Licensee General Electric, Space Systems Division.

DETAILS

A. Participants

E. R. Harris, RSO at the Philadelphia facility (Re-Entry Systems) and Chairman of the Ionizing Radiation Advisory Group
Robert McClintock, RSO at the Valley Forge Space Center, and health physicist for both facilities.
Mr. Bill Reilly, Philadelphia Health Dept, was present during part of the inspection.
Two authorized users were also interviewed during the visit to their facilities.

B. Scope of License Program

Most of the activities involving the use of isotopes are associated with radiation detection equipment development in the space systems. Tritium as $Ca\text{-}T_2$ is being used to measure water vapor. The licensee possesses only a portion of the sources authorized on the license.

C. Organization

Recently the Valley Forge organization has been seperated from the Philadelphia organization. Valley Forge is now called the Space Systems Division. It is headed by D. Fink. Reporting to Fink is an Ionizing Radiation Advisory Group. T. P. Handley, Manager of Security, Safety and Plant Protection, is the chairman. Other members are Robt. McClintock, RSO, and either S. Gotlieb or R. Panero (both MDs). Administratively, McClintock reports to Handley. Mr. Ron Washko, technician, works for McClintock. Health physics is responsible for surveys, leak tests of sources, receipt of material and associated records.

D. Administrative Control

All purchases of isotopes are originally approved by the Ionizing Radiation Advisory Groups. The RSO approves all individual purchases which are within the approval made by the Ionizing Radiation Advisory Groups. All shipments are received by health physics and surveyed. Records of receipt are made. Presently all authorized users are listed in Condition 13. In some cases authorized users supervise others who are actually using isotopes. The licensee in the near future will request an amendment to permit the advisory Group to authorize users.

E. Use of Material

Primary use of radioactive material under this license involves the use of sources (sealed and unsealed) in the development of radiation detection instruments for use on space craft. One user is experimenting with $Ca\,T_2$ to determine water vapor in air. Only a small portion of radioactive materials listed in the license is actually possessed. A check of the inventory did not disclose any possession in excess or contrary to the license authorization.

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Licensee_____ _____

F. **Facilities**

Health physics has one room which is used for storage of radioactive material. Radioactive materials used in instrument development are either in a locked metal cabinet (when not in use) or in a shield container in a locked room. Almost all of these isotopes are in units of 5 mcic or less. The tritium is stored in a chemical hood which has a flow of 100 lft/min and ephausts directly to the atmosphere. The exhaust from the vac pumps used in the tritium experiment equipment ~~exhaus~~ is deposited into the hood. The licensee has survey meters which can detect alpha or beta-gamma. All isotopes are in rooms which are locked during nonworking hours. Most of the

G. **Equipment** facilities are in security controlled areas.

The health physics organization has survey meters for detecting alpha and beta-gamma. Leak tests are evaluated using scaling equipment with either end window or gas flow proportional detectors. Surveying instruments are also located at the facilities where isotopes are used.

H. **Radiological Safety Procedures**

The health physics organization is responsible for making surveys, leak testing sources and receiving isotope shipments. Procedures are submitted to the Ionizing Radiation advisory Group for approval (part of the use approval request). With the exception of tritium, only small quantities of isotopes (≤ 5 mcic per isotope) are used by authorized users. The tritium experiments involve the use of 16 ci of activity. The authorized users are responsible for disposal, with the assistance of health physics. A Form AEC-3 was posted on the wall of each area where isotopes are used.

I. **Personnel Monitoring and Exposure to External Radiation**

Film badges are used to monitor personnel exposures. The badges are supplied by Landauer on a monthly basis. The licensee's records are equivalent to Form AEC-5. The records show the maximum total exposure received by an individual during 1967 was 570 mr. In 1966 the maximum total exposure received by an individual was 950 mr. Most of the badges showed only "minimal" exposure.

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J. **Exposure of Employees to Concentrations of Radioactive Materials**

There is no exposure to airborne concentrations. (b)(6) who has been conducting the tritium experiments submits a monthly breasaway sample to the Medical Department. The sample is analyzed for tritium and the results are given to McClintock. To date all results have shown no tritium was detected.

Send Harris copy of note form

DIVISION OF COMPLIANCE

SPECIAL LIMITED INSPECTION

1. **Name and address of licensee**
General Electric Company
Missile + Space Division
Goddard Blvd.
King of Prussia, Pa.

2. **Date of inspection**
may 2, 1968

3. **Type of inspection**
Reinspection

4. **License number(s), docket number(s), number and date of last amendment for each license. Category and Priority of each license.**
37-02006-05 Pr III
#22 3/21/68

5. **Date of previous inspection.** 9/7+8/66
35mc Co^{60} not leak tested @ 6mos. & possession of 3 mc Am 241 (not less than 1mc)

6. **Is "Company Confidential", or proprietory, or classified information contained in report?**
Yes_____ No ✓
(Specify paragraphs)

7. **Scope of inspection**
This inspection included a review of organizational changes which were in process. The radiation safety program was also reviewed. Only five of the sites where isotopes were being used were visited. Posting and labelling at these site was checked. Exposure records for the years 1967 and 1966 were examined. Survey and leak test records made since Mr. Mr. McClintocke started his employment in the fall of 1967 were reviewed. Also the licensee's system for ordering, receiving and disposing of isotopes was inspected.

8. R. Fish
Inspector

May 14, 1968
Date of Report

H. E. Book
Reviewer

5/15/68
Date of Review

Licensee General Electric - Space Systems Division

Summary

The inspection did not disclose any health and safety problems. A health physicist and one technician (monitor) are responsible for the radiation safety program. A committee controls all use of isotopes. Facilities and control of isotopes was found to be satisfactory. Posting and labelling was found to be as required by 20.203. Appropriate records were being kept. It was suggested that where small quantities of isotopes were stored (≤5 mci per isotope and total less than 100 mci) a record be made of a direct reading survey.

Noncompliance and Safety Items

The only item of noncompliance involved the failure to leak test three alpha sources (Po^{210}, 1 mci; Am^{241}, 0.11 μci; Am^{241}, 0.10 μci) on a 3 month frequency as required by condition 14C.

Unusual Occurrences None

Status of Previously Reported Noncompliance or Safety Items

The nominal 35 mci Co^{60} source has been leak tested on a 6 month frequency. The 3 mci Am^{241} source was returned to the manufacturer.

Management Interview

A summary of the inspection findings was presented to Mr. E. R. Harris and Mr. Robert McClintock. Mr. T. P. Handley was not available. The item of noncompliance resulted from confusion due to the fact that the -6 license requires only a 6 month leak test frequency for sealed sources possessed. McClintock, the health physicist, assumed the same leak test requirement was part of both licenses.

Licensee_____ _____

K. **Effluents to Unrestricted Areas** None

L. **Disposals**

All disposals are made by transfer to Isotopes, Inc. Records are kept by McClintock. The is very little disposal under the subject license. Some tritium is released to the atmosphere thru the hood exhaust. Concentrations of tritium are less than 2×10^{-7} μci/ml. Records of such released are kept by the user as part of the experimental record.

M. **Miscellaneous Surveys, Evaluations, and Records** None

N. **Special License Conditions** none

O. **Posting and Labeling**

All areas were posted as required by 20.203
Containers were labelled as required by 20.203(f).

Comer Byron

Film Badges

3 + 4th qtr. 1967 max 250 mr

for yr 1967 – 570 mr

1966 1 @ 950

rest @ < 300 mr for yr

mostly minimal

pocket chambers available, mostly for SNAP 0–200 mostly [illegible]

Am 0.11 μci 11/14/67

4/25/67

Po^{210} 1 mc 11/13/67

4/25/67

100 mc

10-16-67 4×10^{-3} μc disposed

5 mc

2/22/68

4/25/68

Am 0.1 μci

10/24/67

4/25/68

Am 7 @ 200 μci/source

11-2-67 1-31-68

12-12-67 3-4-68

W6

[illegible]

routine, bioassay for (b)(6) [illegible] medical

results to H P no positive to date

Licensee _____ _____

P. **Independent Measurements** none

Q. **Operations Observed** none

R. **Incidents, Overexposures, Theft or Loss, Equipment Malfunction** none

S. **Other Information or Continuation from Previous Paragraphs**

All sealed sources are leak tested by either McClintock or Washko. All sources have been leak tested on a frequency of 6 months or less. The following data shows three alpha sources were not leak tested on a 3 month frequency as required:

Isotope	Quantity	Leak test dates
Am-241	0.1 μci	11/14/67 , 4/25/68
Am-241	0.1 μci	10/24/67 , 4/25/68
Po_{0}-210	1 mci	11/13/67 , 4/25/68

all leak test results showed < 0.005 μci removable contamination

Bldg 1

activated electronics & 2 tory systems

Ta Sr Co Preplanning for Re Entry

Bldg 2

CaT c in a hood water vapor exp

several small unsealed sources liquid ampules,

Bldg 8

check sources instrumentation

Po^{210}

Sr^{90} largest 5 mc.

Bldg 800

45,000 c Pu

Main Body

Storage vault

Instrumentation