GENERAL ELECTRIC COMPANY

3198 CHESTNUT STREET, PHILADELPHIA, PENNA. 19101 . . . TELEPHONE 823—1000

MISSILE AND SPACE DIVISION

RE-ENTRY SYSTEMS DEPARTMENT 5151

March 5, 1965

FYI Nelson Lyon
E. C. Cleveland

Mr. Robert E. Brinkman
United States Atomic Energy Commission
Isotopes Branch
Division of Licensing and Regulation
Washington, D. C. 20545

Re: ML:IB:WEH(64050)

Dear Mr. Brinkman:

Included here is the additional information you requested for continuing your review of the Re-Entry Systems Department application for a broad license for our expanding byproduct material programs.

Our Department Instruction 10.9 has been revised as requested in your letter of December 31, 1964, copy enclosed.

We are equipped with a Baird Model 420E geiger type survey meter having full scale ranges of 1, 10 and 100 mr/hr. This meter's calibration is established by measuring, in known geometry, the gamma fields of iridium-192 sources having known activities up to 10 mc. Each scale is checked at 3 or 4 points every three months. In addition one point checks are made daily as tests utilizing radioactive materials are being conducted.

The activities of the iridium reference sources have been measured by Technical Operations, Inc., of Burlington, Massachusetts. This vendor has low activity standards that are checked against a reference source certified by the National Bureau of Standards; he estimates that his measurements agree within ± 5% of those made by the Bureau.

A secondary check of the survey meter's calibration is made at monthly intervals by comparing it with a Victoreen Model AGB50B-SR ionization chamber meter. This instrument has a built-in Strontium-90 check source.

As new isotopes are received, our survey meter will be checked against them. Prior to receipt, all sources currently contemplated will have been accurately measured elsewhere (i.e., Technical Operations, Inc., the G.E. Vallecitos Atomic Laboratory, etc.). If future requirements so dictate, a certified long-life reference source(s) will be procured.

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GENERAL ELECTRIC PROGRESSLAND
A Walt Disney PRESENTATION AT THE NEW YORK WORLD'S FAIR

In addition we have a Geiger-Miller Survey Meter having full scale ranges of 2, 20 and 200 mr/hr. This meter will be calibrated in a similar manner. All personnel who handle or are exposed to radioactive materials wear film badges supplied by the R. S. Landauer, Jr. and Company from Matteson, Illinois. Those engaged in machining or who will have hand and finger exposure to radioactive materials will also wear ring badges supplied by R. S. Landauer, Jr. and Company. Pocket dosimeters (Cambridge Model BM20005/2) have been acquired and will be used by handlers and necessary (infrequent) visitors. The latter are logged in and out of the applicable facilities and permanent records of all users will be logged on a "before and after" reading basis. The dosimeters are calibrated against a Radector Model AGB-50B-SR which has a built-in SR90 source.

Isotopes handled in the facility are all "captive" materials in that they are bonded into carriers such as phenolic laminates, metallic pieces, etc. of macro size. No powdered materials are handled or currently anticipated. If a requirement for using such arises in the future, new laboratory space equipped with adequate fume hoods, glove boxes, exhaust filters, and handling equipment will be provided.

Tests involving radioactive sources are currently carried out in an open-topped shield built of two-inch thick lead blocks. This "cave" is proportioned so that man-high space in adjoining rooms is maintained at less than one-tenth milli rem per hour. Overhead space that may be irradiated is fenced off; entrance to it is controlled by a gate having a lock identical to the one in the laboratory.

Our current radioactive sources are handled with a variety of tongs and forceps which provide working separations of five to twenty-five inches. These tools are selected so as to keep the dose rate at the operator's hands below 100 mr/hr. Average handling time is about ten seconds or less out of every two minutes during actual experimental work.

Included in our facilities is a lathe which is used to machine radioactive plugs (.1-2 millicuries). The lathe is surrounded by a plastic box which has an opening in the bottom leading to a Cambridge Absolute Filter vacuum cleaner to collect shavings. The whole device is positioned within a fume hood which is equipped with absolute filters. Pressure gages are attached to the hood flow system so that the need to replace the filters may be determined.

The plugs are handled with nip tongs. During machining the operator wears plastic gloves and a protective coat. After machining, the plugs are rinsed in acetone in a metal container with lid. A safety can is used for the acetone. The residue of the rinsing container is monitored for radioactive activity as is the plastic bag insert of the vacuum cleaner. The area is monitored through logging procedures and use of film badges. All sources are kept in lead containers.

GENERAL ELECTRIC

Our facilities also include a radiation vault (see drawing ICA-LH-B-A-706) reinforced by concrete in thickness as shown.

Leak tests will be performed using Lead Detection Kit LT 100 supplied by the Budd Company, Instruments Division, P.O. Box 245, Phoenixville, Pennsylvania or equivalent laboratory.

Currently we have authorization for byproduct material usage at our facilities in Philadelphia and King of Prussia, Pennsylvania under licenses 37-2006-4, -5, and -6. We are also awaiting AEC approval of a submitted amendment to the 37-2006-6 license for byproduct material usage at the General Electric Company, Vandenberg Air Force Base, California. Upon issuance of a broad license we will cancel licenses -4, -5, and -6 except for the above mentioned amendment for Vandenberg Air Force Base. The latter is not covered by the broad license.

License 37-2006-3 which expired on January 31, 1965 will be cancelled through submittal of Form WA-277 as requested.

If you have any questions, please feel free to call me.

Sincerely yours,

J. A. Trapold for T. P. Handley

T. P. Handley, Manager
Security, Safety and Plant Protection
Room 6112 - Ext. 3396/7

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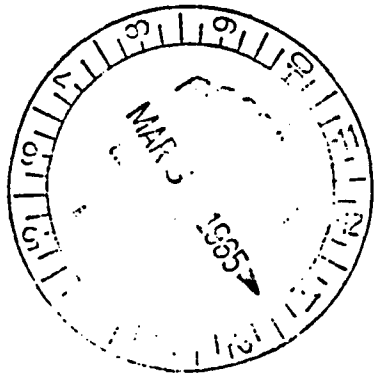

I PURPOSE

To state the requirements that shall apply in the use of all radiation, radiation machines, and radioactive materials to insure the maximum safety to all persons in the Department.

These requirements are intended to be consistent with the regulations of the Atomic Energy Commission, Department of Health (Pennsylvania), and the recommended practices for the General Electric Company.

II DEFINITIONS

A. Radiation - Gamma rays and X-rays, alpha and beta particles, high-speed electrons, neutrons, protons, and other nuclear particles; but not sound or other radio waves, or visible infrared and ultra-violet light.

B. Radiation Machine - any device that produces radiation when the associated control devices are energized.

C. Radioactive Materials - any material (solid, liquid, or gas) that emits radiation spontaneously, for example: carbon-14, cesium-137, cobalt-60, radium, thorium, etc.

D. Dose - in radiology, a dose of ionizing radiation is a quantity of radiation.

E. Rem (Roentgen equivalent man) is the quantity of any type of atomic radiation which causes the same biological effect as one roentgen of X or gamma radiation.

G. Permissible Limits for External Exposure (a)

Part of Body	Dose per calender quarter	Accumulated Dose (rems)
Whole body, head and trunk, blood forming organs, gonads, lens of eyes, other organs	1.25	5 (N-18) (b)

Skin of whole body	7.5	10 (N-18) [b]
Hands and forearms, feet and ankles	18.75	75 per year

(a) These limits are based on presently available information and cannot be regarded as permanent.

(b) Where N is age in years and is greater than 18.

III POLICY

A. All proposed uses of radioactive material or ionizing radiation-producing devices shall be reviewed and prior approval for use secured from the Radiation Advisory Board consisting of:

Department Safety Engineer (Chairman)
Manager - Medical Operation
A representative from the Engineering Section and the Systems and Technology Section; both of whom shall be appointed by the Department General Manager.

B. All radiation machines and radioactive materials shall be used, stored, handled, transported, or disposed of in accordance with existing regulations (i.e., Atomic Energy Commission, Commonwealth of Pennsylvania, General Electric Company and the RSD Radiation Advisory Board) and in such a manner that no person shall receive an excessive radiation dose therefrom.

C. Radioactive materials shall be stored so as to minimize the probability of their being handled or tampered with by unqualified persons.

D. In the case of a leaking source, spill, or similar accident in which there is a possibility of ingestion or inhalation of radio-active material or severe body contamination, the Safety Engineer, the Radiological Safety Officer, and the Medical Physician shall be promptly called.

E. No radioactive material shall be melted, welded, pickled, machined or otherwise worked except in accordance with written instructions obtained from the Safety Engineer.

F. Individuals handling or working with radioactive material or who may be exposed to radiation in the course of their employment shall be required to pass a physical examination and wear radiation

monitoring devices supplied by the Safety Engineer.

G. Disposal of radioactive material, when required, shall be in accordance with Atomic Energy Commission, and/or State of Pennsylvania rules and regulations.

H. Where Atomic Energy Commission, or State of Pennsylvania Rules and Regulations may not necessarily apply, the Department will be guided by recommendations of such organizations as the National Committee on Radiation Protection and Measurement and also by Company recommendations; particularly where recommendations establishing lower levels of exposure are concerned.

I. Emergency exposures of individuals will be made only after the approval of the Safety Engineer has been secured.

J. Accidental exposures (actual or suspected) in excess of the quarterly limits stated above shall be immediately reported to the Safety Engineer and the Department physician.

IV RESPONSIBILITIES AND PROCEDURE

A. The Manager of a component wanting to perform work which utilizes radioisotopes or ionizing radiation-producing devices shall submit a written request to the Chairman of the Radiation Advisory Board. The request shall include the following information:

1. Quantity, type and form of any radioisotopes to be used or description of ionizing radiation-producing equipment.

2. Name, title and biographical background of the individual who will be responsible for the work to be performed.

3. Names, titles and biographical backgrounds of individuals who will work with the materials or equipment.

4. A general description of the work to be performed.

5. A specific description of the safety precautions to be taken.

B. The Radiation Advisory Board shall control the use of by-product material and will be responsible for assuring full compliance with General Electric Company and Department operating procedures, AEC license conditions, and regulations and State laws and regulations as applicable.

C. All drafting activities will be responsible for including the Safety Engineer on a distribution list of all drawings which show the inclusion of radioactive materials, and they shall also note in bold lettering on the drawing -

CAUTION: RADIOACTIVE MATERIAL

D. Purchasing, or the initiating manager, shall notify and secure the approval of the Safety Engineer prior to the purchase of any radiation-producing device or radioactive material.

(Note: AEC Licenses will only be secured by the Safety Engineer as needed. In order to avoid unnecessary delays advise him of needs well in advance of critical dates.)

E. Buyers assigned to purchase radioactive material or radiation machines will secure instructions from the manufacturer on the following subjects, as appropriate:

1. Recommended procedures during installation, normal use, shut-down and storage to protect personnel from excessive radiation.

2. Recommended procedures in the event of accident, fire or flood to minimize radiation hazards and radioactive contamination hazards to personnel.

3. A statement of the tested "safe life" for sealed sources.

4. Information on the resistance of the source to attack by corrosive materials.

NOTE: Sealed source containers should be provided by a manufacturer with a label stating: (a) should read the caption CAUTION RADIOACTIVE MATERIAL (b) the name or chemical symbol of the source and its activity, i.e., number of curies, (c) the year of sealing, (d) name of manufacturer, (e) serial number, or type number in the case of small sources manufactured in large quantities (f) standard radiation symbols and colors shall be used.

F. The Safety Engineer will be responsible for:

1. Obtaining from the Atomic Energy Commission, the Interstate Commerce Commission and other authorized government agencies those licenses required to obtain and ship radioactive sources and register the licenses with the Commonwealth of Pennsylvania.

2. Inspecting by-product material programs as necessary to determine full compliance with Company and Department operating procedures, AEC licensed conditions and regulations and State laws and regulations as applicable.

3. Assuring that supervisors have the necessary information to instruct new personnel in safe working practices.

4. Keeping records of all radioactive sources, to include:

   a. Date of order.
   b. Purchase Order number.
   c. Identification or type of source.
   d. Part number.
   e. Vendor.
   f. Number of pieces.
   g. Weight per piece.
   h. Total Weight.
   i. Location.
   j. Amount and type of radioactive material.
   k. Close rate at a given distance.

5. Examining and inventorying incoming sources of radiation; tagging all radioactive material.

   NOTE: A special tag will be prepared by the Safety Engineer for radioactive material which can be safely handled. This tag will accompany the material through the plant.

   All radioactive material shall be labeled, CAUTION-RADIOACTIVE MATERIAL, and this warning sign shall always remain on the material while it is in

in the plant.

6. Seeing that written "Safety Requirements" are prepared so that the radiation exposure of each worker is kept to a minimum.

7. Assuring that individuals required to handle radioactive material in potentially toxic quantities wear adequate protective clothing and monitoring devices; maintaining records concerning the exposure of each individual.

8. Conducting radiation surveys, leakage tests, air and water sampling where required and keeping records on these surveys as indicated in the initial program.

9. Insuring that suitable warning signs and devices are in place and operating as required (or better) in accordance with the regulations of the Department of Health, Commonwealth of Pennsylvania and the Atomic Energy Commission.

10. Insuring that shielding, storage containers, and handling equipment are adequate and are maintained satisfactorily.

11. Maintaining up-to-date operating instructions for the radiation equipment.

12. Investigating each case of excessive or abnormal exposure to determine the cause and take steps to prevent a recurrence.

13. Planning and posting, in advance, "Safety Requirements" for coping with possible emergencies (i.e., fire, flood, source leakage, etc.) which might result in external overexposure of personnel or intake of radioactive materials.

14. Maintaining, preparing, and submitting all records, reports, and notifications required by the Atomic Energy Commission and the Department of Health, Commonwealth of Pennsylvania.

15. Informing the Specialist-Taxes, Insurance, and Royalties of the procurement of each radioactive source.

G. The Medical Physician shall be responsible for:

1. Performing all necessary and required medical examinations; the intervals and extent to be determined by the Medical Physician.

2. Insuring the necessary related medical care for individuals in the program.

H. All planning components, Development Manufacturing, will include on all applicable "Planning Sheets" the following notation:

"This Planning Sheet has Radioactive Material; do not change sequence".

I. Production Control (or other applicable operation) will be responsible for:

1. Determining the total quantity of radioactive material to be assigned to each requesting operation, and

2. Providing this information to the Safety Engineer.

J. All components concerned with the handling, machining, reworking or testing of radioactive materials will be responsible for:

1. Posting the "Safety Requirements" provided by the Safety Engineer.

2. Obtaining the approval of the Safety Engineer prior to performing any operation involving maching, melting, welding, heating, etc., any source of radiation.

3. Obtaining the approval of the Safety Engineer prior to disposal of any sources of radiation.

K. Receiving and Shipping

1. Receiving shall not release any radioactive material or radiation-producing devices without the written permission of the Safety Engineer.

2. Shipping shall not ship or otherwise transport radioactive materials without the written permission of the Safety Engineer, and then shall do so only in accordance with the current regulations of the I. C. C., AEC and/or other authoritative governmental agencies (Federal, state or local).

L. General Accounting will:

1. Ascertain that the Department has adequate insurance coverage for the radioactive sources area.

DEPARTMENT GENERAL MANAGER