPE	(b) CHEMICAL FORM	(c) PHYSICAL FORM (Including % U or Th)	(d) MAXIMUM AMOUNT AT ANY ONE TIME (in pounds)
NATURAL URANIUM			
URANIUM DEPLETED IN THE U-235 ISOTOPE	Uranium Uranium	Sealed Sources powder	200 lbs. 200 lbs.
THORIUM (ISOTOPE)	~~Thorium dioxide~~ Thorium dioxide	Unsealed Discs Sealed Sources	100 lbs. 300 lbs.

(e) MAXIMUM TOTAL QUANTITY OF SOURCE MATERIAL YOU WILL HAVE ON HAND AT ANY TIME (in pounds)

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.

See attachment #1

10. DESCRIBE THE MINIMUM TECHNICAL QUALIFICATIONS (INCLUDING TRAINING AND EXPERIENCE) THAT WILL BE REQUIRED OF APPLICANT'S SUPERVISORY PERSONNEL (INCLUDING PERSON RESPONSIBLE FOR RADIATION SAFETY PROGRAM) OR OF APPLICANT IF APPLICANT IS AN INDIVIDUAL.

See attachment #2

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 instrument).

See attachment #2

(b) SENSITIVITY, FREQUENCY, AND STANDARDS USED IN CALIBRATING INSTRUMENTS LISTED IN (a) ABOVE (INCLUDING AIR SAMPLING EQUIPMENT). (If film badges, specify method of calibrating and processing, or name supplier).

See attachment #2

(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 #1

[illegible] PROCEDURES TO PROTECT HEALTH AND MINIMIZE DANGER TO LIFE AND PROPERTY AND RELATE THE [illegible] WITH THE OPERATIONS LISTED IN ITEM 9. INCLUDE: (1) SAFETY FEATURES AND PROCEDURES TO AVOID NONNUCLEAR ACCIDENTS [illegible] HAZARDS, FIRE, EXPLOSION, ETC., IN SOURCE MATERIAL STORAGE AND PROCESSING AREAS.

See attachment #1

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

See attachment #1

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

See attachment #1

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. See attachment #2

(*b*) Detailed procedures for waste disposal.

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
(Applicant named in Item 2)

Dated SEPTEMBER 8, 1969

BY: Robert O. McClintock
(Print or type name under signature)
ROBERT O. McCLINTOCK

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.

U.S. GOVERNMENT PRINTING OFFICE: 19[illegible] O-706-877 [illegible]

ATTACHMENT #1

GENERAL ELECTRIC

SPACE DIVISION
VALLEY FORGE SPACE CENTER
P.O. BOX 8555
PHILADELPHIA, PA. 19101

SUBJECT

RADIOLOGICAL PROCEDURES

August 25, 1969

T. P. Handley, Manager
Security, Safety and Plant Protection
Room M1140
Valley Forge

The following procedures should be followed when working with depleted uranium or materials containing depleted uranium:

1) All programs must be reviewed and approved by the Ionizing Radiation Advisory Group prior to the start of any work with radioactive materials.

2) Receiving - All radioactive materials, including uranium, should be marked with an appropriate shipping tag. Receiving segregates all radioactive materials upon arrival and notifies Health Physics. Health Physics takes a radiation and contamination survey before delivery to the user.

3) Storage - Radioactive materials must be stored in locked, properly posted room or locker which has been approved by the Health Physicist. Periodic contamination surveys are taken of the storage areas.

4) Mixing - When working with uranium in powder form, proper contamination procedures must be followed. All work must be performed in a hood which has been checked annually to assure air flow is at least 100 linear feet per minute. All users must wear proper protective clothing which will include gloves and lab coat. Film badges are worn by all personnel involved in this procedure. Periodic contamination surveys are taken to assure contamination controlled. All waste materials are disposed as radiological waste.

5) Manufacturing - Manufacturing work with uranium must be performed in a properly posted room. Contamination is to be controlled by papering table tops, etc., and use of disposable gloves and lab coats. Work in a hood is

recommended but not required. All waste materials are disposed as radiological waste and periodic contamination surveys are taken.

6) Inspection - Minimal contamination control is required for this job. All inspectors should wear gloves when handling uranium. Periodic contamination surveys are taken.

7) Shipping - All radioactive materials, including depleted uranium, should be marked with an appropriate shipping tag before shipment. Health Physics must take a radiation and contamination survey to assure all radiological shipping regulations are met.

8) Miscellaneous Suggestions:

a) The maximum amount of material to be handled at any one time should not exceed fifty (50) pounds.

b) The material should not be transported, carried or shipped to any location except by using proper shipping procedures.

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 flow.

d) All personnel actively engaged in uranium work should be trained in the problems involved when working with radioactive materials.

9) Emergency Procedure:

a) An emergency is defined as a spill involving the spread of uranium dust.

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 spill to the room (i.e., close all doors, etc.)

2) Remain in one area to limit spread of contamination.

GENERAL ELECTRIC

T. P. Handley August 25, 1969

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 personnel involved.

3) Supervise decontamination of all personnel, if necessary.

4) Supervise decontamination of the room.

R. O. McClintock
Health Physicist
Room M1020, Valley Forge
Ext. 5926

/dmf

ATTACHMENT #2

Supervisors of workers using radioactive materials must be approved by the Ionizing Radiation Advisory Group (IRAG). Members of the IRAG include:

Chairman - T. P. Handley - Manager, Security, Safety and Plant Protection

Secretary - R. O. McClintock - Health Physicist

Member - Dr. R. Panaro - Physician

The minimum technical qualifications for supervisory personnel for source material include U. S. Department of Health, Education and Welfare course in Basic Radiological Health or equivalent, supervisory responsibility at GE and past experience in handling radioactive materials.

The person responsible for the Radiation Safety Program will be the Health Physicist, R. O. McClintock. His resume is attached.

Attached is a partial list of Health Physics instruments available for monitoring source materials. Calibration methods are also attached. Film badge service is supplied by R. S. Landauer, Jr. & Co., 103 Bayard Street, New Brunswick, New Jersey.

Waste Disposal services are supplied by Radiological Service Co., 50 Van Buren Avenue, Westwood, New Jersey.

ATTACHMENT 2a

Type of Instrument	Number Available	Radiation Detected	Sensitivity	Window Thickness	Use
Victoreen Model 440	1	Beta Gamma	0-300mr/hr	1mg/cm^2	Surveying & Measuring
Eberline Pac-46	2	Alpha (adaptable for low-energy beta)	0-5000,000 c/m	0.85mg/cm^2	Monitoring & Surveying
Eberline Model E-120	2	Beta Gamma	0-50mr/hr	30mg/cm^2	Measuring
Nuclear Measurements Corp. Model GS-3	2	Beta Gamma	0-20mr/hr	30mg/cm^2	Measuring
Nuclear Measurements Corp. Model PC-3T	2	Alpha, Beta		w counter	Surveying to count smears and air samples
Staplex Air Sampler	2				Air sample counted on PC-3T
Gast Air Pump (Wattman 41 filter)	1				Air sample counte on PC-3T
Eberline (AIM-3)	2	Alpha	0-1000 c/m	1mg/cm^2	Air Monitoring

ATTACHMENT 2b

1) The Victoreen Model 440, Eberline Model E-120, and Nuclear Measurements Corporation Model GS-3 are calibrated using a 25 mc Cobolt-60 source. The instruments are calibrated yearly and spot-checked as needed.

2) The Eberline Pac-4G and the Nuclear Measurements Corporation Model Pc-3T are calibrated using a 0.2 uc Carbon 14 source and a 8×10^{-4} uc Plutonium 238 source. The instruments are calibrated weekly.

Attachment #2a

Robert O. McClintock

EDUCATION:

B. S. in Physics - College of William & Mary 1957

M. S. in Radiological Physics - University of Rochester 1958
(A.E.C. fellowship)

EXPERIENCE:

1958 - 1960 Health Physics Shift Engineer - Covered Health Physics activities during shift hours at the Westinghouse Testing Reactor. Was responsible for radiation and contamination surveys.

1960 - 1967 Health Physicist - Was responsible for all Health Physics activities at the Brookhaven Graphite Research Reactor and the High Flux Beam Reactor. Supervised staff of seven and was involved in waste disposal, environmental monitoring, tritium control and all other Health Physics activities.

1967 - Present Health Physicist - Responsible for all Health Physics activities at General Electric Space Division. Projects include SNAP 19 and 27 Radioisotope Thermoelectric Generators.

Health Physics Certification - American Board of Health Physics 1966

ATTACHMENT #3

TO: Frank Witt

SUBJECT: Health Physics Procedures Work With Thorium Dioxide

The following radiation safety procedures must be followed whenever working with Thorium, either as a sealed source or Thorium Oxide discs.

1. Approval - All programs involving radioactive materials must be reviewed and approved by the Ionizing Radiation Advisory Group prior to the start of any work.

2. Receiving - All radioactive materials should be marked with an appropriate shipping label and must be addressed to the attention of the Health Physicist. H.P. will make the necessary radiation and contamination surveys before delivery to the user.

3. Storage - Radioactive materials must be stored in a locked, properly posted room or locker which has been approved by the Health Physicist. Only personnel approved by H.P. as isotope handlers can remove radioactive material from these areas. Periodic contamination surveys will be taken of the storage areas.

4. Handling Thorium Dioxide Discs (0-6 lbs per disc) - All handling of the Thorium Dioxide discs must be under the cognizance of the Health Physicist. Routine contamination procedures for low level radioactive materials will be followed. All chips, broken pieces or dirt from the discs must be cleaned up immediately. Any destructive testing, cutting, grinding, sawing, etc., must be performed in a hood with a H.P. approved filtration system. Routine contamination surveys will be taken by H.P.

5. Impact Testing of Sealed Sources - All impact testing of sealed sources must be performed at the Morgantown Test Facility under the cognizance of the Health Physicist. No more than six (6) pounds can be tested during any one test. The test area must be located within a closed building equipped with an absolute filter on its air exhaust system. Personnel will evacuate the test area during the test. The H.P. or his representative will make contamination surveys before allowing personnel to reenter the test area (surveys will use the AIM-3 continuous air monitors PAC 46 alpha probes and smear surveys counted on a PC3T flow counter). Routine radiological safety procedures for handling the sealed sources will be followed. The test group will keep an inventory at all sources.

6. Shipping - All radiological materials must be shipped according to Department of Transportation regulations. Shipment by private vehicles will be discouraged. H.P. will take radiation and contamination surveys to assure that all radiological shipping regulations are met.

7. Emergency Plan - Thorium Dioxide - An emergency involving Thorium Oxide is defined as the spread of contamination due to chipping, breaking or similar actions on the discs. The isotope user should don gloves and clean up the area as well as possible. Personnel who might be contaminated should remain near the area until they are cleared by a H.P. survey. A complete contamination survey and cleanup will be conducted under the direction of the Health Physicist.

   Emergency Plan - Impact Test - An emergency during the impact test is defined as a rupture of a sealed source involving the release of Thoria contamination. The contamination will be discovered by the H.P. surveys prior to entry by test personnel. A decontamination team will don respirators (if needed) and protective clothing and enter the test area. Cleanup will follow standard procedures. Since the amount per test is small (≈ 6 lbs) and the air is evacuated through an absolute filter, contamination will be confined to the test area.

Robert O. McClintock

R. O. McClintock
Health Physicist

ATTACHMENT #4

JORDAN S. DAVIS

EDUCATION:

1. BS in Pharmacy - Philadelphia College of Pharmacy and Science - 1962

2. MS in Radiological Health - Temple University School of Pharmacy - 1965 (U.S. Public Health Service Fellowship)

3. U.S. Department of Health, Education and Welfare, Division of Radiological Health - Training courses in:

   a. Applied Radiation Protection
   b. Management of Radiation Accidents

EXPERIENCE:

1964 - 1969 Radiation Health Physicist for the Pennsylvania Department of Health - Primary responsibilities were in evaluating and conducting compliance inspections of the users of radiation sources within the Commonwealth. Since I was responsible for radiation protection services for one-third of the State, I have also acted as a consultant for the management of radiation accidents occurring in this area.

1969 - Present Specialist - Radiation Protection - Responsible for all Health Physics activities at General Electric, Re-entry & Environmental Systems Division.

APPLICATION FOR BYPRODUCT LICENSE

8. Type of Training

   a) Temple University and USPHS Training Courses
   b) Temple University and USPHS Training Courses
   c) Temple University and USPHS Training Courses
   d) Temple University and USPHS Training Courses

9. Experience with Radiation

	Isotope	Max. Amount	Experience	Duration	Type of Use
1.	Any Byproduct Material	< 100 mCi	Pa. Dept. of Health	5 yrs.	Inspection & Emergency
2.	Radium	< 200 mCi	Pa. Dept. of Health	5 yrs.	Inspection & Emergency